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Special Issue: **Public Policy in a Digital Era – The low-density territories challenge**

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Nota conceptual

A aceleração tecnológica e a transição digital, incidindo sobre o binómio informação/energia, e através dele sobre o território e sobre todas as dinâmicas que nele ocorrem, geram novos desafios e novas oportunidades para as políticas públicas.

Se analisarmos as estratégias e os programas mobilizadores do desenvolvimento territorial, nas suas diferentes abordagens, o cruzamento das novas tecnologias-chave – como a análise de dados (Big Data), a computação de nuvem e a internet das coisas – associam-se às novas competências digitais e ao desenvolvimento das infraestruturas de processamento, armazenamento e distribuição de dados, para criar ecossistemas viáveis, nos quais a informação e o conhecimento funcionam como aceleradores de potencial e chaves de diferenciação competitiva.

Será essa receita universal, como parece ser quando analisamos os grandes instrumentos de política pública da União Europeia, nomeadamente os incluídos no Quadro Financeiro Plurianual 2021-2027, bem como os Planos de Recuperação e Resiliência, e verificamos que esses instrumentos e planos convergem nas prioridades que assumem em termos de transição digital e na atribuição de dotações financeiras significativas a estes domínios, potenciando o seu impacto e tornando ainda mais crítica a importância do sucesso destas opções estratégicas?

Serão estas estratégias de investimento significativo em redes digitais, nomeadamente em infraestruturas e também em competências, que apostam na conexão de pessoas, empresas e centros de conhecimento, uma resposta eficaz e suficiente para ultrapassar os problemas estruturais de falta de massa crítica que tendem a limitar o impacto das políticas públicas para o desenvolvimento em territórios de baixa densidade?

Em que condições específicas é que essa eficácia pode ser melhor assegurada e como podem os impactos ser monitorizados de forma credível e atempada para proporcionar correções de rota, sempre expectáveis quando se tentam novas abordagens e se usam novas ferramentas?

Dar um contributo para responder a estas questões de inegável premência e atualidade, é o foco desta edição especial do Public Policy Portuguese Journal, na qual os leitores podem encontrar abordagens diversificadas e que abrem estimulantes caminhos de reflexão e de investigação.

Os artigos que integram este *Special Issue*

O artigo de **Manuel Laranja** e **Anabela Santos** debruça-se sobre as lições aprendidas com experiências realizadas nas regiões portuguesas do Alentejo e Algarve para prototipagem de políticas online de apoio aos "processos de descoberta empresarial" inerentes à implementação das estratégias de especialização inteligente, e também sobre o modo como a adopção de abordagens digitais pode contribuir para assegurar a continuidade da implementação das políticas em tempos difíceis, e para melhorar os níveis de participação no modelo de governança destas estratégias.

Ainda sobre a temática das estratégias regionais de especialização inteligente, e dos processos de descoberta empresarial, **Sónia Pereira** e **Aurora Teixeira** analisam, no seu artigo, o papel das universidades na cadeia de valor da especialização inteligente. O trabalho empírico deste artigo baseia-se na análise das estratégias de investigação e inovação de onze regiões, com diferentes níveis de desempenho de inovação e distintos padrões de especialização, da União Europeia, pertencentes a sete dos seus Estados-membros. Os resultados deste estudo mostram que as universidades estão principalmente envolvidas em atividades relacionadas com a investigação e que a intensidade do envolvimento varia de acordo com o desempenho da inovação e os padrões de especialização das regiões em que se localizam – quanto maior o desempenho da inovação de uma região, maior o nível de envolvimento da universidade.

A problemática do crescimento inteligente, inclusivo e sustentável é o tema central no artigo de **Sara Marques**, **Cecília Rosa** e **Manuela Natário**. À luz destes três grandes objetivos da Estratégia Europa 2020, estudaram o caso concreto do território da NUTS III - Beiras e Serra da Estrela, um território em acentuado declínio demográfico, com uma reduzida densidade populacional, com muito baixa

proporção de exportações de bens de alta tecnologia, onde é ténue a aposta no setor da investigação e desenvolvimento e onde o envelhecimento demográfico continua a acentuar-se.

O artigo de **Rui Barroso** analisa a questão da transformação digital enquanto fator chave para impulsionar o desenvolvimento regional em territórios de baixa densidade, incidindo em particular o seu estudo nos pilares estratégicos necessários para impulsionar a inovação com base na transformação digital e alta tecnologia e no caso particular do *Digital Innovation Hub* da região portuguesa Alentejo. O autor defende que a definição dessa estratégia deve assentar num processo de escolha *bottom-up*, em que as escolhas a ter presentes não deverão ser apenas de base tecnológica ou competitiva, mas também de natureza social e cultural, respondendo verdadeiramente a desafios societais.

O conceito de território desafiado pela tecnologia e pela pandemia

A tendência não é nova, mas a pandemia tornou mais evidente o potencial do teletrabalho no desempenho de múltiplas funções. Em particular, o seu potencial de poder ser exercido em múltiplas circunstâncias, sem conexão com a localização física de quem o exerce ou com a localização da entidade para o qual é exercido. Esta oportunidade de transformação, induzida pelas tecnologias, ganhou dimensão e gerou novas perspetivas de abordagem, por parte dos territórios, em função das infraestruturas disponíveis e dos fluxos nelas gerados, com impacto na localização física das pessoas, nas rotinas de mobilidade e dos processos de criação de riqueza.

A oportunidade dos territórios de baixa densidade poderem vir a atrair teletrabalhadores motivados por condições diferenciadas de vida, e novas empresas, que aí localizadas, podem usufruir de serviços e competências centrais para o seu processo de criação de valor geradas dentro e fora do território, proporciona novas dinâmicas de desenvolvimento que desafiam a própria noção de território e o modo de entender o seu planeamento, mas também o próprio racional que deverá estar na base das políticas públicas que lhe dão suporte.

Em particular, é grande o desafio daí decorrente para o planeamento das infraestruturas complementares, designadamente no domínio da saúde, da educação, da habitação ou da mobilidade. A densidade e a qualidade da oferta tem que ser ajustada ao potencial aumento da densidade e da especificidade da procura. Como fazê-lo num contexto em que a desconexão entre o local de exercício do trabalho e a entidade para o qual é exercido pode ocorrer num duplo sentido, é um enorme desafio que os responsáveis pelas políticas públicas terão que enfrentar nos tempos mais próximos.

A autonomia estratégica no centro

A aceleração tecnológica teve também um papel decisivo no aprofundar da globalização e na dispersão das cadeias de valor. As quebras nessas cadeias, verificadas no contexto da pandemia, no inicio dos processos de recuperação e mais recentemente com os impactos da invasão da Ucrânia, colocou na primeira linha do debate, e na reflexão sobre o desenho das políticas públicas, a questão da autonomia estratégica. Ou seja, da capacidade dos territórios garantirem os bens essenciais ao bem-estar de quem os habita e ao funcionamento da sua estrutura económica e social em situações de crise nas cadeias de abastecimento.

Autonomia estratégica não tem que significar obrigatoriamente protecionismo ou fechamento. Deve sim ser entendida enquanto independência suficiente para poder gerar interdependências seguras, num caminho de parcerias interterritoriais transnacionais.

Para esta segunda linha de ação, a questão da massa crítica dos territórios assume um papel preponderante. A teoria dos polos de desenvolvimento ou de conhecimento, enquanto nós de redes capazes de reter pessoas e saberes e gerar massa crítica territorial, tem frequentemente sido difícil de implantar, sobretudo em territórios em que a baixa densidade é endémica e fortemente estrutural.

Massa crítica real e massa crítica virtual

Que impacto tem a aceleração tecnológica na massa crítica que é uma restrição chave no sucesso de muitas estratégias de desenvolvimento em territórios de baixa densidade?

Em primeiro lugar, a instalação de boas infraestruturas de acesso às redes e as plataformas digitais têm o potencial de atrair mais pessoas ao território para daí exercerem o seu trabalho, desde que

estejam acessíveis os serviços de proximidade necessários para tornar essa fixação atrativa. Novas empresas e serviços baseados na qualidade dos acessos virtuais têm também mais condições de fixação.

A massa crítica virtual pode despoletar condições para criar unidades viáveis de desenvolvimento que conjuguem a fixação física de pessoas e empresas com a sua interligação a redes mais vastas onde a ausência de densidade pode ser diluída e reconfigurada. A multiplicação de unidades viáveis desta natureza, pode permitir desenvolver, sob a capa da massa crítica virtual, uma camada de massa critica real que permita um impulso determinante para o sucesso dos programas e das políticas de desenvolvimento do território.

Cadeias de conhecimento e cadeias de valor

A separação entre cadeias de informação, conhecimento e valor é um exercício para auxiliar a análise, tendo em conta que na era digital elas estão cada vez mais imbricadas e interligadas.

Contudo, se tivermos em conta que a escassez de massa crítica condiciona os territórios de baixa densidade na sua capacidade de se inserirem nas cadeias de conhecimento e a ocuparem posições sustentáveis nas cadeias de valor, a virtualização acrescida das cadeias de conhecimento, auxiliada pelas políticas públicas capazes de assegurar as infraestruturas de acesso e a consolidação de unidades viáveis de desenvolvimento, abre novas perspetivas para os territórios de baixa densidade.

Tal como referido anteriormente, sob uma rede aumentada de acesso ao conhecimento, que colmata parcialmente as fragilidades do ecossistema dos territórios de baixa densidade, é mais provável o surgimento de dinâmicas de fixação e de desenvolvimento que, de outras formas, não se consolidariam nestes territórios.

O "algoritmo" do desenvolvimento e as políticas públicas

A nota conceptual atrás enunciada é baseada na ideia de que a ausência de massa critica de retenção e multiplicação do investimento, em políticas de desenvolvimento dos territórios de baixa densidade, é a principal limitação ao sucesso dessas políticas. Em particular, na fixação e atração de pessoas em geral e de pessoas qualificadas em particular.

Para responder a este desafio propõe-se que as políticas públicas convirjam no objetivo de criarem unidades viáveis de fixação, cruzando dinâmicas virtuais e reais, e apostando num desenvolvimento sincronizado das infraestruturas e competências digitais, com as infraestruturas físicas de proximidade, necessárias para tornar a fixação real atrativa. Como sejam a oferta básica em saúde, educação, habitação, lazer ou mobilidade, tendo em conta a maximização das oportunidades de cruzamento entre a oferta virtual e a oferta de proximidade em áreas tão estruturantes como a saúde ou a educação.

Em última análise, as unidades viáveis são comunidades viáveis no plano económico, social, ambiental, cultural e de perceção de qualidade de vida e de potencial de realização num quadro intergeracional.

Desenhado e instalado o "algoritmo" criador, capaz de conjugar, aplicar e aprender com a aplicação e a monitorização do modelo, as unidades viáveis poderão multiplicar-se, tornando os territórios de baixa densidade, territórios de densidade otimizada para o seu potencial e equilíbrio.

Junho 2022

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Editorial

Public Policy in a Digital Age - The low-density territories challenge

Conceptual note

Technological acceleration and the digital transition, focusing on the information-energy binomial, and through it on the territory and on all the dynamics occurring within it, generate new challenges and new opportunities for public policies.

If we analyse the strategies and programmes that mobilize territorial development, in their different approaches, the intersection of new key technologies - such as data analysis (Big Data), cloud computing and the internet of things - are associated with new technologies, digital skills and the development of data processing, storage and distribution infrastructures, to create viable ecosystems, in which information and knowledge act as potential accelerators and keys to competitive differentiation.

Will this recipe be universal? It appears to be when we analyse the major public policy instruments of the European Union, namely those included in the Multiannual Financial Framework 2021-2027, and the Recovery and Resilience Plans. We see that these instruments and plans converge on the priorities they assume in terms of digital transition and significant financial allocations to these areas, enhancing their impact and making the importance of the success of these strategic options even more critical.

Will these strategies of significant investment in digital networks, namely in infrastructure and skills, focusing on connecting people, firms and knowledge centres, be an effective and sufficient response to overcome the structural problems of lack of critical mass that tend to limit the impact of public policies in developing low-density territories?

Under what specific conditions can this effectiveness be better ensured and how can the impacts be credibly and timely monitored to provide course corrections, always to be expected when trying new approaches and using new tools?

Contributing to answering these questions of undeniable urgency and relevance is the focus of this Special Issue of the Public Policy Portuguese Journal, in which readers can find diversified approaches that open up stimulating pathways for reflection and investigation.

The articles in this Special Issue

The article by **Manuel Laranja** and **Anabela Santos** focuses on the lessons learned from experiences in the Portuguese regions of Alentejo and Algarve for the prototyping of online policies to support the “entrepreneurial discovery processes” inherent to the implementation of smart specialisation strategies, and on how the adoption of digital approaches can help to ensure policy implementation continuity in difficult times, as well as improving levels of participation in the governance model of these strategies.

Still on the topic of regional strategies for smart specialisation and entrepreneurial discovery processes, **Sónia Pereira** and **Aurora Teixeira** analyse the role of universities in the smart specialisation value chain. The empirical work of this article is based on analysis of the research and innovation strategies of eleven regions of the European Union, with different levels of innovation performance and different specialisation patterns, in seven Member States. The results of this study show that universities are mainly involved in research-related activities and that the intensity of involvement varies according to innovation performance and the specialisation patterns of the regions in which they are located – the higher a region’s innovation performance, the higher the level of university involvement.

Smart, inclusive and sustainable growth is the central theme in the article by **Sara Marques**, **Cecília Rosa** and **Manuela Natário**. In the light of these three major objectives of the Europe 2020 Strategy, the authors studied the specific case of the NUTS III territory - Beiras and Serra da Estrela, a territory in sharp demographic decline, with low population density, a very low proportion of exports of high-quality technological goods, and where investment in the research and development sector is tenuous and the population continues to age.

The article by **Rui Barroso** analyses digital transformation as a key factor in boosting regional development in low-density territories. The author focuses in particular on the strategic pillars necessary to drive innovation based on digital transformation and high technology and the case of the Digital Innovation Hub in the Portuguese region of Alentejo. The author argues that the definition of this strategy should be based on a bottom-up process, in which the choices to be considered should not only be of a technological or competitive but also of a social and cultural nature, to truly respond to societal challenges.

The concept of territory challenged by technology and the pandemic

The trend is not new, but the pandemic has made the potential of teleworking to perform multiple functions more evident. In particular, its potential to be exercised in multiple circumstances, with no connection between the physical location of the person performing it or that of the entity for which it is performed. This opportunity for transformation, induced by technologies, has grown and generated new perspectives for territories, according to the available infrastructure and the flows this generates, with an impact on people's physical location, mobility routines and the processes of wealth creation.

The opportunity for low-density territories to attract teleworkers motivated by differentiated living conditions, and new firms, which when located there, can enjoy services and core competencies for their value creation process generated inside and outside the territory, provides new development dynamics that challenge the very notion of territory and the way of understanding its planning, but also the very rationale that should be at the base of public policies.

In particular, the resulting challenge from this in planning complementary infrastructure, namely in the field of health, education, housing or mobility, is great. The density and quality of supply has to be adjusted to the potential increase in density and specificity of demand. How to do this in a context in which the disconnection between the place where the work is performed and the entity for which it is carried out can occur in a double sense, is a huge challenge that those responsible for public policies will have to face in the near future.

The strategic autonomy at the centre

Technological acceleration also played a decisive role in deepening globalization and in dispersing value chains. The breaks in these chains, verified during the pandemic, at the beginning of the recovery processes and more recently with the impacts of the invasion of Ukraine, put the question of strategic autonomy at the forefront of the debate, and in reflection on the process of designing public policies. In other words, territories' ability to guarantee essential goods for their inhabitants' well-being and for the functioning of their economic and social structure in situations of crisis in supply chains.

Strategic autonomy does not necessarily mean protectionism or closure. It must be understood as sufficient independence to be able to generate secure interdependencies, in a path of transnational interterritorial partnerships.

For this second line of action, territories' critical mass assumes a leading role. The theory of development or knowledge poles, as nodes in networks able to retain people and knowledge and generate critical territorial mass has often been difficult to implement, especially in territories where low density is endemic and strongly structural.

Real critical mass and virtual critical mass

What impact does technological acceleration have on critical mass, which is a key constraint for the success of many development strategies in low-density territories?

Firstly, installing good infrastructure to access networks and digital platforms has the potential to attract more people to the territory to work there, provided that the services necessary to make this settlement attractive are locally available. New firms and services based on the quality of virtual access also have better conditions for becoming established.

Virtual critical mass can trigger conditions to create viable development units that combine the physical installation of people and companies with their interconnection to wider networks where the absence of density can be diluted and reconfigured. Multiple viable units of this nature can make

it possible to develop, helped by a virtual critical mass, a layer of real critical mass that provides a decisive impulse for the success of programmes and policies for territorial development.

Knowledge chains and value chains

Distinguishing between information, knowledge and value chains can help the analysis, as in the digital age they are increasingly intertwined and interconnected.

However, if we take into account that the scarcity of critical mass conditions in low-density territories makes it difficult for them to become part of knowledge chains and to occupy sustainable positions in value chains, the increased virtualization of knowledge chains, aided by public policies to ensure access infrastructure and the consolidation of viable development units, opens up new perspectives for low-density territories.

As mentioned above, with an increased network of access to knowledge, which partially addresses the weaknesses of low-density territories' ecosystems, the dynamics of settlement and development are more likely to emerge, which otherwise would not be consolidated in these territories.

The development "algorithm" and public policies

The conceptual note mentioned above is based on the idea that the absence of a critical mass of retention and multiplication of investment, in policies for the development of low-density territories, is the main limitation to the success of these policies, especially as regards attracting and retaining people in general, and qualified people in particular.

In order to respond to this challenge, public policies should converge on the objective of creating viable units of fixation, crossing virtual and real dynamics, and focusing on synchronized development of infrastructure and digital skills, with the physical infrastructure of proximity, necessary to make real installation attractive. This includes the basic offer in health, education, housing, leisure and mobility, maximizing opportunities to cross between the virtual offer and the offer of proximity in structural areas such as health or education.

Ultimately, viable units are viable communities in terms of economic, social, environmental, cultural and perceived quality of life with the potential for achievement in an intergenerational framework.

Once the creative "algorithm" is designed and installed, capable of combining, applying and learning from the model's implementation and monitoring process, viable units will be able to multiply, turning low-density territories into territories of optimized density according to their potential and balance.

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Prototyping (online) Events to Support Entrepreneurial Discovery: The Cases of Alentejo and Algarve[1]

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ABSTRACT

The Covid-19 pandemic and the government measures to stop the disease from spreading accelerated corporate digital transition and the use of digital communications. In-person meetings were replaced by online video conference meetings, and such a trend may persist beyond the short term. Communication technologies can also help to improve the mechanisms of support to the Smart Specialisation Entrepreneurial Discovery process, however, the existing literature does not explicitly address the need to adapt this process to non-in-person events. The present paper aims to fill this gap, by describing the lessons learned with an experiment conducted in the Portuguese regions of Alentejo and Algarve for prototyping online policy support to the "Entrepreneurial Discovery Process". It also provides some guidelines on the organisation of such events, distinguishing between what can be done before, during, and after the event. Furthermore, adopting a digital approach can ensure not only the continuity of the policy in difficult times but can also be a way to improve participation in the S3 governance model in the post-corona crisis.

Keywords: Entrepreneurial Discovery Process; Online event; Covid-19; Portugal.
JEL classification: O31, O33, R11, R58.

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[1] This paper is based on the work performed by Laranja et al. (2021).

[2] The views expressed are purely those of the author and may not in any circumstances be regarded as stating an official position of the European Commission.

1. INTRODUCTION

Smart Specialisation Specialisation (S3) is now a reality in Portugal. Although Innovation policies in Portuguese regions have been in place since the earlier generations of Regional Innovation Strategies (RIS)/ Regional Innovation and Technology Transfer Strategies (RITTS) in the late 1990s and later in the Lisbon Strategy 2010, the S3 approach presented a significant challenge for innovation policy-making in Portugal (Laranja et al., 2020).

One of the main benefits of the S3 approach is that innovation policies no longer rely on high level "innovation plans" driven by broad challenges and followed by "implementation control" but instead require public-private collaboration at the regional and/or national level for discovery and experiment with new directions for R&D and innovation. Hence, this new approach to innovation policy breaks with existing traditions of policy planning and places great emphasis on place-based "entrepreneurial discovery" processes (EDP) requiring a new role for Regional Authorities in supporting and facilitating EDP over the S3 policy cycle.

The EDP is one of the key feature of the S3. The EDP is an entrepreneurial-driven process emphasising the idea of 'discovery' to identify the specialisations that best fit the innovation potentials of each territory (Asheim, 2013; Foray, 2015; Foray et al., 2009; McCann and Ortega-Argiles, 2015). EDP means opening opportunities to explore and experiment with new knowledge applications that the region believes may lead to relevant innovations. Based on existing or new technological and non-technological capabilities "discovery" precedes innovation but it is essentially oriented towards market applications (Foray, 2014:495). In addition, one important issue is that EDP should be driven by the actions of business entrepreneurs, who have privileged "entrepreneurial knowledge" (Foray, 2016) i.e. scientific and technological research at R&D Labs and Universities do not drive this process. Policy-makers also do not drive this process. However, multiple collaborations (regional and extra-regional), networks of relationships between clients, specialised suppliers, technology and industrial associations, R&D Labs, Universities, etc., may greatly enhance the process of opening and defining new opportunities.

While initially, the EC (2012) defined EDP as a strategy implementation process, towards the end of the first S3 strategic cycle (2014-2020), EDP was not just a process for implementation, but a permanent process in which stakeholders – government, firms, higher education establishments, intermediaries, civil society – gather regularly to explore and redefine Research and Innovation (R&I) domains and corresponding projects and activities.

The EDP process is surely not an easy one since it requires policymakers to assume a new role for which perhaps they are not fully prepared.

This paper has two main objectives. First, we aim to understand Smart Specialisation Strategies and Entrepreneurial Discovery Processes and second we use the case study of two low density Portuguese regions, Alentejo and Algarve, to illustrate how EDP can be put into practice through online events.

While there are many aspects of S3 and EDP that have been discussed in the literature and despite the support provided at the EU level (Kyriakou et al., 2017), regional practices of entrepreneurial discovery remain a major challenge, particularly for less developed regions with lower innovation policy capacity. In addition, in the Covid-19 pandemic context[3], where in-person meetings and events have become much more difficult, there are new challenges on how can regional authorities and the private sector can effectively collaborate to implement S3. Digitalising the support to EDP could be an advantage for large peripheral and rural regions where longer traveling distances to attend the meeting may be a disincentive to participate.

We believe that the cases presented in this paper may help regions to adapt the process of implementing their S3 over the programming period 2021-2027. Online events and meetings are one way to continue reaching a relatively large number of regional actors to follow the discovery and experimentation process.

[3] The COVID-19 pandemic, first identified in December 2019 in Wuhan, the capital of the Chinese province of Hubei, quickly spread round the world within weeks and was declared a pandemic by the World Health Organization, on 11 March 2020. Lockdown, confinement and travel limitations were some of the measures adopted by governments to stop the disease from spreading. At the time of the present paper there is still uncertainty about the end of the pandemic.

The Covid-19 pandemic has accelerated the use of digital communication platforms (Statista, 2021b) and even if in the future[4] physical meetings become safe as they used to be, online means of supporting entrepreneurial discovery processes may become part of the "new normal". This will not be a case of physical meetings being entirely replaced, since we know that person-to-person interactions are important for innovation, but a way of complementing and strengthening the process.

The remainder of this paper is as follows. In section 2, we critically explore the definition of "Smart Specialisation Strategies" and "Entrepreneurial Discovery Processes". While section 3 discusses governance challenges for policy support through EDP and section 4 reflects on new challenges presented by the Covid-19 pandemic and the rise of online events. Section 5 reports on the lessons learned from the pilot on-line workshop in Alentejo and Algarve. Finally, section 6 reflects on how this experience can help strengthen the EDP, despite the challenges and difficulties brought by the pandemic.

2. UNDERSTANDING ENTREPRENEURIAL DISCOVERY AND SMART SPECIALISATION: CHALLENGES FOR GOVERNANCE

Following from limitations of earlier innovation policies identified by the Barca (2009) report and from the recommendations of the high-level "Knowledge for Growth" group (Foray et al., 2009), the European Commission (EC) adopted the implementation of Research and Innovation Strategies for Smart Specialisation (the so-called S3) as "integrated, place-based economic transformation agendas" (EC, 2012:8). These agendas, call for regional economic specialisation based on research and innovation domains where regions possess strengths and on leveraging those capabilities through "diversified specialisation" (Foray et al., 2011; Foray, 2015; Balland, Boshma, Crespo and Rigby, 2019; Santoalha, 2019).

To design and implement place-based economic transformation agendas, regions should first define directions for change i.e. concentrate a minimum density of actors and projects in certain priorities. Concentration is also understood as a choice for regional governments to focus local technology infrastructure since governments cannot address all specific knowledge infrastructures and specific services for all sectors and all markets. They are "doomed to choose" (Hausmann and Rodrik, 2006).

Second, S3 transformation agendas require entrepreneurial discovery, which means that, although there is an initial general direction for change (a prioritisation of what needs to change in certain sectors), actual transformation cannot be "planned" from the top but will be discovered as the process unfolds. There is therefore no ex-ante general or thematic grand innovation plan but rather a permanent process of discovery in line with the transformation direction initially defined. This discovery path implies permanent feedback, monitoring, and flexible governance mechanisms.

Existing literature on S3 and EDP (see e.g. Foray, 2014; EC, 2012; Gianelle et al, 2016) provide valuable insights on "what" the S3 policy process is and the importance of entrepreneurial discovery. However, relatively less attention is paid to understand how can the governance of the S3 policy process be more flexible and how should public authorities provide support and facilitate the whole S3 design and implementation process using entrepreneurial discovery.

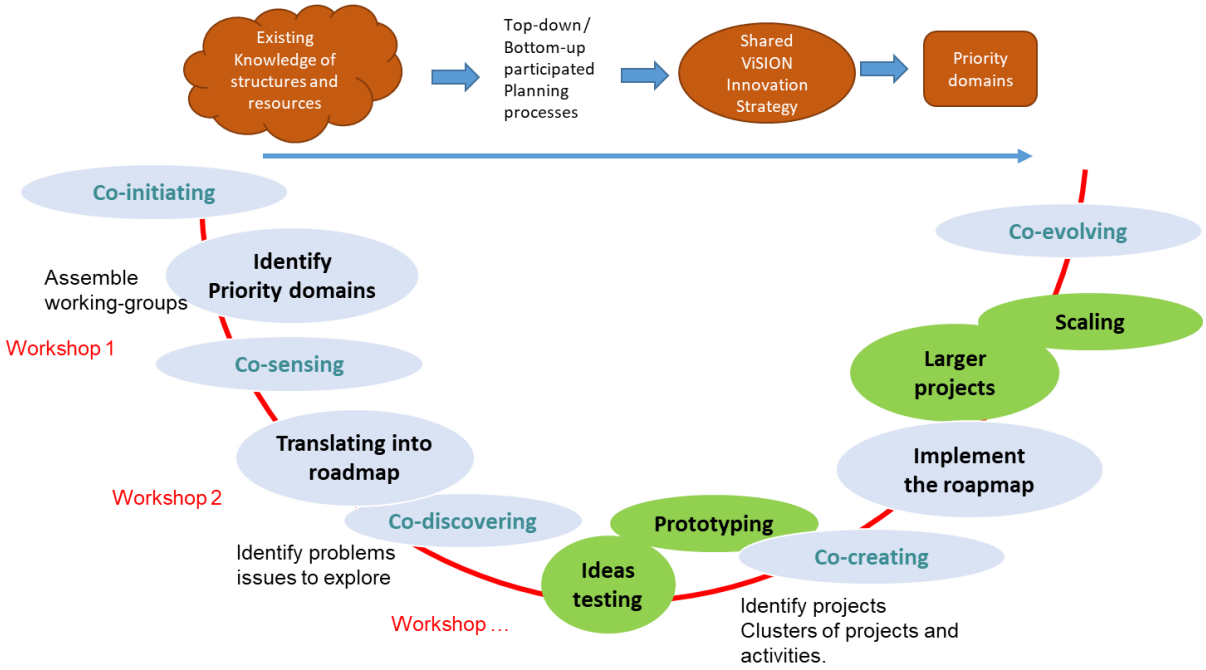
For example, Haussman and Rodrik (2006) refer that hierarchical structures of government are not adequate and recommend exploring "network arrangements" and/or industrial and trading associations as intermediaries that may support and speed up the process. Aghion, David, and Foray (2009) refer that governments must drop their traditional role as principal-agent of a top-down planning and control process and learn a new role as facilitators and co-discoverers, stimulating and promoting the process. In addition Foray (2014:493) argues that this new role would include "punctual and targeted governmental intervention in order to support in a preferential way the most promising new activities in terms of discovery, experimentation, potential spill-over and structural changes".

In Figure 1 we illustrate two different understandings of regional innovation strategies. In the top straight line we have regional innovation plans elaborated through a top-down process, arriving at a common vision for improving general R&D infrastructures and innovation activities. After such

[4] The present paper was written during the second year of the Covid-19 pandemic (2021) and the experiment with the regions conducted in the second half of 2020.

planning for general innovation, policy makers usually concentrate on monitoring and control of public funding related to R&D and Innovation according to the plan.

FIGURE 1: S3 AS STRATEGIC PLANNING PROCESS AND S3 AS A BALANCED PLANNING AND PARTICIPATORY INCREMENTAL PROCESS



Source: Laranja (2021).

In a S3 policy process, designed in Figure 1 as a U curve, the idea is to concentrate on a certain density of inter-related projects and activities in specific priority domains, to experiment whether the resulting synergies, complementarities, and agglomeration trigger regional economic transformation on the longer term. Defining areas or domains for the concentration of projects and activities is, however, a decentralised "self-discovery" process (Haussman and Rodrik, 2003), that should be driven by local enterprises and entrepreneurs (i.e. not driven by local government and not driven by local universities). This means that the domains the region believes may trigger the targeted transformation processes do not need to be entirely pre-defined, as they are supposed to be discovered as the process unfolds. S3 is, therefore, a blending of strategic planning with strategic-practice processes (Whittington, 1996) i.e. initial ill-defined priorities evolve through a step-by-step experimental process that (re)discovers or redefines at lower granularity levels, narrower domains for concentration of concrete R&D, experimentation and prototyping initiatives.

Looking at the S3 from the perspective of providing a framework that encourages engagement, collaboration, and learning amongst public and private participant actors, we can propose a policy process characterised into activities of co-initiating, co-sensing, co-discovery, co-creating, and co-evolving – Figure 1.

To achieve transformation, the S3 process starts from an initial process of co-initiating where regional actors (public and private) come together for a first attempt to define possible directions of transformation for groups of sectors (including directions to change existing R&D and technology infrastructure). At the next stage of co-sensing regional actors work in groups to define at lower granularity levels specific market needs and technological problems and opportunities that need to be addressed. At the co-discovering level, actors will attempt to explore, test, and experiment with R&D and ideas that may solve the problems and/or address the opportunities. In these two stages regional authorities with the support of regional actors, will therefore produce a roadmap of selected projects and initiatives. At the co-creating level, relevant regional actors would further develop their ideas beyond initial testing, receiving support for larger projects. However, to be transformative some projects must scale up and evolve to a stage where they will generate local spillovers, encouraging the entry of more players and wide market diffusion of the new discoveries, through increasing returns (Arthur, 1996) and entrepreneurial "creative imitation".

Success in spreading imitation and generating spillovers appears to depend on important issues associated with related variety, access to specialised suppliers, also on local turnover of skilled workers and managers, and on easy access of "imitators" to local key knowledge-capability infrastructures (which may not be available within the region) as well as access to markets and adequate finance.

Because S3 in this U curve model is not just a matter of planning how to go from one current stage to another future stage, but the continuously negotiated accomplishments of an assemblage of resources and initiatives, instead of the traditional hierarchical governance structure serving a centralised top-down decision process, we suggest the use of participatory governance. Particularly for the initial stages of co-sensing and co-discovering where regional actors learn and discover common needs and problems, defined at lower granularity levels, participatory governance may accelerate learning and discovery.

The use of participatory processes will most likely enhance the quality of the policy-decision process in terms of depth of discovery, meaningfulness, capacity to monitor progress, and, more importantly, will enable business and entrepreneurial learning which is needed to feed the discovery process. It will also facilitate the need to counteract the entrenchment of incumbents and vested interests of the more powerful regional actors that may constrain opening and exploring new directions for discovery. In addition, as the process self-enfolds and if initial discoveries prove successful, participatory governance may help to smooth the tensions between private appropriation and the need to promote local spill-overs (Foray, 2014).

In this regional participatory process, policy makers play the role of facilitators and therefore could use facilitation-consultants. The quality of participatory governance is greatly enhanced by the use of facilitation tools, enabling dialogic interactions between multiple actors (consumers, producers, intermediaries, regional authorities, etc.), i.e. enabling deep dialogue where actors listen and understand each other reaching consensus and collectively legitimizing decisions. Tools that may be used to facilitate the participatory process supporting EDP include, for example, "Open Space Technology" (Harrison, 2008) and practices such as Art of Hosting – AoH, World Café (Brown and Isaacs, 2005). Other frameworks such as Appreciative Inquiry (Coperrider and Whitney, 2005) or even Theory U - based on the human capacity to "presence" and to "pre-sense" an emerging future (Scharmer, 2007), may also be useful. Used mostly on other policy areas such as social and sustainability policies, these facilitation tools enable actors to go beyond explicit knowledge and analysis of hard evidence on markets and on their own resources and capabilities. They enable to sense, amplify common understandings, build awareness, legitimize viewpoints, clarify zones of opposition and indifference, change perceived risks, put forward ideas and concepts, create early commitment from local actors, manage coalitions, and finally stimulate actions.

In addition to participatory governance supported by facilitation techniques, monitoring of S3 must also be taken as participatory monitoring. While in a traditional planning-control approach, monitoring is usually based on investment data and indicators illustrating possible changes in the regional context (Kleibrink, Gianelle and Doussineau, 2016), in a strategy-as-practice approach there is a need to engage participants on critical analysis of successes and constraints in formulating and implementing their projects and initiatives with transformative potential. In participatory monitoring regional actors share control over the content, the process, and the results of their ongoing activities and projects in each domain, engaging in identifying and taking corrective actions if necessary. The information generated throughout the process would be used to help understand which experimental discovery activities should be corrected, stopped, or whether it is too soon to stop experimentation.

3. COVID-19 AND THE USE OF SYNCHRONOUS COMMUNICATION TOOLS TO SUPPORT ONLINE EVENTS

In "normal" circumstances, S3 and governance supporting the EDP process, as described in the previous sections, would benefit from a series of in-person workshop-events. Different stages of the EDP process would have different kinds of workshops, such as EDP-focus-groups or Project Development Labs (Boden et al., 2016). For example, co-initiating would be supported by workshops that envision improving the perceptions of all actors about their domain ecosystem (see and sense the system), followed by workshops that stimulate ideas and creativity for the definition of problems and needs (co-sensing) and workshops for helping with ideas prototyping and project roadmapping

(co-discovery). These series of workshops may be organized by priority domains and would envision further defining and exploring areas for concentration experimental projects and activities.

With the new reality of "physical distancing" due to the Covid-19 pandemic, the rapid rise in the use of synchronous communication tools for all kinds of meetings and events suggests that in-person EDP events could be adapted to online events/workshops. For instance, Covid-19 has sped up the digital transformation of companies worldwide (Statista, 2021a), namely accelerating their digital communication efforts (Statista, 2021a). One month after the first European lockdown, spending on web conferencing software, collaboration, and remote desktop tools increased more than 50% due to Covid-19 (Figure 2). Furthermore, the number of daily active users of Microsoft Teams increased exponentially, reaching 145 million users worldwide in April 2021, i.e. around 6 times more than in a pre-pandemic situation (Figure 3).

FIGURE 2: BUSINESS SOFTWARE SPENDING INCREASES AMID COVID-19 WORLDWIDE, APRIL 2020

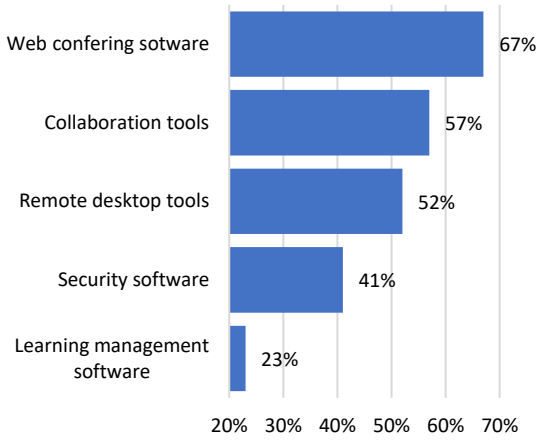
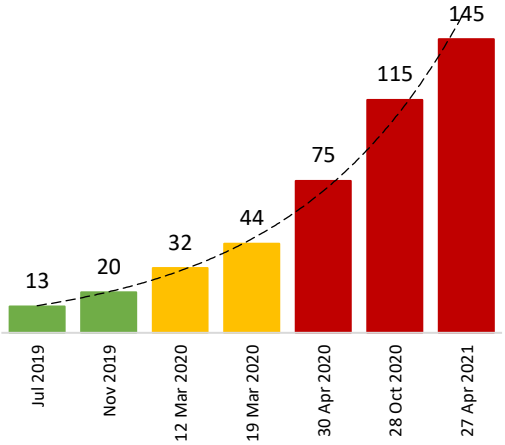


FIGURE 3: NUMBER OF DAILY ACTIVE USERS OF MICROSOFT TEAMS WORLDWIDE, JULY 2019 TO APRIL 2021 (IN MILLIONS)



Source: Statista (2020) for Figure 2 and Statista (2021b) for Figure 3.

Legend (Figure 3): ■ Pre-Covid period | ■ Days following the World Health Organization declared Covid-19 a pandemic | ■ Covid-19 pandemic.

Forecasting for the coming years (see e.g. Statista, 2021a), point to a continuous increase of spending in information technologies (IT), namely Communication Services, Data Center Systems, Devices, Enterprise software, and IT Services. The massive investment in IT in the period 2020/2021 is also expected to change business communication strategy in the medium-long term, namely replacing the physical meetings for online or hybrid ones, to take advantage of the investment made and also for cost-saving (Marques Santos, 2020; Twilio, 2020).

Since, the pandemic generated new trends in business and private communications, the Open Space Technology tools, referred to in the previous section can also be adapted to shorted online events. While these tools can be a refreshing alternative to the stultified, over-programmed event formats of keynotes and discussion panels, nevertheless their use needs to be carefully organized.

The Prototyping of such online events for the initial stages of EDP in the regions Alentejo and Algarve suggested that careful preparation of these online events and the specific facilitation techniques to be used is one key aspect. However, even if online events have several advantages in comparison with in-person events, namely in terms of time-saving and cost reduction, there will always be a loss of personal and human contact (Table 1). This last aspect is particularly important when stakeholders are invited to discuss and discover new ways to foster the innovative capacity of a region, through EDP processes supported by online platforms.

TABLE 1: PROS AND CONS OF ONLINE VERSUS IN-PERSON MEETINGS/EVENTS

	Pros	Cons
Online events	— Cost savings (time and money) — More flexible scheduling — From anywhere in the world	— Highly dependent on internet and IT equipment quality — Loss of interpersonal relationship
In-person events	— Gains in interpersonal communication — Higher concentration and participation	— Cost (money and time) to travel to the meeting place — Cost with event organization

Source: Own elaboration.

4. LESSONS LEARNED FROM ORGANISING ONLINE EDP EVENTS AT ALENTEJO AND ALGARVE

In preparation for the next S3 cycle (2021-2027), workshop events in the regions of Alentejo and Algarve, that were planned as physical in-person events[5], had to be modified and adapted to online events due to the Covid-19 pandemic. This provided the opportunity to test whether support to EDP could be transferred to an online context and what would be the main issues to consider. Both events were organised by the regional managing authorities in charge of implementing S3 in their regions, with the support of the European Commission.[6] The workshops targeted to support the EDP aimed to stimulate entrepreneurs to share experience, identify obstacles, and suggest solutions to strengthen the innovative capacity of the regions. It aimed to bring together a vast range of actors in the territories, from business, research, and the public administration to discuss issues relevant to the regions.

4.1. Context, regional specifies and S3 innovation priorities

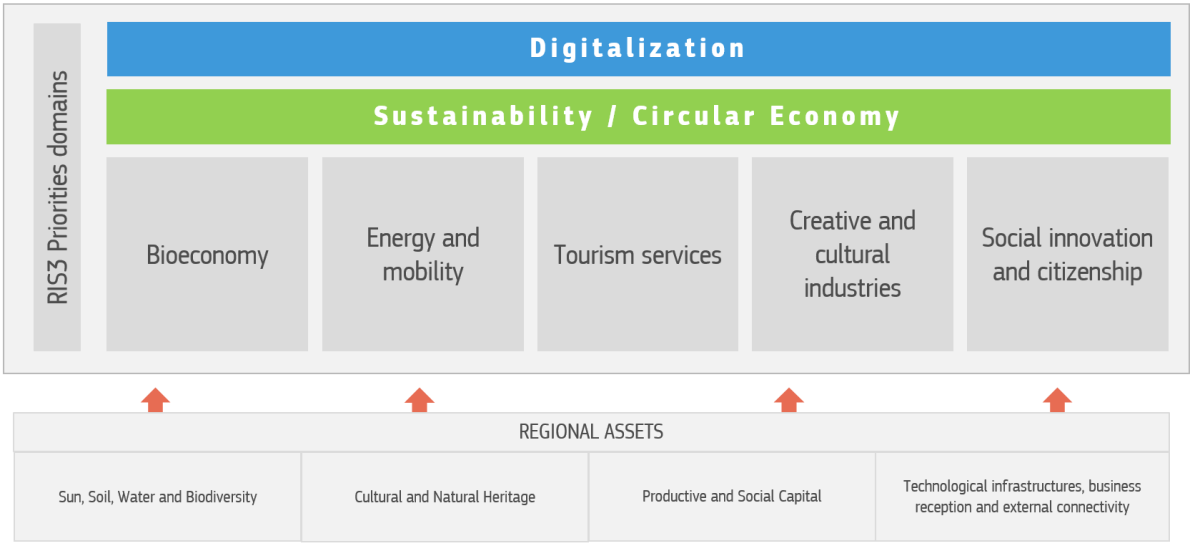
4.1.1. Alentejo region

The Alentejo region is the largest NUTS 2 level region in Portugal but has the lowest population density and the highest rate of aging (INE, 2020). The primary sector (agriculture, farming, hunting, and forestry) accounts for 20% of total employment, followed by manufacturing, which is responsible for 19% of jobs (INE, 2020). Innovation performance has improved over recent years, but the region is still considered a moderate innovator under the Regional Innovation Scoreboard (EC, 2019). In its Smart Specialisation Strategy (S3) for the programming period 2021-2027 (CCDR-Alentejo, 2020), the region has prioritised five vertical themes (Bioeconomy; Energy and Mobility; Tourism Services; Creative and Cultural Industries; Social Innovation and Citizenship) and two transversal enablers (Digitalisation and Sustainability), as displayed in Figure 4.

[5] The present analysis refers to work performed in 2020, to prepare the next S3 cycle (2021-2027).

[6] In the context of the JRC RIS3 Support to Lagging Regions project (https://s3platform.jrc.ec.europa.eu/lagging-regions).

FIGURE 4: S3 INNOVATION PRIORITIES FOR THE ALENTEJO REGION IN THE PERIOD 2021-2027



Source: Marques Santos, Madrid and Haegeman (2020).

Based on the regional specifies and the S3 innovation priorities for the Alentejo region, the theme selected for the workshop was "Sustainable Bioeconomy".[7] In the context of the event, bioeconomy was defined as all the activities related to agriculture and livestock, forestry, fishing and aquaculture, food and beverage manufacturing, and wood and cork manufacturing (for more details see Fialho, 2020). This theme was articulated with the concepts of sustainability and circular economy, due to several bottlenecks that bioeconomy is faced regarding waste management and more efficient use of natural resources. Furthermore, it also represents the alignment of S3 priorities to the EU's new growth policy, the European Green Deal, developed on the basis to become climate neutral in 2050. Such new directionality of the S3 is also in line with the previous work of Neto, Serrano and Santos (2018), who analysed the new possible evolutions for strengthening the implementation of RIS3's strategic rationale in the context of grand societal challenges. In a similar vein, McCann and Soete (2020) come more recently to present some reflections on how place-based innovation policy can support the achievement of the European Green Deal.

4.1.2. Algarve region

The tourism sector, mainly concentrated on the sun, sand and sea concept, is one of the main socio-economic pillars of the economy of the Algarve region. For instance, "accommodation and food service activities" alone represent more than 20% of the total regional employment (INE, 2020). Since 2007, "tourism diversification" has been an innovation priority in Algarve's Smart Specialisation Strategy (CCDR-Algarve and Ualg, 2015). For the 2021-2027 programming period, innovation priorities for the tourism sector are strongly associated with societal challenges, such as Circular Economy, Climate Change, Economy 4.0, Healthy aging, Food security and the Mediterranean diet. Figure 5 displays the list of the S3 innovation priorities for the period 2021-2017.

[7] This S3 priority domain for the Alentejo in 2021-2017 represents a reorientation of the previous one "Food and Forestry". For more details see the S3 of Alentejo for the programming period 2014-2020 (CCDR-Alentejo, 2014).

FIGURE 5: S3 INNOVATION PRIORITIES FOR THE ALGARVE REGION IN THE PERIOD 2021-2027

Source: Own elaboration based on information provided by CCDR-Algarve on 08/09/2020.

For the Algarve event, the selected theme was related to the concept of "Smart Tourism Destination", combining two innovation priorities domains of the region: tourism with digitalization. The concept of "Smart Destination" is associated with how regions as tourism destinations, use technology for the attraction of the tourists, as well the increasing digitalisation of operations and services involved in the tourist visit to the region. Many destinations are now modernising to include increased use of smart technology in their tourist operations e.g. use smartphones to pay for taxis, order meals, check queue times, read the information on the destination, use a supplied QR code to access specific information on local attractions, etc. The ultimate aim of smart tourism is to improve the efficiency of resource management and enhance sustainability through the use of technological innovations and practices. Furthermore, the selection of the theme appears also as the result of the current pandemic context. Indeed, the Algarve is one of the Portuguese regions most affected by Covid-19, due to its highest tourism intensity and high dependence on foreign tourists (Batista e Silva et al., 2018; Marques Santos et al., 2020). Secondly, new market trends appearing in the tourism sector, in a context marked by fear to travel, were implemented for trying to recover tourist confidence and for sanitary reasons, as a contactless system.

4.2. Anatomy of the EDP online workshops

Preparatory meetings with the regional authorities and with experts on each domain enabled to build a small list of what appeared to be fundamental issues related to the priority domains that could be used to stimulate participation and discussion of relevant actors (Table 2).

TABLE 2: LIST OF INITIAL ISSUES TO STIMULATE DISCUSSION IN THE ALENTEJO AND ALGARVE WORKSHOPS

Alentejo "Sustainable bioeconomy"	Algarve "Digitalisation in tourism"
— Need to organize the Bioeconomy domain — Regional weaknesses in qualified human resources and articulating supply and demand of vocational and higher education — Economic valorisation of local waste and sub-products of the local food and forestry industries and across industries — Bureaucracy and legal issues for enterprises — Better coordination and articulation of all relevant actors along the value chain — Weaknesses in local technology and R&D infrastructure and mapping acknowledging already existent knowledge	— Principles of Smart Destination — Use ICT-based tools for data collection, processing and analysis — Improve efficiency in the use of resources and enhance sustainability — Increase tourist satisfaction

Source: Own elaboration based on the workshop experiment results.

To avoid online fatigue, events online are normally shorter events when compared with face-to-face physical events, and therefore the workshops were divided into two separate sessions i.e. two half days. The agendas are included in the supplement material.

A third issue to consider was whether facilitation techniques, used in face-to-face events to increase the quality of the participatory process, could be used in an online context. We decided to try a most simple and well-known technique – now used in many different kinds of events – which is a World Café. A World Café process is driven by 15-20 minutes rounds of conversation for small groups of people seated around a (virtual) table. At the end of the period, some people may move to a different new table. However, usually, one member is known as the "table host" stays for the next rounds. Each round is prefaced with a question specially crafted for the specific context of the World Café. The same questions can also be used for more than one round, or they may build upon each other to focus the conversation or guide its direction. After the small groups finish all rounds (and/or in between rounds, as needed), table hosts are invited to share insights or from their conversations with the rest of the large group.

As referred before both workshop events were divided into two sessions. On the first session and after a brief welcome and introduction to the themes (by invited experts), participants were divided into small groups by virtual rooms and asked to work on a series of questions (Table 3) that guided World Café rounds. In the second session, the rapporteur of each virtual room was asked to present the main conclusions and suggestions discussed in their group[8], as listed in Table 4. Following this, all participants questioned and commented on each other's proposals.

TABLE 3: WORD CAFÉ QUESTIONS IN THE ALENTEJO AND ALGARVE WORKSHOP

Alentejo "Sustainable bioeconomy"	Algarve "Digitalisation in tourism"
1. Please identify market needs that could be met by the development of BioEconomy in Alentejo 2. Characterise the identified needs - What are the problems? - What are the causes of that problem? - Who feels the problem? 3. Propose ideas, initiatives, or projects that may lead to the discovery of innovative solutions to the problem-needs identified? 4. What would you like to know about technologies for the use of BioEconomy to implement the proposed ideas and projects? 5 Which partners would be more adequate to implement the ideas and proposed projects	1. Please identify market needs that could be met by the development of Digitalisation of Tourism and "Smart Destination" in Algarve 2. Characterise the identified market needs for Digitalisation of Tourism in Algarve - What are the problems? - What new problems result from the Covid-19 crisis? - What are the causes of that problem? - Who feels the problem? 3. Propose ideas or projects leading to the discovery of an innovative solution to the problems and needs identifies

Source: Own elaboration based on the workshop experiment results.

[8] Main conclusions of both workshops are available in Marques Santos, Edwards and Laranja (2020a, b).

TABLE 4: SUMMARY OF THE MAIN CONCLUSIONS OF THE WORKSHOPS (*)

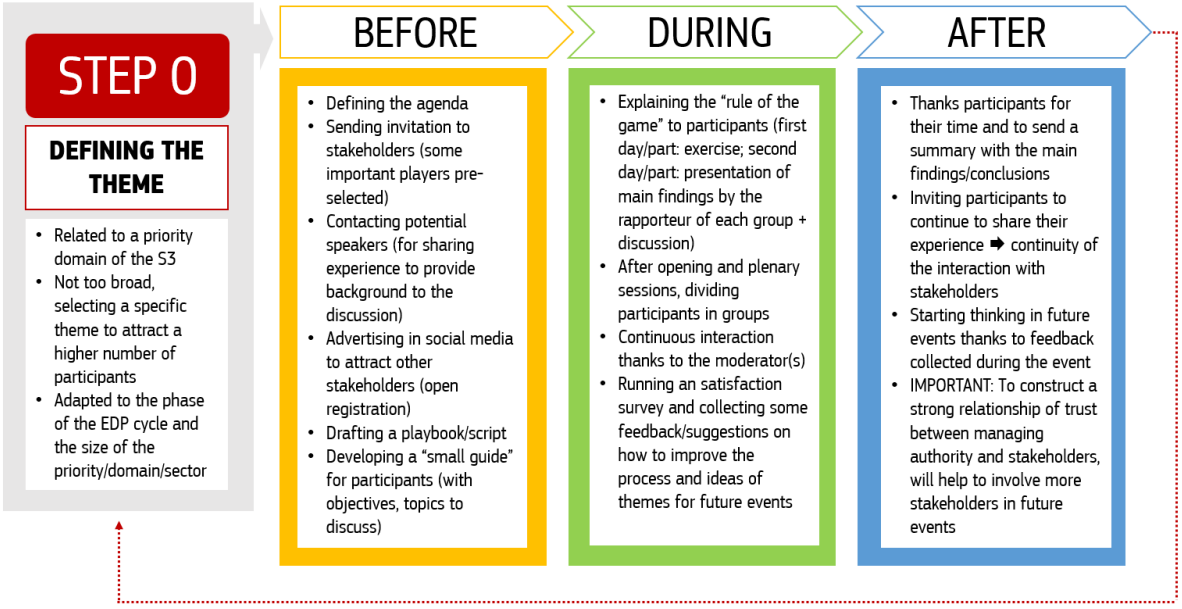
Alentejo "Sustainable bioeconomy"	Algarve "Digitalisation in tourism"
— Inadequate framework conditions (legal and infrastructures) and disarticulation between skills needs and education/training available were highlighted as some of the barriers to innovation — Greater articulation between the different actors in the value chain and a more integrated/systemic approach are some of the identified needs of the market	— Lack of adequate skills, inadequate infrastructure (communication and transport), weak links between tourism services and other economic activities, and ineffective data collection and analysis are some of the bottlenecks. — Better data management, diversification of tourism offer, more networking, and cooperation are some of the identified needs of the market

Source: Own elaboration based on the workshop experiment results.

Note: (*) For more details see Marques Santos, Edwards and Laranja (2020a, b).

The experience of prototyping online EDP-events in Alentejo and Algarve lead to several lessons illustrated in Figure 6 and summarised in Box 1, Box 2, and Box 3.

FIGURE 6. STEPS OF AN ONLINE EDP WORKSHOP



Source: Marques Santos, Edwards and Laranja (2020a).

Box 1. Lessons learned: Before the event phase

Type of event - The type of event to organise depends on the stage of the S3 policy process. Initial events at an initial innovation planning stage to find/define priority domains may serve to characterise and sense the system while exploring and validating the general domains proposed by regional authorities. Events at later stages may focus on stimulating ideas and creativity for (re)definition of priority-domains and helping with project roadmapping i.e. project ideas events or project roamapping events. At stages where domains are better defined, regions may already have working groups (composed by relevant actors on a particular priority domain) and therefore choice of theme should be discussed with the working group. Nevertheless, the theme should be clearly defined to attract sufficient interest from potential regional participants.

Choice of Platform - Another important aspect of organising events is the choice of platform. There are different synchronous communication platforms able to support online events. Although they appear similar, they do not provide the same features, particularly with regards to assigning participants to virtual side sessions or rooms and bringing them back to the main plenary meeting which was one of the features needed to implement World Café rounds online. In addition, one feature that may be useful is the use of Waiting Rooms enabling the organisers to validate participants' registration and admit them one by one or all at once. One particularly important aspect to consider is how the need to share visuals and documentation during the event. For sharing content during the event, ideally, one should standard formats (e.g. pdf files) uploaded through chat facilities.

Duration of the event - Because of online fatigue, the duration of an online event is usually shorter. Shorter events of half-day maximum should be considered even if the workshop needs to be divided into different days. Likewise, the duration of the speakers' communications should be kept to a minimum, ideally 10 minutes.

Playbook - Another aspect that may be useful is the preparation of a Playbook detailing all the operations (pre-, during-, and after-the-event) needed to implement the event. The details usually include a precise definition of tasks/actions, costs, deadlines, as well as roles and responsibilities of different people intervening throughout the event operations-flow at different stages. A more complete Playbook, may also include contingency actions i.e. what to do in case key actors are not present? What to do if the internet connection is lost during the event? etc.

Guide for participants - It is important to provide beforehand a small guide for participants. This could be a PowerPoint or Word document with the objectives of the participatory exercise and questions and topics to be discussed with the participants (Word Café – generative questions). This small guide should be posted on the event website, or alternatively on the website of the organiser. It can also be sent by email to invited/registered participants.

Calling question – In any event, all operations regarding promotion and invitations are very important. We found particularly important how the invitation expresses a "calling-question" that attracts wide interests from a variety of actors related to the event theme.

Invitations - Care should be taken in preparing a list that has plenty of actors from the private-sector, both large and smaller companies. Although business and sectoral associations may also be present, the presence of regional entrepreneurs to benefit from their entrepreneurial knowledge and real case experiences.

Registration - It is also important to make registration compulsory to control the number of participants. Nevertheless, last-minute participants without previous registration, if relevant for the theme in the discussion may also be allowed to enter the virtual event.

Box 2. Lessons learned: During the event phase

Moderators – Our most important lesson during the events related to the importance of having good moderators for the whole event (a Host and a Co-host) and of having moderators and or rapporteurs for the group sessions. The whole structure of the event i.e. how different sessions are organised and how the virtual group discussion sessions will work should be clearly explained to participants during the event. Moderator's knowledge of facilitation techniques (Word Café and others) will be most helpful to increase the quality of the participatory process.

Assigning participants to discussion groups - Using the participants' final list the event-will attribute different participants to the virtual discussion groups/rooms. Depending on which platform is used it is possible to distribute participants randomly by virtual rooms. The number of participants per discussion group should be around 6 participants so that each participant has enough time to express his/her views. During the discussion-group sessions, it helps if one of the co-hosts is not assigned to any particular room and is allowed to enter and leave any of the parallel discussion-group sessions.

Box 3. Lessons learned: After the event phase

Evaluation of the EDP online event – It is most useful to run a short online survey at the end of the second workshop session (second day) to get participants' feedback on the event and suggestions on how to improve the process and ideas of themes for future events.

Follow-up – After the two sessions, it is important to send messages to all participants acknowledging the importance of their contributions. In addition, a summary with the main findings of the event should be circulated (or posted on the event website). It is important to keep the dialogue going, by inviting participants to continue to share their experiences. This can be done by continuing to organise workshops related to different stages of the region's EDP.

5. Final Discussion: the use of online events to support to EDP processes

Regional Smart Specialisation Strategies are much different from regional strategic innovation plans that are elaborated through a top-down participated process, and then followed by monitoring and control of public support expenditures related to R&D and Innovation according to the plan. In S3 regions are to concentrate on a certain density of inter-related projects and activities in specific priority domains, in order to experiment whether the resulting synergies, complementarities and agglomeration trigger regional economic transformation on the longer term. However this process of concentration is a decentralised "self-discovery" process (Haussman and Rodrik, 2003), driven by local enterprises and entrepreneurs i.e. not driven by local government, and not driven by local universities.

In "normal" circumstances, S3 and the EDP process would be supported by a series of in-person workshop-events such as EDP-focus-groups or Project Development Labs (Boden et al., 2016). However, with the new reality of "physical distancing" due to the Covid-19 pandemic, the rapid rise in the use of synchronous communication tools for all kinds of meetings and events suggests that in-person EDP events could be adapted to online events/workshops.

The pilot workshops in Alentejo and Algarve suggest that support to EDP can be continued and improved, even in difficult circumstances. EDP events organised by regional authorities should have the objective of creating a space or fora for understanding current regional innovation capabilities and learning-by-discovery opportunities to explore. These workshops are by no means the start and end of the process and therefore cannot be considered a tick box exercise when designing or revising a strategy. Before innovation actors can independently take the process forward, events organised by regional authorities can help create a shared understanding of what is required if S3 is to be properly implements through EDP.

Going forward, the type of event depends on to the stage of the S3 policy process. Events at the beginning of the process may serve to characterise and sense the system while exploring and validating the general domains proposed by regional authorities. Events at later stages, may focus on stimulating ideas and creativity for (re)definition of priority-domains at lower granularity levels and helping with project design and roadmapping. Just like physical events however, there needs to be sufficient human and financial resources allocated to support the role of facilitation and moderation of the entrepreneurial learning activities.

One advantage of online meetings is that the proceedings can be easily recorded. To keep a synchronous conversation alive, one idea is to synthesize key themes and next steps, then cut and paste them into an online community discussion board, blog, microblog, or community website. Ideally this could be done on the regional authorities website or even better on a specific micro-site

to support the S3 process. This type of follow up is good practice for any type of event, not just digital ones. In fact, physical meetings may create lots of dynamics on the day but this energy is often subsequently lost. Moving from events to online communities and discussion groups associated to each domains, is one way to keep the EDP alive. Therefore, regions should encourage the development of open discussion groups in each priority domain.

These on line open discussion groups in each domain can be supported by multiple channels. While some channels such as text chat, are synchronous (real-time), others such as blogs and wikis, are asynchronous. Some, such as most blogs, are one-way, and others, such as wikis and those using voice-over-IP, are two-way. For example, participants can post suggestions related to the event(s) theme on an online discussion board. In addition, announcements of the events, registration, pre-session preparations, places to post session topics can be organized the workshop site or alternatively on the sites of the organizers. However, unlike in-person events, because of online fatigue online events must be shorter and full day events should be avoided.

Overall, digitalisation of support to EDP allows for more regular interactions, even if it lacks the 'human touch' of meeting physically. It also allows for a potentially more inclusive process as people can join online events from wherever they are based. As we enter the 'new normal', which although is still far from clear, support to EDP can surely be improved and strengthened by experimenting with and building on new opportunities in the digital world.

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Regional smart specialisation strategies and Universities' engagement: An exploratory study

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Abstract

Smart Specialisation became a key piece of the European growth strategy and a major instrument of regional policy. Yet, adopting the principles and operationalising it is quite a complex process. As this novel approach calls for a new and more leading involvement of different actors in a collective 'entrepreneurial discovery process', universities are expected to play an even more pivotal role within the regional innovation systems and in the design and implementation of regional smart specialisation strategies. The present study enlightens on the positioning and role of universities within the value chain of smart specialisation. The empirical work is based on the analysis of the research and innovation strategies of 11 EU regions from 7 countries with different innovation performance levels and specialisation patterns by 2014-2015: two 'leaders', two 'followers', five 'moderate' and two 'modest'. Research results show that universities are mostly engaged in research-related activities and university engagement intensity varies according to the innovation performance and specialisation patterns - the higher the innovation performance of a region, the higher the university engagement level. Besides, the more specialized a region is in modern, high tech or manufacturing industries, the higher it is its engagement with university and its innovative performance.

Keywords: Smart specialisation; regional innovation systems; regional development; university engagement.
JEL classification: O43, R11, R58.

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1. Introduction

Smart Specialisation (SS) can be defined as an innovative policy concept which emphasizes the principle of prioritisation and defines a method to identify desirable areas for innovation policy intervention (Foray and Goenaga, 2013; Foray, 2016). The concept started to be shaped back in the

2000s and has gained high prominence mostly in the European Union's (EU) policy discourse when a report around the globalisation of research and development (R&D) delivered by a group of innovation scholars came out to view in 2007. A couple years later, the "Barca Report" (Barca, 2009) converted the concept into a key piece of the EU growth strategy and a major policy instrument of regional policy (European Commission, 2014a). A new vision emphasising a place-based approach advocated the need for the rethinking of the European regional policy (i.e. Cohesion Policy), in result of a paradigm shift experienced at the regional development policy level (OECD, 2009a,b; Anselmo and Cascio, 2011; Barca et al., 2012; Vanthillo and Verhetsel, 2012; Borrás and Jordana, 2016).

Smart Specialisation is closely linked to economic development and innovation-driven growth policies (McCann and Ortega-Argilés, 2011; Foray et al, 2012; OECD, 2013; Capello and Kroll, 2016). Since the 1980s scholars have been looking for new and more efficient approaches for local and regional development (OECD, 2008; Tomaney et al., 2010; Vanthillo and Verhetsel, 2012; Heimeriks and Balland, 2016). The last decades have witnessed a difficult adjustment period for many European countries, as the majority of governments faced low rates of economic growth, high unemployment figures and regionally concentrated economic development problems. Thus, both national and regional governments have been encouraged to invest in domains complementing the countries' productive assets to build future domestic capability and interregional comparative advantage (OECD, 2013).

The new strategic proposal spread rapidly and was adopted around the Europe 2020 Agenda, the European Commission's (EC) overall growth strategy, with its objectives of smart, sustainable and inclusive growth, and special focus on results. Eventually, the set-up and implementation of national and regional research and innovation strategies for smart specialisation (RIS3) became a prerequisite ("ex-ante" conditionality) to the participation of countries and regions in EU Structural Fund Programmes in the round of EU Cohesion Policy investment for 2014-2020 (European Commission, 2014b).

Over the last years the Smart Specialisation concept evolved to such an extent that it became a key piece of the EU growth strategy (European Commission, 2014a; Piirainen et al., 2017). However, the issues raised by this strategic approach go far beyond the discussion in the European context. In fact, a number of countries are taking growing interest in smart specialisation strategy as one way to lead their economies out of the crisis. Similar strategies are visible in a myriad of states and regions outside Europe such as Michigan or California in the United States, Korea and Singapore, or Australia (OECD, 2013).

While emerging as a relatively simple concept in abstract terms, recent studies suggest that the conceptual and policy implications of Smart Specialisation are far more complex and go beyond scientific, technological and economic specialisation, policy intelligence and governance arrangements (OECD, 2013). Adopting its principles is not expected to be a straightforward process - behind the simple idea stands a very complex process in practice (Foray et al., 2011; Kempton et al., 2013; Rodriguez-Pose et al., 2014). For instance, the method underlying this new approach proposes a new and more leading involvement of different actors in the entrepreneurial discovery process (Foray et al., 2009). Stakeholders from the Knowledge Triangle (Fotakis et al., 2014) as well as academia, businesses, public administrations and civil society shall be actively involved in the new collaborative leadership process advocated by smart specialisation (Foray et al., 2012). Ideally, in order to seek the maximum synergic potential, the smart specialisation process should mobilise all the actors of the "triple helix" and "quadruple helix" right from the very beginning (Foray and Rainoldi, 2013; Carayannis and Rakhmatullin, 2014), including universities.

Universities are core elements of both "triple" and "quadruple helix" innovation models (Leydesdorff, 2012; McAdam et al., 2017). Nevertheless, in times where public funding is under increasing scrutiny, universities need to demonstrate their value, contribution and benefit both to society and economy. While Gunasekara (2006) sustains that the theorisation on the role of universities in regional innovation systems has evolved over the last 20 years, existing literature provides rich insights on the evolution of universities' towards a new role in animating regional economic and social development, beyond their two traditional functions - teaching and research (Etzkowitz and Leydesdorff, 1997; OECD, 2011; E3M Project, 2012). National, regional and local governments as well as supra-national bodies such as the European Commission or OECD give increasing prominence to the role of universities beyond their core functions of teaching and research (Kempton et al., 2013). Indeed, such role has been highlighted by the EC in its agenda for the modernisation of Europe's higher education systems (European Commission, 2011) and promoted by the OECD's reviews of higher education in regional and city development back in 2005.

It becomes clear that higher education is being further mobilised for economic, social and cultural development of cities and regions (OECD, 2007). As this trend is likely to last, the active role of universities in terms of their contribution to local and regional development and innovation has gained a new salience in the context of smart specialisation as a future focus for European regional policy. All these insights converge around the idea that there is a range of mechanisms by which universities can contribute to regional innovation systems (European Union, 2011a; Foray et al., 2012; Kempton, 2015).

In the light of these circumstances, this paper enlightens on "where do universities stand within the value chain of smart specialisation". The actual positioning of universities within regional innovation systems and how their activities can contribute to the transformation of a regional economy through research and innovation strategies for smart specialisation need to be assessed. Accordingly, the specific goals of this paper are twofold: to demonstrate to what extent universities and other research organisations, as knowledge creating institutions, are recognised as key agents, and how (far) they are involved in the set-up and operationalisation of regional strategies for smart specialisation.

2. Literature Review

2.1. Defining Smart Specialisation

Smart Specialisation (SS) is still a developing concept (Del Castillo Hermosa et al., 2015). It is a relatively new approach to innovation policy and to economic development, a strategy in which governments design and deploy their policy instruments on the basis of market signals in order to leverage existing capabilities, assets and competences in the enterprise sector to promote innovation and to generate new comparative advantages (Cooke and Leydesdorff, 2006; United Nations, 2014). From another perspective, smart specialisation is a regional policy framework for innovation driven growth (OECD, 2013). It is also about value for money: smart R&D investment in a context of scarce resources (European Commission, 2012; Vázquez, 2012; Conte, 2014). In fact, it can be seen as an industrial and innovation framework for regional economies that aims to illustrate how public policies, framework conditions, but especially R&D and innovation investment policies can influence economic, scientific and technological specialisation of a region and consequently its productivity, competitiveness and economic growth path.

To push forward the smart specialisation concept, the EC set up of the Smart Specialisation Platform (JRC S3P), which assists European regions and Member States in developing, implementing and reviewing regional smart specialisation strategies, and help identify high-value added activities which offer the best chances of strengthening their competitiveness. In this line of thought, Ketels (2006) contends that competitiveness has become an important subject of academic, political and business debate, with regard to the ability of the economy to generate wealth and employment.

For the purpose of this work, we adopted the broadly accepted definition promoted by the JRC S3P which conceives Smart Specialisation as "a strategic approach to economic development through targeted support to Research and Innovation (R&I)". Its ultimate goal is to boost regional innovation in order to achieve economic growth and prosperity, by enabling regions to focus on their strengths.

According to the JRC S3P, Smart Specialisation targets the increase of efficiency in European investments in research, innovation and entrepreneurship, which involves "a process of developing a vision, identifying competitive advantage, setting strategic priorities and making use of smart policies to maximize the knowledge-based development potential of any region, strong or weak, high-tech or low-tech".

The Smart Specialisation strategy advocated by the European Union builds upon the set-up and implementation of national or regional Research and Innovation Strategies (RIS3), which are an evolution of the Regional Innovation Strategies (RIS) developed since 90s and 2000s (Del Castillo Hermosa et al., 2015). Although they share similar elements, the evolution of the socioeconomic context and the way of conceiving innovation have made a new approach necessary, both in regard to the objectives and the results to be pursued, as well as in the form of defining, implementing and monitoring. RIS3 are integrated, place-based economic transformation agendas that (European Commission, 2014b):

- Focus policy support and investments on key national/regional priorities, challenges and needs for knowledge-based development.
- Build on each country/region's strengths, competitive advantages and potential for excellence.
- Support technological as well as practice-based innovation and aim to stimulate private sector investment.
- Get stakeholders fully involved and encourage innovation and experimentation.
- Are evidence-based and include sound monitoring and evaluation systems.

RIS3 is a process that should lead to the identification of activities in which the investment of resources is likely to stimulate knowledge-driven growth (European Commission, 2014c). Specifically, the process of shaping and implementing a RIS3 strategy consists of a six-step approach sketched out by the EC to support policy-makers in the design and implementation of their national and regional strategies (Foray at al., 2012). In brief, the first step focuses on the analysis of the regional context and potential for innovation, followed by the set-up of a sound and inclusive governance structure, leading to the production of a shared vision about the future of the region. A limited number of priorities for regional development shall then be selected, followed by the establishment of suitable policy mixes. The final stage is the integration of monitoring and evaluation mechanisms.

On the other hand, RIS3 are based on four general principles summarised in the four 'Cs' of Smart Specialisation (European Commission, 2012): (tough) choices and critical mass, competitive advantage, connectivity and clusters, and collaborative leadership. (Tough) Choices and Critical mass appears linked to the selection of a limited number of priorities on the basis of own strengths and international specialisation, avoiding duplication and fragmentation in European Research Area. Competitive Advantage means the capacity to mobilize talent by matching research and technological development and innovation capacities and business needs through an entrepreneurial discovery process. Clusters and Connectivity appear as key to develop world class clusters and provide arenas for related variety/cross-sectorial links internally in the region and externally, which drive specialised technological diversification. Finally, Collaborative Leadership stands for efficient innovation systems as a collective endeavour based on public-private partnership (quadruple helix) and an experimental platform to give voice to all actors.

2.2. The Role of Universities in Regional Development

Over the past years many different concepts have emerged, conceptualising from various perspectives the changing role of Higher Education Institutions (HEIs) and its relation to regional development. Thus, there is a broad literature on the changing role of universities in regional development (Goldstein, 2010; Trippl et al., 2012).

Though not unimportant to the production system, neoclassical economic theory saw the role of knowledge and institutions involved in its creation as exogenous (Freeman, 1995; Capello and Nijkamp, 2009). Then, the emergence of the national innovation systems approach shifted that conceptualisation, while the increasing focus on regions as key contributors to innovation and national economic development has fostered the concept of regional innovation systems (RIS). The theorisation on the role of universities in regional innovation systems has evolved over the last decades (Gunasekara, 2006). It is broadly accepted that the evolution pointed towards the development of a third role in animating regional economic and social development (Etzkowitz and Leydesdorff, 1997; Etzkowitz, 2008; Trippl et al., 2012) that has reshaped and transformed their two traditional functions – teaching and research.

The literature on university "third mission" transformations and their relationships to regional development (also known as 'third stream activities') is relatively broad and diverse. To this regard, Trippl et al. (2012, 2015) highlight four approaches: (i) the entrepreneurial university model, (ii) the regional innovation systems concept, (iii) the "mode 2 of knowledge production" approach, and (iv) the "engaged university" model. Gunasekara (2006) refers to the literature of the engaged university and the "triple helix" model as the two dominant approaches to conceptualisation. These two bodies of thinking point to a distinction between generative and developmental roles performed by universities in regional innovation systems.

While science systems are said to be in transformation (Hessels and Van Lente, 2008), universities have been recognised for long as providers of basic scientific knowledge for industrial innovation through research and related activities but have re-positioned as primary institutional spheres in economic regulation along with industry and the state (Etzkowitz and Leydesdorff, 1997; Leydesdorff, 2012). On these grounds the triple helix model explains the roles and relationships between university, industry and government (Cooke and Leydesdorff, 2006) where a set of political entities, industrial organisations and academic institutions jointly work together within the overall objective of boosting the conditions for innovation and organisation able to drive regional development processes (Etzkowitz, 2008). The model conceptualises a non-linear, interactive approach to innovation as a recursive overlap of interactions and negotiations among the three helices which were formerly separate entities that interacted across strongly closed boundaries (Leydesdorff, 2003). At the same time, it puts emphasis on academic entrepreneurialism, centred on knowledge capitalism and other capital formation projects, which may be regarded as conceptualizing a generative role for universities where these institutions drive development.

On the other hand, the literature of the engaged university (OECD, 1999; Chatterton and Goddard, 2000; Holland, 2005) also focuses on the third role of universities in regional development but it differs from the triple helix model in its emphasis on adaptive responses by universities, which embed a stronger regional focus in their teaching and research missions (Gunasekara, 2006). This approach takes a broader, developmental focus that includes a range of mechanisms by which universities engage with their regions.

Universities' role varies according to different regional settings (Gunasekara, 2006; Kempton, 2015). As a core element of the "Quadruple Helix model" that emerges at the heart of the smart specialisation agenda, the role of universities in regional innovation became a key area of interest. The interaction between science and economic actors at different geographical scales is acknowledged by various authors. McCann and Ortega-Argilés (2011) contend that smart specialisation envisages that "the identification of the knowledge intensive areas for potential growth and development are related to the role of certain classes of players (researchers, suppliers, manufacturers and service providers, entrepreneurs, users) and the public research and industry / science links. The players are regarded as being the agents who use the knowledge acquisition facilities and resources (human capital, ideas, academic and research collaborations) to scan the available local economic and market opportunities, to identity technological and market niches for exploitation and thereby act as the catalyst for driving the emerging transformation of the economy".

Notwithstanding continuities with the preceding regional innovation systems paradigm, Goddard et al. (2013) suggest that the core principles contained in the Smart Specialisation approach represent a set of challenges, tensions and opportunities for the position of universities in regional strategies. Universities are seen as crucial institutions in regional innovation systems, especially in those with an absence of a dynamic, research led private sector. Kempton et al. (2013) advance a set of examples of the roles/contributions of universities to a smart specialisation strategy:

- Contribute to the region's knowledge assets, capabilities and competencies;
- Contribute to the regional entrepreneurial discovery process by bringing global awareness and partnerships across regional borders;
- Provide specialist research expertise and links to national and international networks of knowledge;
- Enhance staff skills and competencies through their teaching programmes (under/post graduate courses, continuing professional training, lifelong learning);
- Contribute to capacity building on the demand side through new business creation;
- Act as key anchor institution in terms of institutional leadership and governance;
- Contribute to local knowledge creation and its translation into innovative products and services.

From another perspective, in the study published by McAdam et al. (2012) on the development of the university's role in the transfer of technology to interested parties at the regional level, three potential means of aggregating value for regional development arise: the regional benefits of universities (population growth, job opportunities, increasing spin-offs and other costs), the benefits implicitly deriving from growth in the "knowledge economy", and the response capacity through the supply of flexible and innovative solutions to the front-line of an economy undergoing rapid mutation within a concept of regions acquiring knowledge and including universities. Further to this analysis,

Dinapoli (2011) highlights how higher education institutions act as catalysers of economic growth and serve as the fuel to drive new ideas and technologies through building up a qualified workforce, establishing partnerships with private sector entities and investors. The university may also help reposition regions within the framework of knowledge economies, fostering their development and innovation through the conversion of research outputs into new products, business processes and organic changes that create wealth or social welfare" (OECD World Forum, 2007).

Yet, despite the numerous opportunities, there are a number of challenges and obstacles to be considered. Actually, adopting the principles of smart specialisation is expected not to be straightforward. Studies have revealed a number of barriers to engagement between universities and their cities/regions in terms of their contribution to innovation (OECD, 2007; Goddard and Puukka, 2008). If public authorities and the key regional players understand the principles, practices and barriers and how to overcome them, the potential for maximising the contribution of universities will be enhanced (Kempton et al., 2013).

3. METHODOLOGY

The programme of empirical research relied on a qualitative data and content analysis, complemented by a survey. Specifically, the first component consisted on mapping and listing data related to the innovation performance of EU countries and regions, based on the Innovation Union Scoreboard (IUS) 2014 and the Regional Innovation Scoreboard (RIS) 2014. Following the assessment by the EC, both countries and regions have been selected and divided into four groups according to their innovation performance levels (see Table A1): "innovation leaders", "innovation followers", "moderate innovators" and "modest innovators".

Regarding the average innovation performance at country level, according to the 2014 IUS edition, EU Member-States (EU 28) have been classified as follows: "Innovation leaders" (4 countries), "Innovation followers" (10 countries), "Moderate innovators" (11 countries) and "Modest innovators (3 countries). Similarly, Europe's regions are grouped into different and distinct innovation performance groups based on their relative performance on the Regional Innovation Index compared to that of the EU. According to the latest RIS edition in 2014, Europe's regions (190 in total) have been classified into "Regional Innovation leaders" (34 regions), "Regional Innovation followers" (57 regions), "Regional Moderate innovators" (68 regions) and "Regional Modest innovators" (31 regions). For the purpose of this work, both EU Members States and regions were listed and distributed within each innovation performance group.

Afterwards, countries and regions listed in IUS and RIS 2014 were shortened according to their registration status in the Smart Specialisation Platform (S3P) at the time the study (February 2015). The results of the analysis showed that out of the 28 countries, only 15 were officially registered at national level in the S3P, and out of the 190 regions, only 96 were officially registered in the S3P.

With a narrower sample composed of 96 regions, it became key to assess which regions had already smart specialisation strategies defined and available, and which from those met the criteria of a "valid" region for this study (i.e. existing RIS3, available in English, German, Italian, Spanish or Portuguese). So, "valid" smart specialisation strategies or regional innovation plans were further researched. In addition to a search on the web, for this task, 238 contact persons from the different regions appearing in the S3P Platform were contacted by e-mail between 2 March and 8 April 2015.

The initial message described the theme, scope and goals of the study and asked for support in the identification and specific location of the regional RIS3 of each region. Out of the 96 email messages sent, 23 responses by e-mail were received. Also the Smart Specialisation Platform Team (JRC IPTS) has been contacted with the goal of finding out if there is a page with all the RIS3 – the answer was "no", countries and regions are not obliged to publish their RIS3. In the end of this round, based on the inputs received by RIS3 contact persons and our own research on the web, 56 regions were considered potentially valid for further analysis.

A match was then performed to assess if all these replies were coming from "valid" regions – 4 regions were excluded as they did not meet the criteria related to the existence of a RIS3 strategy or regional innovation plan in a language which we could understand and analyse. So, our sample was once again shortened into 18 regions. This final stage paved the way to the selection of the regions to study.

From the overall listing of RIS3, peer-reviewed strategies for smart specialisation in different countries and regions were selected, followed by a benchmarking exercise which included a

comprehensive qualitative content analysis aimed at assessing the involvement and contribution of universities to their regional RIS3, by revealing the actual activities they develop (or are expected to develop in the future) in their regional development agendas.

Universities engagement level was then assessed in the light of a range of specific activities that refer to knowledge-based interactions between HEIs and organisations in the private, public and voluntary sectors, and wider society – the so called "third stream activities".

Specifically, the analysis was performed around 4 broad activity groups, as detailed in Table 1 below, namely: 1) the placement of undergraduate and postgraduate students and academic staff; 2) research and jointly undertaken research activities, contract research and consultancy activity, participation in consortia by academics and involvement of external organisations; 3) dissemination and networking between HEIs and external organisations, 4) community-based activities, and 5) other activities such as the use of academic resources of the HEIs by external organisations. Accordingly, for each RIS3 selected, the proximity to the activities described below was sought and examined in an attempt to measure knowledge transfer activities of universities.

TABLE 1: MATRIX OF ACTIVITIES RELATED TO UNIVERSITIES ENGAGEMENT

Group of activities	University engagement activities
Activities around **exchanges of** undergraduate and postgraduate **students and academic staff** with/to external organisations	Post-course placements of undergraduate/postgraduate students
	In-course student projects or placements
	Joint curricula development
	Personal secondments to external organisations (short or long term)
	Hosting visits by individuals from external organisations (short or long-term)
	Membership of advisory boards to external organisations
	Providing highly qualified human resources
	Providing advanced training (phd/post-doc)
	Providing continuing professional development (CPD) and/or lifelong learning training
Activities around (joint) **research activities**, contract research and consultancy activity, participation in consortia by academics involving external organisations	Knowledge/technology creation and transfer to business sector
	Joint research agreements
	Contract research agreements
	Consultancy agreements
	Taking out patents
	Licensing research
	Forming spin-outs
	Forming consultancy
	Participation in consortia involving external organisations
	New knowledge and technology dissemination and outreach
	Creation of physical facilities with external organisation funding
	Support to "seed" projects
	Product prototyping and testing, proof of concept, pilot actions, product validation
Activities related to **dissemination and networking** between HEIs and external organisations	Joint publications with individuals from external organisations
	Attending conferences with HEI and external organisations' participation
	Organizing conferences with HEI and external organisations' participation
	Participation in standard-setting forums
	Participation in networks involving external organisations
	Giving lectures or talks for non-HEI external organisations
	Providing informal advice on a non-commercial basis
Community-based activities	Giving public lectures for the community
	Provision of community-based performance arts
	Provision of community-based sports
	Provision of public exhibitions
	Involvement with schools projects
Other activities	Provision of equipment and facilities

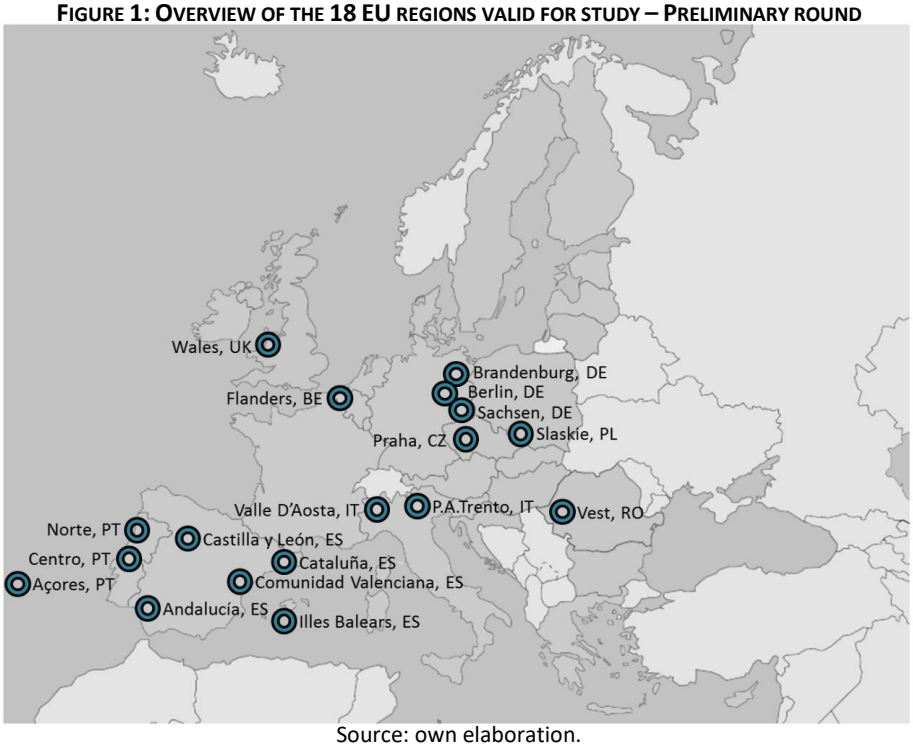
Source: own elaboration, based on the evaluation report by PACEC and the CBR, University of Cambridge, 2009.

The qualitative content analysis was complemented by an online survey that was set up and made available online (Google forms technology) between 8 March and 21 April 2015. The survey was part of the second email message sent to the regional RIS3 contact persons – its specific goal was to ask the people in charge of the conception and implementation of regional smart specialisation strategies about the involvement and role of universities within the smart specialisation strategy of their regions according to the activities matrix. Taking into account its specific regional context and RIS3, each respondent had to identify if Universities in his/her region are currently involved or expected to be involved in activities around i) exchanges of undergraduate and postgraduate students and academic staff with/to external organisations, ii) joint research activities, contract research and consultancy activity, participation in consortia by academics involving external organisations, iii) dissemination and networking between HEIs and external organisations, iv) community-based activities or v) other activities. Survey respondents were also asked to rate the overall involvement of Universities within the Smart Specialisation strategy of their regions. Apart from 5 replies from contact persons stating they were not in good position to reply, 22 responses to the survey were received in total. The answers received allowed to make a cross-analysis enabling to assess whether there were any convergence/divergence with the results of the qualitative content analysis carried out.

The analysis undertaken allowed outlining a set of models based on patterns that are likely to demonstrate the trends regarding the role of universities within smart specialisation agendas. These trends were established by analysing the type of activities that universities perform in their regions in connection to the region's innovation performance level and specialisation patterns. Different models are outlined according to the regional innovation performance levels, meaning that models for "innovation leaders", "innovation followers" "moderate innovators" and "modest innovators" regions are put forward with the aim of being used for future reference. Those models are seen as useful as they will make available, for instance, to those countries and regions that still not have defined their RIS3 strategies, guidelines around the involvement of universities and other research organisations in the design and implementation of regional research and innovation strategies for smart specialisation.

When it comes to the selection of relevant regions for analysis, initially, 18 regions met the criteria that allowed carrying out the analysis (see Figure 1). For each of the 18 potentially 'valid' regions, a regional profile with generic information and an overview of the innovation performance according to the RIS 2014 has been outlined (the latter to be used in the characterization of the selected regions for study at a later stage, along with a description of the specialisation areas). Then, regions were grouped according to their innovation performance level.

FIGURE 1: OVERVIEW OF THE 18 EU REGIONS VALID FOR STUDY – PRELIMINARY ROUND



Source: own elaboration.

The next stage was the final selection of regions for study. The rationale behind the final selection appears from the outset linked to the regional innovation performance level (verified through RIS 3 indicators analysis), the specialisation profile and the feedback obtained from the regional SS contact persons at S3P in response to the survey on university engagement related activities (verified through the reception of reply to the research survey).

As opposed to the regional innovation leaders and regional modest innovators groups, where 2 regions in each group fully complied with the two criteria above thus being immediately selected, in the case of the regional innovation followers and regional moderate innovators another criteria was applied – in benefit of inner heterogeneity within the same innovation group and regional diversity, we looked for the regions presenting the most different innovation indicators (in the case of the innovation followers, 2 out of 3 regions were selected, in the case of the moderate innovators, 5 out of 11 regions). As a result, out of the 18 potentially valid regions, we came down to a group of 11 regions in total, distributed according to their innovation level, as shown in Table 2.

TABLE 2: LIST OF EU REGIONS SELECTED FOR STUDY

Regional Innovation Group	Selected regions for study
Regional innovation leaders	Berlin (DE) Sachsen (DE)
Regional innovation followers	Brandenburg (DE) Wales (UK)
Regional moderate innovators	Cataluña (ES) Norte (PT) R.A. Açores (PT) Valle D'Aosta (IT) Slaskie (PL)
Regional modest innovators	Illes Balears (ES) Vest (RO)

Source: own elaboration.

4. EMPIRICAL RESULTS

The results of the qualitative content analysis carried out to the regional innovation strategy documents are presented according to the regional innovation performance level, thus the main outputs and conclusions are presented by innovation performance group: regional innovation leaders and followers, moderate and modest innovators.

University engagement: Innovation Leaders – Berlin & Sachsen

The content analysis carried out focused on the regional innovation policy documents of the two innovation leading regions, namely:

- Joint Innovation Strategy of the States of Berlin and Brandenburg (innoBB)
- Innovation Strategy of the Free State of Sachsen

The analysis revealed that universities in both regions are mostly involved in activities related to one of the two traditional missions of universities acknowledged by the literature – research, building upon the idea that besides its activity linked to the provision of new and qualified workers (first stream), universities contribute to their regional innovation systems by increasing knowledge production and delivering scientific results (second stream). In fact, in spite of being involved in activities related to their core teaching function, through the provision of highly qualified human resources and advanced training aimed at fostering exchanges with external organisations, higher education institutions in both regions seem to play a particularly active role around joint research

activities, contract research and consultancy activity, as well as in the participation in consortia by academics involving external organisations.

Unsurprisingly, there are differences amongst the specific activities that each region engages in. From our point of view, such differences can be possibly explained by the specific environment and interactions between stakeholders from the different sectors within each regional innovation system itself. Taking as example the case of those activities related to the first stream (education), building upon student and staff exchanges with/to external organisations, the two regions account differently when it comes to in-course students projects or placements, secondments, joint curricula development and continuing professional development – as opposed to Berlin, Sachsen seems to give higher importance to these areas of university action.

It should be noticed that Berlin takes a leading position in new fields of technology, from life/health sciences to ICT, optics, microsystems up to clean technologies, while Sachsen takes the lead in advanced manufacturing around automotive industry, ICT/microelectronics, life sciences, environmental and energy technology, railway technology and aerospace. Despite the obvious different fields of action (contract research agreements, research licensing, taking out patents, disseminating new knowledge or technology, creation of physical facilities with external funding), possibly deriving from the fact that the two regions have different specialization areas, some other activities seem to be similarly key to both regions, as they can be found in both regional strategies. That is the case of second stream activities related to knowledge and technology creation and transfer to business sector, joint research agreements, spin-outs formation, participation in consortia involving external organisations, and product prototyping and testing, proof of concept, pilot actions or product validation.

When it comes to activities related to dissemination and networking between HEIs and external organisations, both regions seem to value the participation of universities in networks involving external organisations. On the other hand, the content analysis shows that community-based activities are rather absent from the pool of activities in which universities are involved in. Finally, both regions are engaged in other type of activities, namely the provision of equipment and facilities.

These findings are corroborated by the perspective of those in charge of designing and implementing regional RIS3. When observing the activities pinpointed by the smart specialisation contact persons at S3 Platform (RCPs) at the validation survey, it becomes clear that in general terms there is convergence with our analysis – both leading regions recognize universities as key providers of basic scientific knowledge for innovation mostly through research-related activities. This can be demonstrated by the large amount of research-related activities universities are involved in, followed by education-related activities.

Table 3 shows the results of the content analysis carried out in the present study as well as those of the survey answered by the regional contact persons (RCPs) dealing with issues related to smart specialisation. It is worth mentioning that our analysis and the ones from the RCPs do not match totally when it comes to the selection of activities with university involvement. For instance, when analyzing both RIS3, we found pieces of evidence that denote the involvement of universities in activities around joint curricula development with business sector (Sachsen), and in the provision of highly skilled and trained workforce (Berlin and Sachsen).

TABLE 3: INNOVATION LEADERS ANALYSIS ON UNIVERSITY ENGAGEMENT ACTIVITIES

UNIVERSITY ENGAGEMENT ACTIVITIES MATRIX		Regional Innovation Leaders			
		Berlin (DE-NUTS 1)		*Sachsen (DE-NUTS 1)*	
		Content analysis	Regional Contact Person analysis (Survey)	Content analysis	Regional Contact Person analysis (Survey)
Activities around **exchanges of** undergraduate and postgraduate **students and academic staff** with/to external organisations	Post-course placements of undergraduate/postgraduate students				
	In-course student projects or placements				●
	Joint curricula development			○	
	Personal secondments to external organisations (short or long term)				●
	Hosting visits by individuals from external organisations (short or long-term)				●
	Membership of advisory boards to external organisations				
	Providing highly qualified human resources	○		○	
	Providing advanced training (phd/post-doc)	○		○	
	Providing continuing professional development (CPD) and/or lifelong learning training	○		○	
Activities around (joint) **research activities**, contract research and consultancy activity, participation in consortia by academics involving external organisations	Knowledge/technology creation and transfer to business sector	○		○	
	Joint research agreements	○	●	○	●
	Contract research agreements	○	●		●
	Consultancy agreements			○	●
	Taking out patents		●	○	
	Licensing research			○	
	Forming spin-outs	○	●	○	●
	Forming consultancy				
	Participation in consortia involving external organisations	○	●	○	●
	New knowledge and technology dissemination and outreach			○	
	Creation of physical facilities with external organisation funding		●	○	●
	Support to "seed" projects				
	Product prototyping and testing, proof of concept, pilot actions, product validation	○	●	○	●
Activities related to **dissemination and networking** between HEIs and external organisations	Joint publications with individuals from external organisations		●		
	Attending conferences with HEI and external organisations' participation				●
	Organizing conferences with HEI and external organisations' participation				●
	Participation in standard-setting forums				
	Participation in networks involving external organisations	○	●	○	●
	Giving lectures or talks for non-HEI external organisations				
	Providing informal advice on a non-commercial basis				●
Community-based activities	Giving public lectures for the community				
	Provision of community-based performance arts				
	Provision of community-based sports				
	Provision of public exhibitions				
	Involvement with schools projects				
Other activities	Provision of equipment and facilities	○	●	○	●
	Overall rating of the involvement of universities within the SS strategy of the region (RCP)	n/a	3	n/a	4

Source: own elaboration.

On top of the two separate visions above, the positioning of universities within the value chain of smart specialisation is also upheld by the overall rating from the RCPs on the involvement of universities in the conception and implementation of the regional RIS3 – while Berlin rates overall university involvement with 3, Sachsen rates it 4 out of 5.

University engagement: Innovation Followers – Brandenburg and Wales

The content analysis performed focused on the regional innovation policy documents of the two innovation follower regions, namely:

- Joint Innovation Strategy of the States of Berlin and Brandenburg (innoBB) & Innovation Strategy of the State of Brandenburg (innoBB plus)
- Innovation Wales

The analysis revealed that universities are mostly engaged in activities related to its second mission: research, building upon the notion that universities contribute actively to their regional innovation

systems by producing knowledge and delivering scientific results to be absorbed by the society at a later stage (third mission), on top of providing excellence in education (first mission).

Indeed, despite being involved in activities related to their first mission – teaching – through the provision of qualified workforce and advanced training aimed at encouraging exchanges with external organisations, higher education institutions in both regions seem to play a particularly active role around joint research activities, contract research and consultancy activity, participation in consortia by academics involving external organisations, being also involved in research licensing and spin-outs formation activities.

As expected, differences can be seen regarding the specific activities in which universities are involved in each region. From our point of view, those differences are due to the specific milieu and interactions between stakeholders within the two regional innovation systems. Looking into the universities first mission (education) as an example, it becomes clear that the two regions have different views about the promotion of post-course placements of students, joint curricula development, staff secondments and providing highly qualified work force – while Wales addresses the first three areas within its RIS3, Brandenburg puts more emphasis on the provision of highly qualified human resources. However, both regions are tuned in what regards the importance of providing advanced, continuing professional training or lifelong learning training.

It should be noticed that Brandenburg takes a leading position in advanced manufacturing, steel production, agri-food industry and tourism, while Wales takes the lead in sectors around agriculture, heavy industry (coal mining, oil refining) and traditional manufacturing (aerospace, automotive and electronics). Despite the clear different fields of action (joint research and contract research agreements, licensing research, spin-outs formation and new knowledge dissemination and outreach), possibly resulting from the fact that the two regions have different specialization areas, some other actions seem to be key to both regions. That is the case of second stream activities related to scientific knowledge and technology creation, transfer to business sector and participation in consortia involving external organisations and product testing/prototyping/validation, proof of concept or pilot actions.

In respect of activities related to dissemination and networking between HEIs and external organisations, both regions seem to value the participation of universities in networks involving external organisations. Once again, the content analysis reveals that community-based activities are rather absent from the pool of activities in which universities are involved in. Actually, only Wales fosters university involvement with schools via joint projects. On the other hand, Brandenburg is engaged in other type of activities, namely the provision of equipment and facilities.

Although these findings find a thin matching with the perspective of those in charge of designing and implementing regional RIS3, when observing the activities pinpointed by the smart specialisation contact persons at S3 Platform at the validation survey, it becomes clear that in general terms there is convergence with our analysis – both innovation follower regions recognize universities as key providers of basic scientific knowledge for innovation mostly through research-related activities. Again, this can be demonstrated by the larger amount of research-related activities universities are involved in, followed by education-related activities.

Table 4 shows the results of the content analysis carried out in the present study as well as those of the survey answered by the regional contact persons (RCPs) dealing with issues related to smart specialisation. It is worth mentioning that there is a considerable gap between our analysis and the one from the RCPs around the selection of activities with university involvement. For instance, when analyzing both RIS3, we found pieces of evidence that denote the involvement of universities in activities around the provision of highly qualified human resources, product prototyping/testing, etc (Brandenburg), as well as advanced training and knowledge/technology creation and transfer (Brandenburg and Wales).

TABLE 4: INNOVATION FOLLOWERS ANALYSIS ON UNIVERSITY ENGAGEMENT ACTIVITIES

UNIVERSITY ENGAGEMENT ACTIVITIES MATRIX		Innovation Followers			
		Brandenburg (DE-NUTS 1)		*Wales (UK-NUTS 1)*	
		Content analysis	Regional Contact Person analysis (Survey)	Content analysis	Regional Contact Person analysis (Survey)
Activities around **exchanges of** undergraduate and postgraduate **students and academic staff** with/to external organisations	Post-course placements of undergraduate/postgraduate students		●	○	
	In-course student projects or placements		●		
	Joint curricula development		●	○	
	Personal secondments to external organisations (short or long term)			○	●
	Hosting visits by individuals from external organisations (short or long-term)				
	Membership of advisory boards to external organisations		●		●
	Providing highly qualified human resources	○			
	Providing advanced training (phd/post-doc)	○		○	
	Providing continuing professional development (CPD) and/or lifelong learning training	○	●	○	
Activities around (joint) **research activities**, contract research and consultancy activity, participation in consortia by academics involving external organisations	Knowledge/technology creation and transfer to business sector	○		○	
	Joint research agreements	○	●		
	Contract research agreements	○	●		●
	Consultancy agreements				●
	Taking out patents		●		
	Licensing research		●	○	●
	Forming spin-outs	○	●		●
	Forming consultancy		●		
	Participation in consortia involving external organisations	○	●	○	●
	New knowledge and technology dissemination and outreach			○	
	Creation of physical facilities with external organisation funding				
	Support to "seed" projects				
	Product prototyping and testing, proof of concept, pilot actions, product validation	○		○	●
Activities related to **dissemination and networking** between HEIs and external organisations	Joint publications with individuals from external organisations				
	Attending conferences with HEI and external organisations' participation		●		●
	Organizing conferences with HEI and external organisations' participation		●	○	●
	Participation in standard-setting forums				
	Participation in networks involving external organisations	○	●	○	●
	Giving lectures or talks for non-HEI external organisations		●		
	Providing informal advice on a non-commercial basis			○	●
Community-based activities	Giving public lectures for the community				●
	Provision of community-based performance arts				
	Provision of community-based sports				
	Provision of public exhibitions		●		
	Involvement with schools projects		●	○	●
Other activities	Provision of equipment and facilities	○			●
	Overall rating of the involvement of universities within the SS strategy of the region (RCP)	n/a	5	n/a	5

Source: own elaboration.

On top of the two separate visions above, the positioning of universities within the value chain of smart specialisation is also upheld by the overall rating from the RCPs on the involvement of universities in the conception and implementation of the regional RIS3 – both regions rate overall university involvement in their RIS 3 with 5, out of 5.

University engagement: Moderate Innovators – Norte, Cataluña, Azores, Valle D'Aosta, Slaskie

The content analysis carried out focused on the regional innovation policy documents of the five moderate innovator regions, namely:

- Regional Strategy of the North Region for Smart Specialisation (Norte 2020)
- Research and Innovation Strategy of Autonomous Region of Azores (RIS3 Açores)
- Research and Innovation Strategy of Cataluña for Smart Specialisation (RIS3CAT)
- Smart Specialisation Strategy in Valle D'Aosta (VdA 2020)
- Regional Innovation Strategy of the Slaskie Voivodeship

The analysis revealed that universities are mostly engaged in research-related activities, i.e. universities' second mission. The five regions are engaged in activities around the

knowledge/technology creation and transfer to the business sector as well as the participation in consortia involving external organisations.

With the exception of Valle D'Aosta, all regions are involved in activities around product prototyping/testing/validation, proof of concept or pilot actions – see Table 5 for a synthesis. The same table shows that the regions get involved in a myriad of different activities, for instance, in the dissemination and outreach of new knowledge and technology (Norte, Azores and Slaskie), contract research agreements (Valle D'Aosta), consultancy agreements and licensing research (Norte and Cataluña), forming spin-outs (Cataluña and Azores). Support to seed projects, joint research agreements, taking out patents and forming consultancy do not appear to be key areas of action for most regions.

Despite being mostly involved in activities related to their second mission – research – higher education institutions in all regions seem to play a quite an active role around education and training activities, as well as students and staff exchanges. Cataluña, Azores and Slaskie are the regions where universities intervene more in regards to education activities. All regions are committed to providing highly qualified human resources to business and society; also, with the exception of Cataluña, they all work towards the provision of advanced training. Another exception can be seen in Norte, where activities around the provision of continuing professional development and/or lifelong learning training are inexistent, as opposed to the other four regions. As expected, due to the different regional settings, differences can be seen regarding the specific activities in which universities are involved in each region. The following combinations are also observed: post-course placements of students (Norte and Cataluña), in-course student projects and placements and secondments to external organisations (Cataluña and Slaskie), joint curricula development (Cataluña and Azores).

In respect of activities related to dissemination and networking between HEIs and external organisations, all regions are keen to participate actively in networks involving external organisations. Azores and Slaskie also refer the attendance and organisation of conferences with HEIs and external organisations' participation as action areas (Azores). Lastly, the participation in standard-setting forums appears to be an activity where Silesian universities are involved in.

Once more, the content analysis reveals that community-based activities are rather absent from the pool of activities in which universities are involved in. On the other hand, apart from Norte, all regions are engaged in other type of activities, namely the provision of equipment and facilities.

Generally speaking, these findings find a thin matching with the perspective of those in charge of designing and implementing regional RIS3. When observing the activities pinpointed by the smart specialisation contact persons at S3 Platform at the validation survey, it becomes clear that in general terms there is convergence with our analysis – all moderate innovator regions recognize universities as key providers of basic scientific knowledge for innovation mostly through research-related activities in first place. Again, this can be demonstrated by the higher number of research-related activities in which universities are involved in, followed by education-related activities.

Table 5 shows the results of the content analysis carried out in the present study as well as those of the survey answered by the regional contact persons (RCPs) dealing with issues related to smart specialisation in the regions concerned. It is worth mentioning that there is a considerable gap between our analysis and the one from the RCPs around the selection of activities with university involvement. For instance, when analyzing both RIS3, we found pieces of evidence that denote i) a higher involvement in education and training activities than the one transmitted by Valle D'Aosta and Slaskie's respondents; ii) less involvement of universities in activities around the communication based activities, than the one transmitted by Cataluña, Azores and Norte's respondents; in fact, Cataluña and Azores selected all activities (7 in total).

TABLE 5: MODERATE INNOVATORS ANALYSIS ON UNIVERSITY ENGAGEMENT ACTIVITIES

UNIVERSITY ENGAGEMENT ACTIVITIES MATRIX	Moderate Innovators									
	Norte (PT-NUTS 2)		*Cataluña (ES-NUTS 2)*		*R.A. Açores (PT-NUTS 2)*		*Valle D'Aosta (IT-NUTS 2)*		*Slaskie (PL-NUTS 2)*	
	Content analysis	Regional Contact Person analysis (Survey)	Content analysis	Regional Contact Person analysis (Survey)	Content analysis	Regional Contact Person analysis (Survey)	Content analysis	Regional Contact Person analysis (Survey)	Content analysis	Regional Contact Person analysis (Survey)
Post-course placements of undergraduate/postgraduate students	○		○			●				
In-course student projects or placements			○			●			○	
Joint curricula development		●	○	●	○					
Personal secondments to external organisations (short or long term)		●	○						○	
Hosting visits by individuals from external organisations (short or long-term)				●	○					
Membership of advisory boards to external organisations				●		●				●
Providing highly qualified human resources	○		○		○		○		○	
Providing advanced training (phd/post-doc)	○				○		○		○	
Providing continuing professional development (CPD) and/or lifelong learning training			○		○	●	○		○	
Knowledge/technology creation and transfer to business sector	○		○		○		○		○	
Joint research agreements				●	○	●				
Contract research agreements		●		●		●	○		○	
Consultancy agreements	○	●	○	●		●		●		●
Taking out patents			○	●		●				
Licensing research	○	●	○	●		●				
Forming spin-outs		●	○	●	○	●				
Forming consultancy					○	●		●		●
Participation in consortia involving external organisations	○	●	○	●	○	●	○	●	○	●
New knowledge and technology dissemination and outreach	○				○				○	
Creation of physical facilities with external organisation funding				●		●				
Support to "seed" projects	○								○	
Product prototyping and testing, proof of concept, pilot actions, product validation	○	●	○	●	○	●		●	○	
Joint publications with individuals from external organisations		●		●		●				
Attending conferences with HEI and external organisations' participation		●		●	○	●				
Organizing conferences with HEI and external organisations' participation		●		●	○	●				
Participation in standard-setting forums		●		●		●			○	●
Participation in networks involving external organisations	○	●	○	●	○	●	○		○	
Giving lectures or talks for non-HEI external organisations				●		●				
Providing informal advice on a non-commercial basis				●		●				
Giving public lectures for the community				●		●				
Provision of community-based performance arts		●								
Provision of community-based sports										
Provision of public exhibitions				●						
Involvement with schools projects				●		●		●		●
Provision of equipment and facilities		●	○	●	○	●	○	●	○	●
Overall rating of the involvement of universities within the SS strategy of the region (RCP)	n/a	3	n/a	5	n/a	4	n/a	4	n/a	4

Source: own elaboration.

On top of the two separate visions above, the positioning of universities within the value chain of smart specialisation is also upheld by the overall rating from the RCPs on the involvement of universities in the conception and implementation of the regional RIS3 – Cataluña rates overall university involvement in their RIS 3 with 5, Azores, Valle D'Aosta and Slaskie with 4, and Norte with 3 (out of 5).

Modest Innovators – Illes Baleares and Vest

The content analysis carried out focused on the regional innovation policy documents of the two modest innovator regions under study, namely:

- Regional Innovation Strategy for Smart Specialisation in Sustainable and Technological Tourism (S4T2 Balears)

- Smart Specialisation Strategy in West Region Romania

The content analysis showed that universities perform slightly different roles within the two regions. While in the case of Illes Baleares universities engagement seems to be equally distributed amongst its two main functions: education (first stream) and research (second stream, in Vest region universities appear to be particularly active in activities connected to the second mission of universities, i.e. research, namely around knowledge/technology creation and transfer, contract research, patenting and research licensing, spin-outs creation, as well as the participation in

consortia involving external organisations and product prototyping/testing/validation, proof of concept and pilot actions. On the contrary, in Illes Balears universities are mostly engaged in research activities around knowledge/technology creation and transfer to business sector, joint research agreements and consultancy agreements.

The engagement in first mission activities (education) seems to be aligned with the low indicators on population with tertiary education presented by Illes Balears.

Such positioning may in turn call for the need of investing more in the qualification and training of workforce (including the provision of professional continuing development or lifelong learning training) in the Balearic Islands, along with the creation of joint curricula that meet the needs of the market in both regions.

Surprisingly, there are only few matchings amongst the specific activities that each modest region engages in. That is the case of joint curricula development and provision of continuing professional development (CPD) and/or lifelong learning training in the field of education, and knowledge/technology creation and transfer to business sector, in the field of research activities.

When it comes to activities related to dissemination and networking between HEIs and external organisations, Illes Balears seems to value the participation of universities in networks involving external organisations. On the other hand, the content analysis shows that community-based activities are totally absent from the pool of activities in which universities are involved in. Finally, Vest region is engaged in other type of activities, namely the provision of equipment and facilities.

These findings denote a mismatch with the perspective of those in charge of designing and implementing regional RIS3 in the two regions. This can be demonstrated by the large amount of research-related activities universities are involved in Vest, followed by education-related activities (Illes Balears and Vest). Also, when observing the activities pinpointed by the smart specialisation contact persons at S3 Platform at the validation survey, it becomes clear that there is low convergence with our analysis – both regions mark universities as having different active roles and contributions in activities related to dissemination and networking between HEIs and external organisations, community-based activities and other activities, such as the provision of equipment and facilities.

Table 6 shows the results of the content analysis carried out in the present study as well as those of the survey answered by the regional contact persons (RCPs) dealing with issues related to smart specialisation. It is worth mentioning that our analysis and the ones from the RCPs do not match totally when it comes to the selection of activities with university involvement.

TABLE 6: MODEST INNOVATORS ANALYSIS ON UNIVERSITY ENGAGEMENT ACTIVITIES

UNIVERSITY ENGAGEMENT ACTIVITIES MATRIX		Modest Innovators			
		Illes Balears (ES-NUTS 2)		*Vest (RO-NUTS 2)*	
		Content analysis	Regional Contact Person analysis (Survey)	Content analysis	Regional Contact Person analysis (Survey)
Activities around **exchanges of** undergraduate and postgraduate **students and academic staff** with/to external organisations	Post-course placements of undergraduate/postgraduate students				●
	In-course student projects or placements				●
	Joint curricula development	○		○	●
	Personal secondments to external organisations (short or long term)				
	Hosting visits by individuals from external organisations (short or long-term)				
	Membership of advisory boards to external organisations		●		
	Providing highly qualified human resources	○			
	Providing advanced training (phd/post-doc)			○	
	Providing continuing professional development (CPD) and/or lifelong learning training	○		○	
Activities around (joint) **research activities**, contract research and consultancy activity, participation in consortia by academics involving external organisations	Knowledge/technology creation and transfer to business sector	○		○	
	Joint research agreements	○	●		●
	Contract research agreements		●	○	●
	Consultancy agreements	○	●		
	Taking out patents		●	○	●
	Licensing research		●	○	●
	Forming spin-outs		●	○	
	Forming consultancy				
	Participation in consortia involving external organisations		●	○	●
	New knowledge and technology dissemination and outreach				
	Creation of physical facilities with external organisation funding				●
	Support to "seed" projects				
	Product prototyping and testing, proof of concept, pilot actions, product validation		●	○	
Activities related to **dissemination and networking** between HEIs and external organisations	Joint publications with individuals from external organisations				●
	Attending conferences with HEI and external organisations' participation		●		●
	Organizing conferences with HEI and external organisations' participation		●		●
	Participation in standard-setting forums				
	Participation in networks involving external organisations	○	●		●
	Giving lectures or talks for non-HEI external organisations				●
	Providing informal advice on a non-commercial basis		●		
Community-based activities	Giving public lectures for the community		●		●
	Provision of community-based performance arts				
	Provision of community-based sports				
	Provision of public exhibitions				
	Involvement with schools projects		●		●
Other activities	Provision of equipment and facilities		●	○	●
	Overall rating of the involvement of universities within the SS strategy of the region (RCP)	n/a	4	n/a	4

Source: own elaboration.

On top of the two separate visions above, the positioning of universities within the value chain of smart specialisation is also upheld by the overall rating from the RCPs on the involvement of universities in the conception and implementation of the regional RIS3 – both regions rate overall university involvement with 4, out of 5.

Synthesizing the research results

The content analysis performed to the 11 regional smart specialisation strategies (RIS3) allows us to confirm that Smart Specialisation is being taken seriously not only by the EU, but also by national and regional governments. Despite at different paces, regional strategies and policy instruments are being designed and deployed all over Europe in order to leverage existing capabilities, assets and competences to promote regional innovation and to generate new comparative advantages (Cooke and Leydesdorff, 2006; United Nations, 2014). Our results also corroborate the notion that Smart Specialisation symbolizes a paradigm change in regional policy – it is clear that regional smart specialisation strategies are place-based and geared to different types of regions (OECD, 2009a).

In general, the empirical results of the research work point towards an active involvement of universities within regional smart specialisation strategies. Such positioning is totally aligned with the

smart specialisation concept in what regards the importance of involving actively different actors in the entrepreneurial discovery process (Foray et al., 2009). Indeed, as key actors within the “triple helix” and "quadruple helix" innovation models, universities are being mobilised (Foray and Rainoldi, 2013; Carayannis and Rakhmatullin, 2014) in many different ways.

Table 7 gathers the results of the content analysis regarding the university engagement intensity in terms of activities, by region and innovation group.

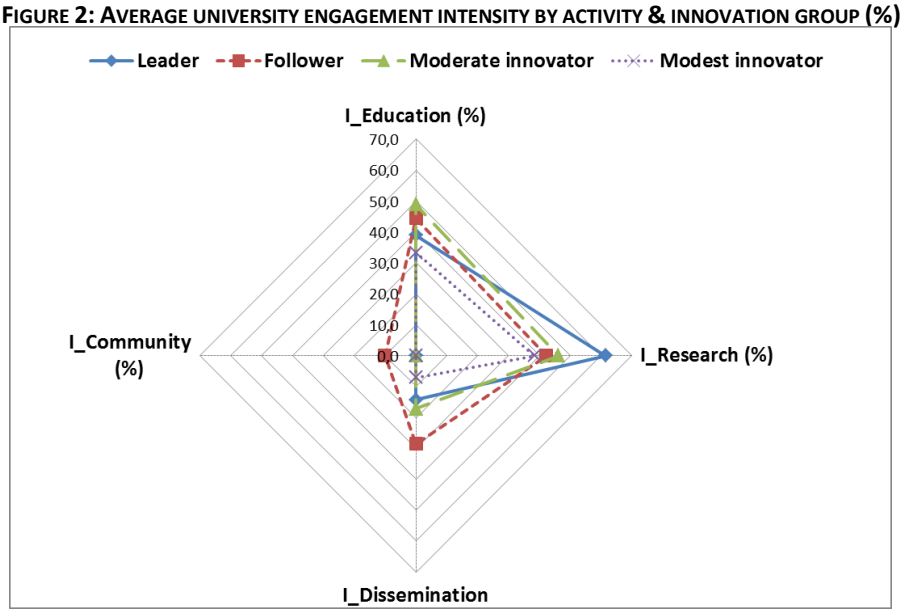
TABLE 7: UNIVERSITY ENGAGEMENT LEVEL ACCORDING TO ACTIVITIES MATRIX

Number of potential activities		9	13	7	5	1	35
Selected regions for study	**Regional Innovation Group**	**A_Education**	**A_Research**	**A_Dissemination**	**A_Community**	**A_Other**	**A_University engagement level**
Berlin (DE)	Leader	3	6	1	0	1	**11**
Sachsen (DE)	Leader	4	10	1	0	1	**16**
Brandenburg (DE)	Follower	3	6	1	0	1	**11**
Wales (UK)	Follower	5	5	3	1	0	**14**
Norte (PT)	Moderate innovator	3	7	1	0	0	**11**
Cataluña (ES)	Moderate innovator	6	7	1	0	1	**15**
R.A. Açores (PT)	Moderate innovator	5	7	1	0	1	**14**
Valle D’Aosta (IT)	Moderate innovator	3	3	1	0	1	**8**
Slaskie (PL)	Moderate innovator	5	6	2	0	1	**14**
Illes Balears (ES)	Modest innovator	3	3	1	0	0	**7**
Vest (RO)	Modest innovator	3	7	0	0	1	**11**

Source: own elaboration

On the one hand, our results reinforce the existing notion that the university engagement level varies accordingly to the innovation performance. Indeed, we found evidence that the best performing regions in terms of innovation present higher university engagement levels (innovation leaders), while the ones with the lowest innovation performance indicators participate in less activities, thus present the lowest engagement (modest innovators). In other words, the higher the innovation performance, the higher the university engagement level. On the other hand, in regions with an average innovation performance - innovation followers and moderate innovators - a quite balanced level of university engagement is observed, connected mostly to education and research-related activities. Figure 2 provides a graphical illustration on the overall university engagement intensity (in average) of the 11 regions analysed, by activity and innovation group.

FIGURE 2: AVERAGE UNIVERSITY ENGAGEMENT INTENSITY BY ACTIVITY & INNOVATION GROUP (%)



Source: own elaboration.

Note: Average university engagement intensity by activity was computed as the mean over the regions included in the corresponding innovation group of the proportion of activities in total potential activities for each dimension.

According to the outcomes obtained, Innovation Leader regions present the highest intensity of university engagement (38.6%) along with the highest level of innovation. They are primarily engaged in research-related activities (61.5%), followed by education-related (38.9%) and dissemination activities (14.3%). Community-based activities are rather absent but still they are actively involved in other activities, namely the provision of equipment and facilities (100%).

In contrast, Innovation Follower regions are clearly in a catch-up process: they present the second highest level of university engagement intensity (35.7%) right behind leading regions. As opposed to leading regions, they are primarily involved in education-related activities. Although the differences are quite low, the highest level of university engagement intensity is connected to universities first mission (44.4%), followed by research-related activities (42.3%). It also stands out that the intensity of engagement in dissemination activities is quite high (28.6%), when compared to all other groupings, while little action around community-based activities is observed (10.0%). Innovation Followers are also involved in other types of activities, namely the provision of equipment and facilities (50.0%).

Meanwhile, Moderate Innovators regions rank third in what regards the level of university engagement intensity (35.4%) right behind follower regions. Like follower regions, moderate innovators are primarily involved in education-based activities. In spite of the differences being little, the highest level of university engagement intensity is connected to universities first function (48.9%), followed by research-related activities (46.2%). The intensity of engagement in dissemination activities is relatively high (17.1%), while no action around community-based activities is observed. They are also engaged in providing equipment and facilities (80.0%).

Finally, Modest Innovator regions rank fourth in what regards the level of university engagement intensity (25.7%) right behind moderate regions. Similarly to leading regions, modest innovators are primarily involved in research-based activities. Although the differences are not statistically significant, the highest level of university engagement intensity is connected to universities second function (38.5%), followed by education-related activities (33.3%). The intensity of engagement in dissemination activities is quite low (7.1%) when compared to all other groupings, while no action at all is observed around community-based activities. These regions are also engaged in other activities, namely the provision of equipment and facilities (50.0%).

For a clearer understanding of the results obtained, Table 8 shows the average university engagement intensity of the regions under study within the different innovation groups.

Our analysis also evidences that regions highly engaged in research-related activities tend to focus less on dissemination activities, as opposed to the regions with higher rates of involvement around education-based activities which put higher emphasis on dissemination activities (see Table 8).

TABLE 8: AVERAGE UNIVERSITY ENGAGEMENT INTENSITY (%)

Innovation Groups	I_Education (%)	I_Research (%)	I_Dissemination (%)	I_Community (%)	I_Other (%)	I_Univ_Engagement_ Intensity (%)
Innovation Leaders	38,9	61,5	14,3	0,0	100,0	**38,6**
Innovation Followers	44,4	42,3	28,6	10,0	50,0	**35,7**
Moderate Innovators	48,9	46,2	17,1	0,0	80,0	**35,4**
Modest Innovators	33,3	38,5	7,1	0,0	50,0	**25,7**

Source: own elaboration.

Note: Average university engagement intensity by activity was computed as the mean over the regions included in the corresponding innovation group of the proportion of activities in total potential activities for each dimension.

Linked to the analysis performed on the university engagement activities, the results of the survey revealed that amongst all RCPs, leading regions' RCPs are the ones that rate the overall university

engagement intensity with the lowest score (3.5 out of 5.0). Such finding calls for reflection: either they are conservative or they find themselves already at a stage where they are used to active university involvement within the innovation cycle. Follower regions' RCPs rate the overall university engagement intensity with the highest level of university engagement intensity (5.0 out of 5.0). Moderate innovators regions' RCPs rate the overall university engagement intensity with the second highest level of university engagement intensity (4.0 out of 5.0). Like moderate innovators, RCPs from modest innovators regions rate the overall university engagement intensity with the second highest score (4.0 out of 5.0).

The feedback received from RCPs supports the idea of several authors (Foray and Rainoldi, 2013; Carayannis and Rakhmatullin, 2014) that for a maximum synergic potential, the smart specialisation process should mobilise all the actors of the "triple" and "quadruple helix" right from the very beginning. Also, throughout this work, it became clear that regional policy-makers are working closely with universities in the process of shaping and implementing RIS3 strategies. In turn, such collaboration is aligned with the six-step approach sketched out by the EC to support policy-makers in the design and implementation of their national and regional strategies (Foray at al., 2012).

Finally, when it comes to the regional specialisation – verified through the analysis of 6 activity dimensions *modern vs traditional, high tech vs low tech and manufacturing vs services* in the 11 regions - our results reinforce the existing notion that the type of regional specialisation is attached to innovation performance - the more specialized is the region in modern, high tech or manufacturing industries, the higher is its innovative performance.

Table 9 provides a graphical illustration on the specialisation intensity of the 11 regions analysed, by specialisation dimension and innovation group.

TABLE 9: REGIONAL SPECIALISATION INTENSITY

		Specialisation Activities		
Regions under study	**Regional Innovation Group**	**S1_Modern (1) vs Traditional (0)**	**S2_High tech (1) vs Medium-low tech (0)**	**S3_Manufacturing (1) vs Services (0)**
Berlin (DE)	Leader	1	1	0
Sachsen (DE)	Leader	1	1	0
Brandenburg (DE)	Follower	0	0	1
Wales (UK)	Follower	0	0	1
Norte (PT)	Moderate innovator	0	0	1
Cataluña (ES)	Moderate innovator	0	0	0
R.A. Açores (PT)	Moderate innovator	0	0	1
Valle D'Aosta (IT)	Moderate innovator	0	0	0
Slaskie (PL)	Moderate innovator	0	0	0
Illes Balears (ES)	Modest innovator	0	0	0
Vest (RO)	Modest innovator	0	0	1

Source: own elaboration.

Notes: S1: distinction between sectors is based on the European Commission's DG Enterprise and Industry definitions of traditional manufacturing industries and emerging industries http://ec.europa.eu/enterprise/policies/sme/regional-sme-policies/documents/no.4_service_innovation_en.pdf. S2 and S3: distinction between sectors is based on the Statistical Classification of Economic Activities in the European Community 2008, NACE Rev. 2 - http://ec.europa.eu/eurostat/en/web/products-manuals-and-guidelines/-/KS-RA-07-015.

The following trends were observed when analyzing the 4 innovation groups: i) in innovation leader regions, specialisation occurs in emerging, medium-high and high tech industries with strong development in R&D activities and high value-added services; ii) in follower regions, specialisation is associated to traditional, medium-low tech industries and a higher weight of the service sector; iii) moderate innovators' specialisation is mainly in traditional and medium-low tech sectors and the weight of industry is rather light: some regions rely on manufacturing while other rely on in services,

possibly deriving from the fact that some regions shifted their industrial activities towards new growing sectors; finally, in modest innovators, the weak economic and technological development seems to be linked to the specialisation profile connected to traditional, medium-low tech sectors and to the variability among regional production structures, with a region specialised in industry while the other in services.

Summing up, from the overall analysis performed, we found that sectoral and technology specialisation, along with R&D and knowledge intensity, is related to regions' innovation performance. We might thus infer that R&D intensive industries along with high accessibility to knowledge, tertiary education and life-long learning at the regional level tend to be associated to higher involvement of universities within innovation performance processes.

5. CONCLUSIONS

Existing literature recognizes Smart Specialisation as a strategic approach to economic development and innovation-driven growth (McCann and Ortega-Argilés, 2011; Foray et al, 2012; OECD, 2013) through targeted support to research and innovation (S3P). However, several authors suggest that adopting its principles is not expected to be a straightforward process (Foray et al., 2011; Kempton et al., 2013; Rodriguez-Pose et al., 2014). As a new approach that calls for a more leading involvement of different actors (Foray et al., 2009), all actors should be mobilised right from the outset (Foray and Rainoldi, 2013; Carayannis and Rakhmatullin, 2014).

As core elements of both "triple" and "quadruple helix" innovation models (Leydesdorff, 2012), universities are increasingly called upon to adjust their action, both in terms of research activities and human capital development, to better meet the needs of business and society. There is a broad literature on the changing role of universities in regional development (Goldstein, 2010; Trippl et al., 2012) providing rich insights on the evolution of universities' towards a new role in animating regional economic and social development, beyond their two traditional functions - teaching and research (Etzkowitz and Leydesdorff, 1997; OECD, 2011; E3M Project, 2012). Yet, universities' role varies according to different regional settings (Gunasekara, 2006). As a core element of the "quadruple helix model", the potential role and contributions of universities to regional innovation became a key area of interest on the last years. Still, to the best of our knowledge little or no similar work has been done so far in what regards the way universities are being actually involved in the design and set-up of smart specialisation strategies and RIS3, in their regions.

The research question of this study is "Where do Universities stand in the value chain of Smart Specialisation?". Specifically, we proposed to determine to what extent universities are contributing to the development and growth of the regions, and by which means, taking into consideration the regions' specific innovation performance and specialisation levels. In few words, our aim was to assess and characterize university engagement activities in the context of regional smart specialisation strategies.

At an empirical level, the present study may contribute to enrich the existing literature by providing a comprehensive appraisal of the activities universities are currently involved in within regional smart specialisation strategies. From the examination of multiple RIS3 and the validation from those who are directly involved in the conception and operationalization of regional RIS3 (the Smart Specialisation regional contact persons), some trends and patterns could be identified. In total, 11 RIS3 were analysed and benchmarked.

The work conducted revealed four main results. First, universities are playing an active role in the process of designing and implementing regional innovation strategies - every RIS3 mentions and describes directly or indirectly such involvement, meaning that the RIS3 methodology is being fulfilled around European regions.

Second, universities are mostly engaged in activities related to its second mission - research - building upon the notion that universities contribute actively to their regional innovation systems by producing knowledge and delivering scientific results to be absorbed by the society at a later stage (third mission), on top of providing excellence in education (first mission). The lack of community-based activities could possibly be an issue to be addressed in future research work.

Third, within research activities, universities appear to be more involved in three major sub activities, namely knowledge and technology creation and transfer to business sector, participation in consortia involving external organisations, and product prototyping /testing/validation, proof of concept and

pilot actions. When it comes to patterns by innovation group: i) universities in innovation leader regions are mostly involved in knowledge and technology creation and transfer to business sector, joint research agreements, formation of spin-outs, participation in consortia involving external organisations, and product prototyping/testing/validation, proof of concept or pilot actions; ii) universities in innovation follower regions are mostly involved in knowledge and technology creation and transfer to business sector, participation in consortia involving external organisations, and product prototyping/testing/validation, proof of concept or pilot actions; iii) similarly to innovation followers, universities in moderate innovator regions are mostly involved in activities related to the participation in consortia, knowledge/technology creation, dissemination/outreach and transfer to the business sector, and product prototyping/testing/validation, proof of concept or pilot actions; iv) universities in modest innovators are mostly involved in activities related to the knowledge and technology creation and transfer to business sector.

Fourth, university engagement intensity varies accordingly to the innovation performance and specialisation pattern of the regions: the higher the innovation performance of the regions, the higher the university engagement level. Also, the more specialized a region is in modern, high tech or manufacturing industries, the higher is its engagement with universities and its innovative performance.

In general, the results corroborate the hypothesis that higher regional innovation performance levels are associated to a larger extent of creation of relationships and interactions between all stakeholders of the regional innovation systems. We found that leading innovation regions provide higher recognition to the key role and rely strongly on the contributions from universities. On the contrary, low innovation performers, such as the modest innovators, do not seem to evidence a similar recognition level about the importance and involvement of universities.

The observations and results obtained highlight the importance of universities and regional policymakers working together in the set-up and implementation of regional innovation policies toward success in increasing regional competitiveness and growth.

This implies that universities understand their current positioning and remain open to contributing in other ways to regional development, by becoming involved in other activities beyond research-related activities that can bring added-value to the region. It does not mean that universities shall stop making efforts in their current activities. On the contrary, shall universities consider Smart Specialisation a priority, efforts shall be undertaken as to keep and improve their scientific standards as well as their involvement level to regional development.

On the other hand, regional policymakers shall pay attention and consider the contributions from all stakeholders. Due to the regional focus of Smart Specialisation, regional authorities shall be aware that it is their responsibility to set-up the right conditions for all key actors to interact and contribute actively to better regional performance. That said, mechanisms shall be set-up at policy level. Additionally, national governments have a key role to play – they shall undertake actions, namely through the set-up of suitable, nationally-scoped policy instruments and mechanisms aimed at promoting and supporting such interactions beyond the supra-regional level.

The work has two important limitations. First, the analysis was limited by the availability of material, namely the research and innovation strategies for smart specialisation for all EU regions as at the time of this study many RIS3 are still being designed. Second, the work was strongly dependent on the subjective interpretation and self-perception of both ours and the regional respondents when filling up the online survey about the activities in which universities are involved, based on the matrix developed. To this respect it should be noted that it is our opinion that interpretation discrepancies are due to the fact that we tend to make a deeper and detailed analysis of the RIS 3 (micro level analysis), while RCPs tend to make a broader analysis (macro level analysis). However, despite being perception-based, RCPs rating is understood as a vital and reliable input towards the comprehensive vision of the involvement of universities in the design and operationalization of smart specialisation strategies, by those who are directly linked to their conception and implementation at regional level.

The extension or replication of the analysis to include research and innovation strategies for smart specialisation from other EU regions with varying innovation performances in order to enlarge the results observed during the present work would constitute an interesting path for future research. Also interesting would be to set-up focus groups composed of several people aimed at running the analysis performed under this work at a larger dimension, as a way of obtaining a stronger results validation while downsizing subjective results arising from perception-based analysis.

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ANNEXES

TABLE A1: MAIN INFORMATION SOURCES FOR THE CONTENT ANALYSIS

Innovation group	Regions	Document sources
Innovation Leaders	Berlin & Sachsen	- Joint Innovation Strategy of the States of Berlin and Brandenburg (innoBB) - Innovation Strategy of the Free State of Sachsen
Innovation Followers	Brandenburg and Wales	- Joint Innovation Strategy of the States of Berlin and Brandenburg (innoBB) & Innovation Strategy of the State of Brandenburg (innoBB plus) - Innovation Wales
Moderate Innovators	Norte, Cataluña, Azores, Valle D'Aosta, Slaskie	- Regional Strategy of the North Region for Smart Specialisation (Norte 2020) - Research and Innovation Strategy of Autonomous Region of Azores (RIS3 Açores) - Research and Innovation Strategy of Cataluña for Smart Specialisation (RIS3CAT) - Smart Specialisation Strategy in Valle D'Aosta (VdA 2020) - Regional Innovation Strategy of the Slaskie Voivodeship
Modest Innovators	Illes Baleares and Vest	- Regional Innovation Strategy for Smart Specialisation in Sustainable and Technological Tourism (S4T2 Balears) - Smart Specialisation Strategy in West Region Romania

Source: own elaboration.

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Diagnóstico do Território Beiras e Serra da Estrela no Âmbito dos três Domínios Chave do Quadro Estratégico Comum 2020

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RESUMO

O objetivo deste estudo é apresentar uma caraterização, análise e disgnóstico do território da NUTS III Beiras e Serra da Estrela (BSE) baseada na estratégia da União Europeia para 2020 e orientada para a área de intervenção em três domínios chave: o Crescimento Inteligente, o Crescimento Inclusivo e o Crescimento Sustentável.

Assim, a análise do território da BSE é baseada na identificação de dados e indicadores orientados para a área de intervenção dos três domínios chave, enquadrados no Quadro Estratégico Comum 2020, do Portugal 2020 (Comissão Europeia, 2020).

Os indicadores foram extraídos da base de dados do Instituto Nacional de Estatística (INE) e são apresentados ao nível da desagregação geográfica nível III e complementada com uma análise mais aprofundada, ao nível dos concelhos que compõem a BSE, sempre que a informação disponível assim o permita.

A Análise SWOT permitiu verificar as potencialidades demonstradas nos pontos fortes, que aliados com as oportunidades externas, numa estratégia bem delineada, poderão representar um fator para a prospeção e desenvolvimento da BSE. No entanto, esta análise também revela uma série de fragilidades do território, a apresentar pontos fracos de difícil intervenção, que vão de encontro com as ameaças externas de matéria sensível.

Palavras-chave: Diagnóstico, Swot, Beiras e Serra da Estrela.
Classificação JEL: R11, R18 e O11.

1. INTRODUÇÃO

Para responder ao crescente número de desafios, os territórios necessitam de se dotar de abordagens e instrumentos que permitam diagnosticar as suas fraquezas e ameaças, bem como

identificar as suas especificidades, singularidades e oportunidades. No âmbito programas quadro e das políticas europeias de coesão territorial o ponto de partida para os planos de ação regional é o diagnóstico do território.

De acordo com Lardon, *et al*. (2005), o diagnóstico do território é uma base essencial em qualquer abordagem territorial. Assenta no objetivo de formular uma decisão e acompanhar a mudança para caracterizar as potencialidades de um dado território, facultando o conhecimento das realidades locais para a definição das estratégias e ações a desenvolver.

Segundo Natário (2019), Alves (2007) a metodologia para a realização do diagnóstico territorial pode ser abordada através de um diagnóstico geral (com as especificidades e atuações dos atores locais), setorial (com uma caracterização aprofundada, com perspetivas e tendências de evolução) ou estratégico (com as condicionantes estruturais, os pontos fortes/fracos, as oportunidades e as ameaças).

Com efeito, esta abordagem orienta-se para a diferenciação e para a competitividade territorial e assenta na abordagem das competências centrais dos territórios que confere atenção não só aos recursos (físicos, humanos e organizacionais) que os diferenciam e lhes confere identidade mas também às capacidades e saberes fazeres específicos comuns a diversos atores, que melhor permitem combinar e mobilizar esses recursos, por forma a efetivamente aumentar a sua capacidade de competir e a disputar um espaço de diferença (Alves, 2007).

Por sua vez, o Programa Europa 2020, definiu um quadro estratégico: Europa 2020 – Estratégia da União Europeia para um crescimento inteligente, sustentável e inclusivo com a delineação dos objetivos a desenvolver e orientados para a área de intervenção nestes três domínios chave (Comissão Europeia, 2020).

Assim, o objetivo deste estudo é apresentar uma caraterização, análise e disgnóstico do território da NUTS III Beiras e Serra da Estrela (BSE) tendo como ponto de partida a área de intervenção nos três domínios chave: o Crescimento Inteligente, o Crescimento Inclusivo e o Crescimento Sustentável no âmbito da estratégia da União Europeia para 2020 e do próximo quadro comunitário de apoio 2021-27.

A metodologia utilizada assenta primeiramente numa breve caraterização do território da Beiras e Serra da Estrela (BSE), e da observação do Índice de Desenvolvimento Global, que agrega três dimensões de desenvolvimento: a competitividade, a coesão e a qualidade ambiental. Segue-se a análise do território da BSE baseada na identificação de dados e indicadores orientados para a área de intervenção em três domínios chave: o Crescimento Inteligente, o Crescimento Inclusivo e o Crescimento Sustentável, enquadrados no Quadro Estratégico Comum 2014-2020, do Portugal 2020 (Comissão Europeia, 2020).

Os indicadores foram extraídos da base de dados do Instituto Nacional de Estatística (INE). A análise dos dados é feita através da comparação de um período temporal, a começar no ano de 2011 e a terminar em 2018, 2019 ou 2020, conforme a disponibilidade dos dados mais recentes.

Os indicadores são apresentados ao nível da desagregação geográfica nível NUTS[9] III[10] e complementada com uma análise mais aprofundada, ao nível dos concelhos que compõem a BSE sempre que há valores disponíveis para os mesmos. Apresenta-se ainda a referência à média nacional e à Região Centro. Depois de identificados, procede-se à análise dos valores apurados para a BSE, e também para os Municípios que a compõem. Posteriormente é apresentada a Análise SWOT, uma ferramenta que permite realizar um diagnóstico a nível interno, onde são verificados os pontos fortes e os pontos fracos e a nível externo, são apontadas a oportunidades e as ameaças inerentes ao meio envolvente deste território. Finalmente apresenta-se as conclusões.

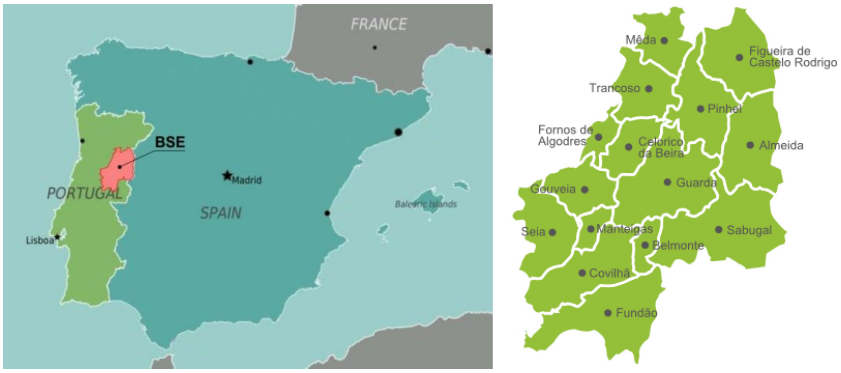
[9] NUTS é o acrónimo de "Nomenclatura das Unidades Territoriais para Fins Estatísticos", sistema hierárquico de divisão do território em regiões. Criada pelo Eurostat no início dos anos 1970, esta nomenclatura visa a harmonização das estatísticas dos vários países em termos de recolha, compilação e divulgação de estatísticas regionais. (Pordata, 2020).

[10] De acordo com o Decreto-Lei n.º 46/89 de 15 de fevereiro, os níveis I, II e III da NUTS são fixados do seguinte modo: Nível I - constituído por três unidades, correspondentes ao território do continente e de cada uma das Regiões Autónomas dos Açores e da Madeira; Nível II - constituído por sete unidades, correspondentes, no continente, às áreas de atuação das comissões de coordenação regional, criadas pelo Decreto-Lei n.º 494/79, de 21 de dezembro, com a nova delimitação constante do anexo I ao presente decreto-lei, de que faz parte integrante, e ainda aos territórios das Regiões Autónomas dos Açores e da Madeira; Nível III - constituído por 30 unidades, das quais 28 no continente, com a nova delimitação constante do anexo II ao presente Decreto-lei, de que faz parte integrante, e duas correspondentes às Regiões Autónomas dos Açores e da Madeira.

2. Caraterização do território Beiras e Serra da Estrela

A NUTS III BSE localiza-se na Região Centro de Portugal e tem uma vasta área que faz fronteira com o país vizinho, a Espanha (Figura 1).

Figura 1: Território BSE na Península Ibérica e Mapa dos Municípios



Fonte: Adaptado de https://pt.wikivoyage.org/wiki/Pen%C3%ADnsula_Ib%C3%A9rica e https://cimbse.pt/apresentacao/quem-somos/

A NUTS III BSE integra três NUTS III da reorganização territorial anterior a 2013[11], a Beira Interior Norte, Cova da Beira e Serra da Estrela, com um total de 15 Municípios: Almeida, Belmonte, Celorico da Beira, Covilhã, Figueira de Castelo Rodrigo, Fornos de Algodres, Fundão, Gouveia, Guarda, Manteigas, Mêda, Pinhel, Sabugal, Seia e Trancoso (Figura 1). Numa análise sociodemográfica da NUTS III BSE, o território ocupa uma superfície de cerca de 6300 km^2.

O Quadro 1 mostra a divisão dos Municípios pelas três NUTS III, anteriores a 2013.

Quadro 1: Correspondência entre NUTS III e Municípios do Território BSE

NUTS III	Municípios
Beira Interior Norte	Almeida, Celorico da Beira, Figueira de Castelo Rodrigo, Guarda, Manteigas, Mêda, Pinhel, Sabugal, Trancoso
Cova da Beira	Belmonte, Covilhã, Fundão
Serra da Estrela	Fornos de Algodres, Gouveia, Seia

Fonte: Elaboração própria, adaptado de Decreto-Lei n.º 46/89 de 15 de fevereiro, do Ministério do Planeamento e da Administração do Território.

3. Índice de Desenvolvimento Regional

Segundo o INE (2020) o **Índice Sintético de Desenvolvimento Regional**[12] (ISDR) baseia-se num modelo concetual que privilegia uma visão multidimensional do desenvolvimento regional, estruturando-o em três componentes: competitividade, coesão e qualidade ambiental.

[11] Em 2015 entrou em vigor uma nova divisão regional em Portugal – NUTS 2013. Em relação à versão anterior – NUTS 2002 –, traduz-se por significativas alterações de número e de composição municipal das NUTS III, as quais passaram de 30 para 25 unidades territoriais, agora designadas de «unidades administrativas». Essas unidades administrativas correspondem às "Entidades Intermunicipais", "Região Autónoma dos Açores" e "Região Autónoma da Madeira" (Pordata, 2020).

[12] "Com base numa matriz de 65 indicadores estatísticos, para as 25 regiões NUTS III portuguesas, devidamente normalizados (estandardização estatística e reescalonamento min max com valores máximo e mínimo de referência extraídos do conjunto dos 65 indicadores estandardizados para o período temporal disponível), distribuídos por três componentes – competitividade, coesão e qualidade ambiental – e posteriormente agregados por média não ponderada, quer para o nível intermédio das componentes, quer do nível das componentes para o nível do índice global, obtêm-se quadro indicadores compósitos – competitividade, coesão, qualidade ambiental e índice global de desenvolvimento regional. Os quatro indicadores compósitos são apresentados por referência ao contexto nacional (Portugal = 100), sendo o valor nacional estimado pela média dos índices das respetivas NUTS III ponderados pela população residente e não obtido diretamente a partir do modelo de análise que é aplicado exclusivamente às NUTS III" (INE, 2020).

Assim, o índice de desenvolvimento global, agrega estas três dimensões de desenvolvimento regional (competitividade, coesão e qualidade ambiental). De acordo com a Tabela 1, fazendo a comparação para Portugal (=100), na NUTS III BSE verifica-se que em 2019 este indicador apresenta um valor de 96,36, abaixo da média nacional e da média da Região Centro todavia com um acréscimo de 0,67 face ao ano de 2011, ao contrário da Região Centro que registou um decréscimo de 0,12. Da análise deste indicador constata-se da disparidade da NUTS III BSE face ao contexto nacional e também regional.

TABELA 1: ÍNDICE SINTÉTICO DE DESENVOLVIMENTO REGIONAL (ÍNDICE GLOBAL)

Localização geográfica	Índice sintético de desenvolvimento regional (índice global)	
	2011	2019
Portugal	100	100
Centro	97,14	97,02
BSE	**95,69**	**96,36**

Fonte: Adaptado de INE (2021).

4. DOMÍNIOS-CHAVE DE ANÁLISE E DIAGNÓSTICO

A União Europeia (UE) (Comissão Europeia, 2020) em 2010/2011 definiu a estratégia para a promoção de crescimento sustentável e do emprego, com o objetivo de que na década seguinte, a Europa saísse fortalecida da crise económica mundial que atravessava há já alguns anos. Para tal, surge o Programa Europa 2020, um quadro estratégico (Europa 2020 – Estratégia da UE para um crescimento inteligente, sustentável e inclusivo) com a delineação dos seguintes objetivos a desenvolver:

- Um crescimento inteligente, baseado na educação, conhecimento e inovação;
- Um crescimento inclusivo, para uma economia com elevado nível de emprego e coesão económica, social e territorial;
- Um crescimento sustentável, com uma economia mais eficaz em termos de recursos, mais ecológica e competitiva.

Neste contexto, pretende-se efetuar o diagnóstico da NUTS III BSE, tendo em conta estes três objetivos consubstanciados em três domínios de análise. Assim, a pesquisa e recolha na base de dados do Portal do INE é selecionada de acordo com os indicadores disponíveis para a NUTS III BSE e tendo em conta as diferentes bases de atuação dos objetivos delineados pela Europa 2020.

4.1. Crescimento Inteligente

Segundo o Quadro Estratégico da Europa 2020 (Comissão Europeia, 2020), o crescimento inteligente significa desenvolver uma economia baseada no conhecimento e na inovação. O crescimento inteligente significa melhorar a qualidade do ensino, da investigação, as tecnologias da informação e da comunicação e assegurar a transformação das ideias inovadoras em novos produtos. Para tal é necessário promover uma maior coesão social e territorial, apoiando o comércio local, as Pequenas e Médias Empresas, a proteção e promoção do património imaterial e cultural para a atração turística.

Neste contexto, os estabelecimentos de ensino são importantes para que se possa inferir sobre a questão do conhecimento/formação e desenvolvimento dos territórios, pois a educação, nomeadamente a forte aposta no Ensino Superior, sustentam a Investigação e o Desenvolvimento.

Assim, quanto ao domínio Crescimento Inteligente, consideraram-se os seguintes indicadores:

- Índice de Competitividade;
- Número de Empresas;
- Número de Nascimento de Empresas;

- Indicadores do Comércio Internacional;
- Exportações de Bens;
- Estabelecimentos de Ensino Superior;
- Bens Imóveis Culturais;
- Recintos de Espetáculos e Espetáculos ao Vivo;
- Dormidas nos Estabelecimentos de Alojamento Turístico
- Estada Média nos Estabelecimentos Hoteleiros e Tipo de Estabelecimento;
- Unidades de Investigação e Pessoal em Investigação e Desenvolvimento.

Relativamente aos índices parcelares de Desenvolvimento Regional, nomeadamente o Índice de **Competitividade**, segundo o INE (2021), este pretende captar o potencial (em termos de recursos humanos e de infraestruturas físicas) de cada região em termos de competitividade, assim como o grau de eficiência na trajetória seguida (medido pelos perfis educacional, profissional, empresarial e produtivo) e, ainda, a eficácia na criação de riqueza e na capacidade demonstrada pelo tecido empresarial para competir no contexto internacional.

A NUTS III BSE apresenta em 2019 um valor no índice de competitividade de 85,47, abaixo da média nacional e da Região Centro (93,23), encontrando-se, mais especificamente, no segundo quintil, embora com ligeira melhoria de 2011 para 2019 (Tabela 2).

TABELA 2: ÍNDICE SINTÉTICO DE DESENVOLVIMENTO REGIONAL (COMPETITIVIDADE)

Localização geográfica	Índice sintético de desenvolvimento regional (Competitividade)	
	2011	2019
Portugal	100	100
Centro	92,65	93,23
BSE	**84,47**	**85,47**

Fonte: Adaptado de INE (2021).

A Tabela 3 mostra o **Número de Empresas** e a sua **Dimensão** por concelho, para a BSE, para Portugal e Região Centro nos anos 2011 e 2019. Salienta-se o facto de que são criadas muito mais microempresas do que qualquer outra dimensão de empresas. De entre os Municípios que integram a BSE, destaca-se a Covilhã no ano de 2011, com 4610 empresas, e no ano de 2019 a Guarda com 4778 empresas, seguem-se os Municípios do Fundão e de Seia, com o Fundão a destacar-se em 2019 com um total de 3240 empresas existentes. Estes quatro Municípios são cidades e estão dotadas de políticas e de plataformas empresariais/industriais que propiciam a criação de empresas. A proximidade a Espanha e os efeitos de *spillover* de investimentos recentes de empresas em setores emergentes como as Tecnologias de Informação e Comunicação constituem ativos cujo potencial é relevante na dinamização económica local. Pinhel, Gouveia e Sabugal também apresentaram, quer em 2011, quer em 2019 um saldo interessante na criação de empresas. De entre os Municípios de menor densidade empresarial da BSE destacam-se Pinhel, Mêda e Trancoso com quase a duplicação do número total de Empresas criadas no ano 2019 em relação ao ano de 2011. Os Municípios da Covilhã e Manteigas são os únicos da BSE que não apresentam saldo positivo na criação de novas empresas no período em análise.

Na NUTS III BSE e nos seus Municípios predominam as microempresas e empresas de pequena dimensão. O número de empresas de média e grande dimensão é muito baixo, embora se tenha registado um aumento deste número de 2011 para 2019.

TABELA 3: NÚMERO DE EMPRESAS E DIMENSÃO EM 2011 E 2019

Número de Empresas e Dimensão										
Localização geográfica	Total	Micro	Pequena	Média	Grande	Total	Micro	Pequena	Média	Grande
	2011					2019				
Portugal	1113559	1065905	40552	6064	1038	1318330	1265671	44189	7179	1291
Centro	241573	231859	8411	1160	143	269110	258799	8754	1358	199
BSE	**21640**	**20938**	**626**	**69**	**7**	**25268**	**24597**	**575**	**82**	**14**
Almeida	596	578	17	1	0	684	671	12	1	0
Belmonte	641	618	19	3	1	698	676	18	3	1
Celorico da Beira	637	619	15	3	0	661	646	14	1	0
Covilhã	4610	4453	135	19	3	4546	4393	121	26	6
F.de Castelo Rodrigo	587	570	17	0	0	902	894	7	1	0
F. de Algodres	409	395	13	1	0	486	475	11	0	0
Fundão	2784	2679	94	11	0	3240	3133	93	13	1
Gouveia	1179	1144	33	2	0	1313	1280	31	2	0
Guarda	4387	4238	130	17	2	4778	4641	114	18	5
Manteigas	308	299	9	0	0	306	295	9	2	0
Mêda	461	447	13	1	0	854	837	16	1	0
Pinhel	931	909	22	0	0	1794	1764	29	1	0
Sabugal	1149	1128	18	3	0	1408	1388	17	3	0
Seia	2081	2009	66	5	1	2203	2137	58	7	1
Trancoso	880	852	25	3	0	1395	1367	25	3	0

Fonte: Adaptado de INE (2021).

Na Tabela 4 apresenta-se o número de **Nascimentos de Empresas** por Localização Geográfica nos anos 2011 e 2019. A tendência do aumento do número de novas empresas é geral no período em análise, verificando-se um aumento de 27,3% em Portugal, 18,9% no Centro e 14,2% na BSE. Comparativamente ao ano de 2011, destacam-se os Municípios do Fundão, com mais 88 empresas, e Trancoso, com mais 65 empresas, e também com um indicador favorável estão Guarda, Fornos de Algodres e Trancoso. Apenas os Municípios de Celorico da Beira, Manteigas e Almeida verificaram perda de nascimentos de empresas.

TABELA 4: NÚMERO DE NASCIMENTOS DE EMPRESAS EM 2011 E 2019

Localização geográfica	Nascimentos de Empresas	
	2011	2019
Portugal	141749	194951
Centro	27253	33593
BSE	**2323**	**2707**
Almeida	61	58
Belmonte	68	89
Celorico da Beira	65	61
Covilhã	560	587
Figueira de Castelo Rodrigo	54	67
Fornos de Algodres	33	68

Fundão	286	374
Gouveia	107	116
Guarda	473	511
Manteigas	40	30
Mêda	67	89
Pinhel	86	134
Sabugal	111	126
Seia	223	243
Trancoso	89	154

Fonte: Adaptado de INE (2021).

Na Tabela 5 estão representados os indicadores do **Comércio Internacional** entre os anos 2011 e 2020. A BSE, na análise da taxa de cobertura das importações pelas exportações, apresenta uma taxa mais elevada em relação a Portugal e à Região Centro, mas a registar um decréscimo de 2011 para 2020, de 12,62. No que diz respeito à proporção de exportações de bens para os quatro principais mercados e Intra União Europeia (UE), a BSE no mesmo período regista um aumento de 2%, no entanto, na proporção de exportações de bens para Espanha perde uma unidade percentual.

Nos indicadores da proporção das importações de bens para os quatro principais mercados e intra-UE, a BSE destaca-se pelo facto de em todos eles perderem pontos percentuais. Por último, a análise do indicador da proporção de exportações de bens de alta tecnologia revela que a BSE aumentou as exportações destes bens, acompanhando a tendência de crescimento deste mercado a nível nacional.

TABELA 5: INDICADORES DO COMÉRCIO INTERNACIONAL EM 2011 E 2020

Indicadores do Comércio Internacional	Localização Geográfica					
Indicadores do comércio internacional	2011			2020		
	Portugal	Centro	BSE	Portugal	Centro	BSE
Taxa de cobertura das importações pelas exportações	71,92	114,46	**124,8**	79,2	117,59	**112,18**
Proporção de exportações de bens para os 4 principais mercados (%)	56	59	**57**	56	61	**59**
Proporção de exportações de bens intra-UE (%)	74	77	**76**	72	77	**78**
Proporção de exportações de bens para Espanha (%)	25	26	**21**	25	29	**20**
Proporção das importações de bens para os 4 principais mercados (%)	57	67	**84**	59	63	**77**
Proporção das importações de bens intra-UE (%)	73	85	**93**	75	78	**90**
Proporção de importações de bens de Espanha (%)	32	39	**62**	33	37	**54**
Proporção de exportações de bens de alta tecnologia (%)	3,07	1,89	**0,18**	5,46	3,25	**0,22**

Fonte: Adaptado de INE (2021).

Quanto às **Exportações de Bens** por localização geográfica, pode verificar-se na Tabela 6 que no ano 2020, há uma tendência geral para a um aumento do valor das exportações nos territórios da Região Centro e da BSE em relação ao ano de 2011.

No total das exportações de Portugal, o território BSE apenas contribui com cerca de 1%, para a média nacional e perdeu peso no contexto nacional de 2011 para 2020. Em relação aos Municípios da BSE, de salientar que só a Guarda e a Covilhã somam mais de 80% do total das exportações na BSE, os restantes municípios apresentam contributos inferiores a 5% e a grande maioria inferiores a 1%.

TABELA 6: EXPORTAÇÕES (€) DE BENS EM 2011 E 2020

Localização geográfica	Exportações (€) de bens			
	2011		2020	
	€	%	€	%
Portugal	42828033392	100,0%	53786304933	100,0%
Centro	8261126670	19,29%	10341865898	19,23%
BSE	**435037299**	**1,02%**	**441445335**	**0,82%**
Almeida	2925169	0,67%	4143196	0,94%
Belmonte	19976453	4,59%	13922982	3,15%
Celorico da Beira	13618283	3,13%	6697399	1,52%
Covilhã	158843622	36,51%	155711635	35,27%
F. de Castelo Rodrigo	2222856	0,51%	298057	0,07%
F. de Algodres	464780	0,29%	4164602	2,67%
Fundão	21207926	4,87%	22262891	5,04%
Gouveia	284619	0,07%	4830001	1,09%
Guarda	190545608	43,80%	206080112	46,68%
Manteigas	274596	0,06%	196060	0,04%
Mêda	67075	0,02%	340175	0,08%
Pinhel	1646567	0,38%	2578418	0,58%
Sabugal	1472408	0,34%	2152073	0,49%
Seia	18692798	4,30%	15124415	3,43%
Trancoso	2794539	0,64%	2943319	0,67%

Fonte: Adaptado de INE (2021).

Ao analisar o indicador **Estabelecimentos de Ensino Superior**, (Tabela 7), em Portugal verificou-se um decréscimo de 16 estabelecimentos de ensino superior nos anos letivos de 2011/2012 (300) para 2019/2020 (284). A Região Centro perdeu 7 estabelecimentos no mesmo espaço temporal. A BSE, com um baixo índice de estabelecimentos de ensino superior conseguiu manter as cinco unidades de lecionação do ensino superior.

A oferta para a formação e a qualificação dos recursos humanos constituem elementos importantes para a sustentabilidade, atração e fixação das pessoas nos territórios. Simultaneamente, a modernização e a eficiência da prestação de serviços e a produção de bens de qualidade estão intimamente ligadas ao desenvolvimento do ensino superior e da formação profissional avançada.

TABELA 7: ESTABELECIMENTOS DE ENSINO SUPERIOR NOS ANOS LETIVOS DE 2011/2012 E 2019/2020

Localização geográfica	Estabelecimentos de ensino superior	
	2011 / 2012	2019 / 2020
Portugal	300	284
Centro	59	52
Beiras e Serra da Estrela	**5**	**5**

Fonte: Adaptado de INE (2021).

Na Tabela 8, apresenta-se o indicador **Bens Imóveis Culturais** (Nº.), na **Categoria de Bens Imóveis**, da BSE em relação ao Centro de Portugal e a Portugal, nos anos 2011 e 2020. A BSE acompanha a tendência do aumento do número de imóveis culturais, a contar com mais 35 desde 2011. Com uma tradição muito marcada a nível de testemunhos de Castelos, Igrejas e Sítios, nomeadamente de cariz paleontológico, a BSE possui uma riqueza inestimável.

De entre os Municípios da BSE que detêm maior aumento de número de imóveis culturais, salienta-se a Covilhã e Seia, que ganham mais 5 classificações de 2011 para 2020 e o Fundão mais 9. Verifica-se também um aumento nos Municípios de Almeida, Celorico da Beira, Guarda, Mêda, Pinhel, Sabugal e Trancoso. Manteigas destaca-se por ser o único Município da BSE a deter apenas um imóvel cultural, sendo este, de categoria Monumento.

TABELA 8: BENS IMÓVEIS CULTURAIS (Nº.), CATEGORIAS DE BENS IMÓVEIS, EM 2011 E 2020

	Portugal	Centro	BSE	Almeida	Belmonte	Celorico da Beira	Covilhã	Figueira de Castelo Rodrigo	Fornos de Algodres	Fundão	Gouveia	Guarda	Manteigas	Mêda	Pinhel	Sabugal	Seia	Trancoso
2011																		
Total	3 859	990	**177**	8	5	8	14	17	11	15	10	25	1	12	12	18	9	12
Monumentos	2 945	778	**139**	5	2	7	10	14	9	13	7	17	1	11	12	16	7	8
Conjuntos	475	124	**21**	2	2	1	2	2	0	2	0	4	0	1	0	2	1	2
Sítios	439	88	**17**	1	1	0	2	1	2	0	3	4	0	0	0	0	1	2
2020																		
Total	4622	1147	**212**	9	5	9	19	17	11	24	10	29	1	13	15	21	14	15
Monumentos	3519	899	**166**	6	2	7	14	14	9	20	7	20	1	12	15	18	11	10
Conjuntos	573	142	**27**	2	2	2	3	2	0	4	0	5	0	1	0	2	2	2
Sítios	530	106	**19**	1	1	0	2	1	2	0	3	4	0	0	0	1	1	3

Fonte: Adaptado de INE (2021).

O indicador **Recintos de Espetáculos e Espetáculos ao Vivo** é apresentado na Tabela 9. A nível cultural, representa-se a relação existente entre o número de recintos de espetáculos e o número de espetáculos ao vivo por localização geográfica, nos anos 2011 e 2020. A BSE não regista aumentos no período em estudo, nestes indicadores, à exceção das sessões de espetáculos que aumentaram, no entanto não se traduz num aumento de espectadores nem de bilhetes vendidos. Esta análise leva a concluir que a área cultural de espetáculos ao vivo não é prioridade de investimento na região, contrariamente ao território do Centro. Relativamente ao número de bilhetes vendidos a diminuição é grande, menos 39007 do que em 2011, facto este que se deve principalmente às restrições implementadas pela pandemia Covid 19 no que se refere a este tipo de atividades.

TABELA 9: RECINTOS DE ESPETÁCULOS E ESPETÁCULOS AO VIVO EM 2011 E 2020

			2011			2020		
			Portugal	Centro	BSE	Portugal	Centro	BSE
Recintos de espetáculos e espetáculos ao vivo	**Recintos de espetáculos**	**Total**	347	86	**10**	388	95	**10**
		Salas / espaços	485	112	**17**	585	133	**17**
		Lugares sentados	190922	39953	**3464**	196013	34678	**3009**
		Sessões	25871	3883	**579**	37049	8229	**796**
	Espetáculos ao vivo	**Espetadores**	8484298	1611254	**278797**	16926411	3625800	**277392**
		Bilhetes vendidos	3424615	445394	**53833**	6037822	729604	**14826**

Fonte: Adaptado de INE (2021).

O número de **Dormidas nos Estabelecimentos de Alojamento Turístico** é um indicador que mostra a competitividade dos territórios. Na Tabela 10 verifica-se ainda uma diminuição muito elevada em relação ao número de Dormidas nos Estabelecimentos de Alojamento Turístico de 2011 para 2020 ao nível do país e Região Centro. Este facto é como consequência da pandemia Covid 19. No mesmo período, a NUTS III BSE ganhou mais 82 285 dormidas.

TABELA 10: DORMIDAS (Nº.) NOS ESTABELECIMENTOS DE ALOJAMENTO TURÍSTICO EM 2011 E 2020

Localização geográfica	Dormidas (N.º) nos estabelecimentos de alojamento turístico e local de residência					
	2011			2020		
	Total	Portugal	Estrangeiro	Total	Portugal	Estrangeiro
Portugal	39440315	13150991	30382160	25798299	13598609	12199690
Centro	4043543	2422906	1599510	3362011	2614902	747109
BSE	**443538**	**412312**	**79176**	**525823**	**474315**	**51508**
Almeida	15176	10557	4822	12201	9382	2819
Belmonte	---	---	---	18438	15405	3033
Celorico da Beira	21343	17236	2869	11260	10166	1094
Covilhã	174115	172270	24193	178022	158004	20018
F. de Castelo Rodrigo	---	---	---	7097	6763	334
Fornos de Algodres	---	---	---	13553	13056	497
Fundão	---	---	---	83071	77568	5503
Gouveia	12710	11806	3354	10994	8912	2082
Guarda	53424	42741	13333	48280	40737	7543
Manteigas	---	---	---	44814	41325	3489
Mêda	---	---	---	17360	16546	814
Pinhel	---	---	---	3514	3379	135
Sabugal	---	---	---	15016	14597	419
Seia	---	---	---	49668	47108	2560
Trancoso	---	---	---	12535	11367	1168

Fonte: Adaptado de INE (2021).

No que se refere ao Turismo, Portugal está na moda e o Centro de Portugal também. A BSE é um destino turístico reconhecido pela riqueza e diversidade de recursos naturais e patrimoniais, atributos que satisfazem diversos segmentos e nichos da procura turística, como se pode constatar com o aumento significativo dos valores do indicador anterior.

No período de 2011 para 2020, a análise dos números da **Estada Média nos Estabelecimentos Hoteleiros**, apresentados na Tabela 11, consolida este facto. A BSE aumenta a estada média dos seus visitantes, ao contrário do que é verificado em Portugal.

TABELA 11: ESTADA MÉDIA (N.º) NOS ESTABELECIMENTOS HOTELEIROS E TIPO DE ESTABELECIMENTO, EM 2011 E 2020

Localização Geográfica	Estada média (Nº.) nos estabelecimentos hoteleiros e tipo de estabelecimento		
	Total	Hotéis	Pensões
	2011		
Portugal	2,8	2,4	2,3
Centro	1,8	1,8	1,8
BSE	**1,5**	**1,6**	**1,2**
	2020		
Portugal	2,5	2,2	2,3
Centro	1,8	1,7	1,9
BSE	**1,7**	**1,7**	**1,7**

Fonte: Adaptado de INE (2021).

Na análise da Tabela 12, verificou-se, entre os anos 2013 e 2019 um acentuado decréscimo de **Unidades de Investigação** na BSE, que ficou aquém da média nacional e do centro do país. No entanto, apesar da diminuição do número de unidades de investigação na BSE, o aumento do número de pessoal ao serviço equivalente a tempo integral em atividades de investigação e desenvolvimento é notório no mesmo período temporal.

O Ensino Superior é o setor de execução que mais propicia a investigação na BSE, seguindo-se as empresas. A nível nacional, para além desses setores, contribuem também o setor do Estado e o setor das instituições privadas sem fins lucrativos, estas últimas sem qualquer representação em investigação e desenvolvimento na BSE.

TABELA 12: UNIDADES DE INVESTIGAÇÃO (Nº.) E PESSOAL EM INVESTIGAÇÃO E DESENVOLVIMENTO, EM 2013 E 2019

Local de residência	Unidades de investigação (Nº.) e desenvolvimento (I&D) e pessoal em I&D					
	Unidades de investigação	Pessoal a tempo integral em I&D				
		Total	Por setor de execução			
			Empresas	Estado	Ensino superior	Instituições privadas sem fins lucrativos
	2013					
Portugal	3549	46711	16220	1983	27753	755
Centro	920	9192	3444	131	5595	22
BSE	**69**	**582**	**129**	**6**	**447**	**0**
	2019					
Portugal	4702	61455	26793	2315	31556	791
Centro	1242	12487	6220	158	6071	38
BSE	**54**	**642**	**164**	**7**	**471**	**0**

Fonte: Adaptado de INE (2021).

4.2. Crescimento Inclusivo

O crescimento inclusivo tem como objetivo capacitar as pessoas de emprego, qualificá-las, lutar contra a pobreza, proporcionar-lhes proteção social e construir uma sociedade coesa, reforçando desta forma a coesão territorial. (Comissão Europeia, 2020).

A inclusão social integra a felicidade das pessoas e comunidades mais desenvolvidas. Implica, por exemplo, uma atividade empresarial com valorização de recursos humanos, com criação de salários justos e postos de trabalho dignos e não-discriminatórios. Um crescimento inclusivo implica desenvolver programas de apoio à sociedade, proporcionar o acesso à educação e formação, respondendo aos problemas sociais das comunidades locais.

Deste modo, quanto ao domínio Crescimento Inclusivo, escolheram-se os seguintes indicadores:

- Índice de Coesão;
- População Residente e Grupos Etários;
- Densidade Populacional e Tipologia de Áreas Urbanas;
- Índice de Envelhecimento;
- Beneficiárias/os do Rendimento Social de Inserção, da Segurança Social;
- Estabelecimentos de Ensino não Superior e Tipo de Estabelecimento;
- Saldo Migratório.

No Índice de **Coesão**, os resultados obtidos refletem um retrato territorial mais equilibrado do que o observado para a competitividade (Tabela 13).

A Tabela 13 mostra que existe um decréscimo no índice de coesão, entre os anos 2011 e 2019, mantendo-se abaixo da média nacional e da Região Centro. Ainda assim, encontra-se também no segundo quintil a nível nacional.

TABELA 13: ÍNDICE SINTÉTICO DE DESENVOLVIMENTO REGIONAL (COESÃO)

Localização geográfica	Índice sintético de desenvolvimento regional (Coesão)	
	2011	2019
Portugal	100	100
Centro	100,56	100,47
BSE	**96,76**	**95,76**

Fonte: Adaptado de INE (2021).

Relativamente à Tabela 14, verifica-se que o número de **População Residente** na BSE, em 2021, diminui, com uma diferença de 22 813 residentes comparando o ano de 2011. Verifica-se de igual modo que a diminuição populacional residente acompanha a tendência ocorrida na zona Centro e Portugal.

Relativamente aos concelhos da BSE, a maior queda acontece no município da Covilhã, diminuindo o valor de residentes em 4743. Além disso, o envelhecimento demográfico continua a acentuar-se quer para Portugal quer para a BSE.

TABELA 14: POPULAÇÃO RESIDENTE (Nº.) EM 2011 E 2021 E ÍNDICE DE ENVELHECIMENTO EM 2011 E 2020

	População Residente (Nº)		Índice de Envelhecimento	
Anos	**2011**	**2021**	**2011**	**2020**
Portugal	10542398	10347892	127	167
Centro	2316169	2227912	160,7	206,8
BSE	**233478**	**210665**	**230,9**	**295,7**
Almeida	7066	5882	443,2	597,1
Belmonte	6808	6204	216,1	277,1
Celorico da Beira	7608	6582	238,2	319,5
Covilhã	51196	46453	192,7	268,9
F. de Castelo Rodrigo	6224	5150	280,5	288,4
F. de Algodres	4965	4398	262,5	288,9
Fundão	28940	26521	222,9	282,7
Gouveia	13892	12221	301,2	375,3
Guarda	42126	40155	151,8	207,1
Manteigas	3400	2909	244,6	403
Mêda	5118	4632	335,9	434,2
Pinhel	9503	8099	292,3	419,9
Sabugal	12351	11281	511,4	462
Seia	24466	21759	236,3	303,8
Trancoso	9815	8419	275,4	373,7

Fonte: Adaptado de INE (2021).

Na Tabela 14, apresenta-se também **o Índice de Envelhecimento** e pode verificar-se que há um aumento de 64,8 na BSE de 2011 para 2020. Esta tendência de aumento acompanha o verificado para a Região Centro e para Portugal. Verifica-se que os Municípios que têm maior aumento do índice de envelhecimento são Almeida, Manteigas, Mêda, Pinhel e Sabugal (acima dos 400). Refira-se, no entanto, que no Município de Sabugal, o índice de envelhecimento diminui (511,4 em 2011 para 462 em 2020).

A **Densidade Populacional** é apresentada na Tabela 15 e verifica-se que este indicador tem vindo a diminuir ao longo dos anos para todos os concelhos e para a BSE, Centro e Portugal e em todas as tipologias de áreas urbanas.

A maior queda de densidade populacional na BSE regista-se na área urbana, passando de 346,3 (Nº/Km^2) em 2011 para 323 em 2019. E verifica-se que a BSE também regista uma queda significativa na densidade populacional ao nível da área mediamente urbana (um diferencial de 5,5), superando quer a Região Centro, quer Portugal. Igualmente se percebe um decréscimo gradual na tipologia da área rural, verificando-se que é superior a Portugal, no entanto inferior equiparada com os valores da Região Centro.

TABELA 15: DENSIDADE POPULACIONAL (Nº/KM2) E TIPOLOGIA DE ÁREAS URBANAS, EM 2011 E 2019

Local de residência	**Densidade populacional (Nº/ km²) por Local de residência e Tipologia de áreas**					
	2011			**2019**		
	Área urbana	**Área mediamente urbana**	**Área rural**	**Área urbana**	**Área mediamente urbana**	**Área rural**
Portugal	452,5	82,4	24,6	448,3	78,8	22,6
Centro	314,2	88,3	33,6	308,4	84,1	30,8
BSE	**346,3**	**64,7**	**20,1**	**323**	**59,2**	**17,7**

Fonte: Adaptado de INE (2021).

Analisando os dados da Tabela 16 verifica-se que o número de **Beneficiários do Rendimento Social de Inserção (RSI)** da Segurança Social diminui na BSE de 8.058 para 5.981, uma diferença de 2.077 beneficiários. Este resultado acompanha o registado na Região Centro e em Portugal, uma diminuição entre 2011 e 2019. Ao nível dos Municípios que compõem a BSE verifica-se que o Fundão é a exceção à regra e aumenta o número de beneficiários de 719 para 864. A explicação pode ser dada através do facto de o Fundão ser tipicamente um concelho de emigração com problemas de baixa densidade populacional. Destacam-se os Municípios da Mêda e Manteigas pelo facto de a diminuição do número de beneficiários ser pouco significativa, tendo em conta que este valor não chega a uma centena.

TABELA 16: BENEFICIÁRIAS/OS DO RENDIMENTO SOCIAL DE INSERÇÃO, DA SEGURANÇA SOCIAL (N.º) EM 2011 E 2019

Local de residência	Beneficiárias/os do rendimento social de inserção	
	2011	**2019**
Portugal	448 290	267 403
Centro	62 660	39 153
BSE	**8 058**	**5 981**
Almeida	176	123
Belmonte	307	202
Celorico da Beira	302	172
Covilhã	1 675	1 404
F. de Castelo Rodrigo	394	282
Fornos de Algodres	227	87
Fundão	719	864
Gouveia	570	422
Guarda	1 496	1 095
Manteigas	111	46
Mêda	98	64
Pinhel	348	146
Sabugal	433	315
Seia	979	637
Trancoso	223	122

Fonte: Adaptado de INE (2021).

Analisando a Tabela 17 verifica-se que diminui o número de **Estabelecimentos de Ensino Não Superior** de 2011 para 2020, sendo transversal à BSE, zona Centro e Portugal. A maior queda ao nível da BSE regista-se nos estabelecimentos designados de jardins-de-infância. Verifica-se ainda que na BSE diminuíram de 2011 para 2020, 1 escola secundária e 1 escola profissional, além disso perdeu 17 escolas básicas. De salientar que a BSE é um território que não aposta nas escolas artísticas, pois não detém nenhuma.

TABELA 17: ESTABELECIMENTOS DE ENSINO NÃO SUPERIOR (N.º) E TIPO DE ESTABELECIMENTO, EM 2011/2012 E 2019/2020

Período de referência dos dados	Localização geográfica	Estabelecimentos de ensino não superior (N.º) por Localização geográfica e Tipo de estabelecimento					
		Total	Jardim-de-infância	Escola básica	Escola secundária	Escola artística	Escola profissional
2011 / 2012	Portugal	10310	3 935	5 432	356	11	267
	Centro	2 944	1 220	1 488	94	2	67
	BSE	**349**	**168**	**151**	**13**	-	**9**
2019/2020	Portugal	8310	2920	4405	**346**	14	262
	Centro	2294	883	1176	**93**	3	65
	BSE	**271**	**107**	**134**	**12**	-	**8**

Fonte: Adaptado de INE (2021).

Perante os valores apresentados do **Saldo Migratório** na Tabela 18, facilmente se percebe uma grande diferença no saldo das entradas e saídas de residentes comparando os anos de 2011 e 2020, uma vez que neste último ano não se verifica nenhum saldo negativo. O saldo positivo da BSE foi suficiente para colmatar as perdas de 2011 assim como no Centro e Portugal. Nos municípios de Fornos de Algodres e Sabugal não se verificou saldo negativo no ano de 2011 contrariando a tendência de todos ou outros territórios e municípios da NUTS III BSE.

Também é interessante verificar que apenas os Municípios de Almeida, Covilhã e Guarda, avaliando o cálculo da diferença entre o saldo negativo e o positivo, do ano de 2011 para o ano de 2020, não recuperaram o número de habitantes.

TABELA 18: SALDO MIGRATÓRIO (Nº.) EM 2011 E 2020

Local de residência	Saldo migratório (N.º)	
	2011	2020
Portugal	-24 331	41274
Centro	-7 456	26555
BSE	**-1 363**	**2099**
Almeida	-104	90
Belmonte	-22	64
Celorico da Beira	-35	83
Covilhã	-437	344
F. Castelo Rodrigo	-10	72
Fornos de Algodres	17	65
Fundão	-129	242
Gouveia	-49	171
Guarda	-388	289
Manteigas	-10	21
Mêda	-33	63
Pinhel	-47	67
Sabugal	6	200
Seia	-98	212
Trancoso	-24	116

Fonte: Adaptado de INE (2021).

4.3. Crescimento Sustentável

Um crescimento sustentável significa construir uma economia sustentável, competitiva, com recurso a tecnologias "verdes", com uma utilização eficiente dos recursos de forma a evitar a degradação ambiental, a perda de biodiversidade e a utilização insustentável dos recursos (Comissão Europeia, 2020).

As energias renováveis são um dos principais sustentos para o combate às alterações climáticas. A proteção ambiental tem que ser encarada como um incentivo à inovação e à resiliência da população e das empresas, com alternativas mais sustentáveis que diminuem a exploração exaustiva dos solos, a escassez dos bens e a insustentabilidade dos custos.

As zonas de intervenção florestal sustentáveis são inclusivas à fauna e à flora, às atividades de turismo de natureza, a atividades ao ar livre, à caça, etc… A reciclagem e a reutilização de bens e materiais é inclusiva, adesiva e possui muito para crescer a nível científico, chamando públicos nacionais e internacionais pelas boas práticas.

Quanto ao domínio Crescimento Sustentável, os indicadores selecionados foram:

- Índice de Qualidade Ambiental;
- Produção Bruta de Eletricidade;
- Superfícies das Zonas de Intervenção Florestal (ZIF);
- Superfícies das Unidades Territoriais e Classes de Usos e Ocupação do Solo;
- Proporção de Resíduos Urbanos Preparados para Reutilização e Reciclagem;
- Estações de Tratamento de Águas Residuais.

O melhor desempenho na estrutura do índice sintético de desenvolvimento global regional da BSE refere-se à **Qualidade Ambiental**. Como se pode observar na Tabela 19, a BSE obteve um índice de 106,72 em 2011 e de 108,99 em 2019. Este indicador encontra-se acima da média nacional, em ambos os anos analisados e, segundo o INE, tendencialmente em terceira posição em relação às 25 NUTS III (INE, 2021).

TABELA 19: ÍNDICE SINTÉTICO DE DESENVOLVIMENTO REGIONAL (QUALIDADE AMBIENTAL)

Localização geográfica	Índice sintético de desenvolvimento regional (Qualidade ambiental)	
	2011	2019
Portugal	100	100
Centro	98,42	97,57
BSE	**106,72**	**108,99**

Fonte: Adaptado de INE (2021).

A **Produção Bruta de Eletricidade** corresponde à energia elétrica total medida à saída de todos os geradores principais dos centros produtores. Como se pode verificar na Tabela 20, de acordo com os dados mais recentes do INE, o último valor observado é no ano de 2019. A produção bruta de eletricidade no território das Beiras e Serra da Estrela acompanha a tendência de crescimento nacional bem como da Região Centro.

TABELA 20: PRODUÇÃO BRUTA DE ELETRICIDADE (KWH), EM 2011 E 2019

Local de residência	Produção bruta de eletricidade (KWh)	
	2011	2019
Portugal	52385015216	53154538725
Centro	18290854650	20749840405
BSE	**1234631441**	**2091981774**

Fonte: Adaptado de INE (2021).

As **Zonas de Intervenção Florestal (ZIF)** são espaços florestais contínuos, submetidos a um plano de intervenção vinculativo, geridos por uma única entidade, sendo prioritariamente aplicadas a zonas percorridas pelos incêndios florestais. De acordo com a análise da Tabela 21, o território da BSE aumentou significativamente a superfície classificada, em consonância com os valores do Continente[13] e do Centro.

De notar que até ao ano de 2011 esta intervenção foi uma forte aposta dos Municípios de Figueira de Castelo Rodrigo, Fundão, Gouveia e Seia. No entanto, e a par com os restantes Municípios da BSE não se verifica qualquer alteração no número de hectares até ao ano de 2019. Uma clara exceção é verificada no Município de Trancoso, que não detinha qualquer superfície ZIF em 2011 e que até 2019 foram classificados 34.774 hectares.

TABELA 21: SUPERFÍCIE DAS ZONAS DE INTERVENÇÃO FLORESTAL (HA) EM 2011 E 2019

Localização geográfica	Superfície das Zonas de Intervenção Florestal (ha)	
	2011	2019
	ha	ha
Continente	808 498	1 461 590
Centro	329 971	459 547
BSE	**61 371**	**96 145**
Almeida	1 981	1 981
Belmonte	0	0
Celorico da Beira	1 114	1 114
Covilhã	0	0
F. Castelo Rodrigo	2 666	2 666
Fornos de Algodres	2	2
Fundão	7 166	7 166
Gouveia	18 403	18 403
Guarda	1 657	1 657
Manteigas	0	0
Mêda	0	0
Pinhel	5	5
Sabugal	1 455	1 455
Seia	26 922	26 922
Trancoso	0	34 774

Fonte: Adaptado de INE (2021).

A **Superfície das Unidades Territoriais** é classificada por **Classes de Uso** do solo e pela sua **Ocupação** em Km^2. Para este indicador, foram selecionados os territórios artificializados, a área agrícola e a área de pastagem no ano de 2010[14] e 2018. Avaliando a Tabela 22, é possível constatar que a BSE tem uma ocupação do solo muito baixa em relação à Região Centro nas diferentes classes. É na área

[13] Este indicador apenas apresenta valores para o Continente, não apresenta dados para a região de Portugal (sendo que inclui também os arquipélagos dos Açores e da Madeira.)

[14] A base de dados do Instituto Nacional de Estatística apenas dispõe para este indicador os anos 2010, 2015 e 2018, pelo que foi selecionado o ano de 2010 por se aproximar mais do espaço temporal em estudo.

agrícola que a BSE tem menor proporção em relação ao Centro, no entanto é na que se regista um maior aumento de 2010 para 2018.

Ao analisar os Municípios, verifica-se que a Covilhã, Gouveia e Trancoso registaram o maior aumento de territórios artificializados no mesmo período. Em Figueira de Castelo Rodrigo, Fundão e Mêda assinala-se um maior aumento da área agrícola até 2018. Conclui-se também que é na área de pastagens que se verifica um declínio na maior parte dos Municípios, a destacar Fundão, Figueira de Castelo Rodrigo e Covilhã, que acompanham a tendência de perda nesta área tanto no Continente, como no Centro e BSE.

TABELA 22: SUPERFÍCIE (KM²) DAS UNIDADES TERRITORIAIS E CLASSES DE USO E OCUPAÇÃO DO SOLO, EM 2010 E 2018

Localização geográfica	Superfície (km²) das unidades territoriais por localização geográfica e classes de uso e ocupação do solo					
	2010			2018		
	Classes de uso e ocupação do solo					
	Territórios artificializados	Área agrícola	Área de pastagens	Territórios artificializados	Área agrícola	Área de pastagens
Continente	4 535,06	22 959,36	5 968,95	4 650,52	23 329,69	5 722,77
Centro	1 525,64	6 531,27	1 203,99	1 562,78	6 572,53	1 172,58
BSE	**140,92**	**1 708,08**	**378,92**	**143,3**	**1 747,54**	**373,1**
Almeida	8,48	141,89	68,89	8,5	144,02	69,2
Belmonte	3,64	53,96	11,49	3,74	54,58	10,94
Celorico da Beira	6,3	74,43	10,21	6,19	77,45	10,81
Covilhã	20,86	122,03	10,33	21,17	125,55	8,88
F. de Castelo Rodrigo	5,05	186,8	38,18	5,33	196,54	36,89
F. de Algodres	4,1	33,27	2,86	4,1	34,11	2,8
Fundão	15,55	237,16	41,45	16,09	244,54	37,53
Gouveia	7,3	69,69	6,71	7,74	71,28	6,57
Guarda	22,36	182,06	35,58	22,51	183,38	35,57
Manteigas	1,58	6,28	1,49	1,58	6,26	1,51
Mêda	5,22	103,99	16,04	5,31	105,1	16,36
Pinhel	8,28	158,77	37,45	8,53	160,9	37,53
Sabugal	11,26	161,46	79,88	11,46	164,01	79,72
Seia	12,65	68,06	6,69	12,63	68,76	6,85
Trancoso	8,28	108,24	11,65	8,42	111,06	11,94

Fonte: Adaptado de INE (2021).

A análise do indicador **Proporção de Resíduos Urbanos Recolhidos Seletivamente** (%) é pertinente para o desenvolvimento sustentável, com a redução de resíduos, a sua maximização para reciclagem e a sua utilização eficiente e sustentável. A Tabela 23 indica que Portugal entre 2011 e 2019 aumentou em 6% a recolha seletiva, com a Região Centro a acompanhar a tendência. Neste indicador, a BSE destaca-se uma vez que no mesmo espaço temporal duplica a proporção de resíduos urbanos recolhidos seletivamente, número que resulta do aumento que se verifica em todos os municípios.

TABELA 23: PROPORÇÃO DE RESÍDUOS URBANOS RECOLHIDOS SELETIVAMENTE (%) EM 2011 E 2019 E ESTAÇÕES DE TRATAMENTO DE ÁGUAS RESIDUAIS (N.º) EM 2011 E 2018

Localização geográfica	Proporção de resíduos urbanos recolhidos seletivamente		Estações de tratamento de águas residuais (N.º)	
	2011	2019	2011	2018
	%	%	N.º	N.º
Portugal	15	21	x	x
Centro	10	16	1 014	x
BSE	**6**	**12**		**233**
Almeida	3	7	20	20
Belmonte	9	11	8	6
Celorico da Beira	6	9	5	6
Covilhã	2	13	23	24
F. de Castelo Rodrigo	6	11	11	11
Fornos de Algodres	6	17	1	2
Fundão	6	9	22	22
Gouveia	7	13	9	12
Guarda	8	12	23	26
Manteigas	13	23	x	0
Mêda	7	15	x	16
Pinhel	6	8	12	19
Sabugal	7	10	26	29
Seia	9	15	24	31
Trancoso	6	9	8	9

Fonte: Adaptado de INE (2021).

O tratamento de águas residuais é um importante fator de saúde pública, preservação de recursos hídricos e da diminuição da poluição do ambiente em geral. O número de **Estações de Tratamento de Águas Residuais (ETAR)** está representado na Tabela 23. Não se dispõe de valores para alguns territórios, no entanto, a soma do número de ETAR registadas em 2011 nos concelhos que compõem a BSE, dá um total de 192. Assim, ao comparar este valor com o registado em 2018, verifica-se um aumento significativo destas infraestruturas. Este aumento corresponde ao investimento feito principalmente em Pinhel e Seia, que registam mais 7 estações de tratamento em cada um dos Municípios, e Gouveia, Guarda e Sabugal a registar mais 3 ETAR cada. O único Município da BSE que não detém nenhuma estação de tratamento de águas até 2018 é Manteigas.

4.4. Análise SWOT

Este ponto destina-se à análise e avaliação do potencial do território da BSE em termos de pontos fortes, pontos fracos, oportunidades e ameaças enquadrada na análise SWOT.

De acordo com Guell (1997) Fonseca (2006) Gurel & Tat (2017), a análise SWOT (*Strenghts, Wealnesses, Opportunities, Threats*), é um processo que envolve quatro áreas em duas dimensões e que comporta quatro componentes: forças, fraquezas, oportunidades e ameaças. Os pontos fortes e fracos são fatores e atributos internos da organização, e as oportunidades e ameaças são fatores e atributos externos à organização.

Segundo Alves (2007) a análise SWOT (Pontos Fortes, Pontos Fracos, Oportunidades e Ameaças) ao combinar duas dimensões de análise (interna e externa) permite por em prática uma abordagem dinâmica que, para além dos pontos fortes e fracos, tem em conta os efeitos da envolvente territorial, facilitando uma aproximação estratégica à sua gestão.

Assim, ao individualizar os pontos fortes e fracos reais e potenciais, as oportunidades que poderão surgir no futuro assim como as ameaças que se perfilam no horizonte de um território, esta ferramenta permite avaliá-lo num contexto dinâmico, e identificar as suas margens de evolução. Além disso, dá indicações relativas à posição no mercado ocupada por um território e fornece uma maior consciência da efetiva qualidade da oferta desse território (Alves, 2007, Mendes 2020).

Segundo Natário (2019) a análise SWOT é então uma ferramenta essencial para o diagnóstico territorial uma vez que permite identificar os pontos fortes (quais as vantagens do território, o que faz bem, quais os recursos relevantes que o território possui) e os pontos fracos (quais as desvantagens do território, o que o território faz mal, quais os recursos relevantes que o território não possui), as oportunidades (que tendências positivas são favoráveis ao território, que fatores externos podem vir a beneficiar ou a causar impactos positivos no território) e ameaças (que obstáculos de natureza externa se perspetivam e que tendências poderão vir a ser desfavoráveis ao território).

Tendo em conta estas considerações pretende-se a aplicação deste instrumento tendo em consideração os 3 domínios chave anteriormente referidos: o Crescimento Inteligente, Inclusivo e Sustentável no que diz respeito à análise da NUTS III BSE. Deste modo, numa abordagem interna do território, são identificados os pontos fortes e os pontos fracos, enquanto que ao nível externo são identificadas as principais oportunidades e ameaças.

Pontos Fracos

- ✓ Índice de competitividade abaixo da média nacional
- ✓ Declínio demográfico
- ✓ Reduzida densidade populacional
- ✓ Predomínio de microempresas
- ✓ Declínio do número de recintos de espetáculos e espetáculos ao vivo
- ✓ Superfícies de unidades territoriais e ocupação do solo muito baixas
- ✓ Forte dependência de importações de bens
- ✓ Redução do contributo para as exportações nacionais
- ✓ Perdas de atividades culturais
- ✓ Índice de coesão abaixo da média nacional
- ✓ Elevado envelhecimento da população

Pontos Fortes

- ✓ Proximidade com a fronteira espanhola
- ✓ Aumento de nascimentos de novas empresas
- ✓ Taxa de cobertura das importações pelas exportações
- ✓ Aumento da proporção de exportações de bens de alta tecnologia
- ✓ Aumento de classificação do número de imóveis culturais
- ✓ Aumento da estada média nos estabelecimentos turísticos
- ✓ Índice de qualidade ambiental acima da média nacional
- ✓ Aumento da proporção de resíduos urbanos recolhidos seletivamente

- ✓ Aumento do número de estações de tratamento de águas residuais
- ✓ Aumento da produção bruta de eletricidade e crescimento de energias renováveis

Oportunidades

- ✓ Políticas de reforço da competitividade e da exportação
- ✓ Políticas de valorização do território e do património
- ✓ Implementação de empresas de base tecnológica
- ✓ Colaboração em redes para o desenvolvimento de produtos turísticos inovadores
- ✓ Colaboração em projetos fronteiriços
- ✓ Aumento de formação profissional e aposta no sistema de ensino
- ✓ Implementação de estratégias de inserção social
- ✓ Crescente procura turística por parte de estrangeiros

Ameaças

- ✓ Elevadas taxas de emigração
- ✓ Crise económica nacional
- ✓ Fraco crescimento da atividade económica
- ✓ Forte concorrência de outras regiões com maior capacidade de atração de investimento
- ✓ Fraco investimento internacional
- ✓ Contexto global de Pandemia COVID-19

No que respeita às oportunidades observadas, estas devem ser aliadas aos pontos fortes oferecidos pelo território e em conjunto delinear objetivos e definir estratégias de inovação e crescimento. O território da BSE tem uma vasta área de intervenção, a começar pela sua localização geográfica num contexto ibérico, potencialmente com o reforço das exportações, atração de investimento com cooperação transfronteiriça.

No que se refere às ameaças ao desenvolvimento do território e aos pontos fracos apresentados, são fatores críticos que não passam indiferentes ao contexto macroeconómico e às dificuldades económicas e financeiras que o País transportou nos últimos anos. Permanecem privações estruturais no plano de acessibilidades e infraestruturas, cuja resolução é dificultada pela falta de prioridade de intervenção pública neste domínio e pelas características de baixa densidade do território.

De salientar também o contexto de crise com origem na pandemia provocada pela doença Covid-19, no início de 2020, de dimensão internacional, que com todas as medidas de contingência adotadas compromete a economia a nível mundial e também a economia destes territórios.

5. Conclusão

Da análise e do diagnóstico da situação territorial e sociodemográfica à NUTS III BSE conclui-se que este é um território com um declínio demográfico e de reduzida densidade populacional, onde o envelhecimento demográfico continua a acentuar-se. O aumento, nos últimos anos, do índice de envelhecimento é verificado na generalidade dos territórios da BSE.

Em 2019, a BSE apresenta saldo positivo no saldo migratório em todo o seu território, no entanto não foi suficiente para colmatar as perdas de 2011. Estes fatores inevitavelmente têm repercussão na área da educação, com uma diminuição acentuada do número de jardins de infância, no fecho de

escolas secundárias e na perda de uma escola profissional. No entanto, a BSE mantém os estabelecimentos de ensino superior.

Num contexto económico e empresarial, no território da BSE aumentaram os nascimentos de novas empresas, predominantemente as microempresas, mas a BSE exporta menos, pois verifica-se que a percentagem de exportações de bens diminui e representa menos de 1% no total de exportações do país em 2019. Neste contexto, a região também tem vindo a perder peso a nível nacional. Também é com muito baixa na proporção de exportações de bens de alta tecnologia e a ficar áquem dos valores da Região Centro e Portugal que registam uma subida maior neste indicador.

A aposta no setor da investigação e desenvolvimento é ténue na BSE, pois o investimento em novas unidades de investigação e os novos postos de trabalho ficou muito longe da média nacional.

No entanto, o potencial turístico é evidente, com a preservação e valorização do território da BSE, uma vez que detém uma herança muito rica em história e património natural. No que respeita a bens imóveis culturais, a BSE aumentou o número de novos imóveis classificados, desde monumentos, conjuntos e sítios. No que respeita à área do turismo a BSE é um destino em consolidação, com um aumento da estada média nos estabelecimentos hoteleiros. Este indicador vem de encontro ao verificado no número de dormidas nos estabelecimentos de alojamento turístico, que de 2011 para 2019, a BSE registou um aumento em mais de 380.000 dormidas.

No âmbito de atividades culturais, a BSE no espaço temporal em estudo, regista perdas no número total de salas/espaços de espetáculos, nos lugares sentados, no número de espetadores e bilhetes vendidos.

Face às exigências implementadas para um crescimento e desenvolvimento sustentável dos territórios, a BSE acompanha de forma favorável a tendência, tendo em conta a análise de vários indicadores. De salientar o aumento de produção bruta de eletricidade com um enfoque no crescimento de energias renováveis, aproveitando os recursos naturais do território. Destaca-se também o aumento de classificação de superfícies do solo, nomeadamente de superfícies (ha) classificados de Zonas de Intervenção Florestal, de superfícies (Km^2) de área agrícola, área de pastagens e de territórios artificializados.

Outro indicador de desenvolvimento sustentável é o tratamento de águas residuais em que a BSE apresenta melhorias, aumentando o número de ETAR. No entanto, é na proporção de resíduos urbanos preparados para reutilização e reciclagem que o território da BSE apresenta um declínio de 2013 para 2019, não acompanhando a propensão no resto do país.

A Análise SWOT permite verificar as potencialidades demonstradas nos pontos fortes, que aliados com as oportunidades externas, numa estratégia bem delineada, poderão representar um fator para a prospeção e desenvolvimento da BSE. No entanto, esta análise também revela uma série de fragilidades do território, a apresentar pontos fracos de difícil intervenção, que vão de encontro com as ameaças externas de matéria sensível.

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Digital Transformation as a key driver to boost regional development in low-density regions

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ABSTRACT

This new era of advanced and immersive digitalization represents, at the same time, a challenge and an opportunity for low-density territories, making the implementation of strong and ambitious structural innovation policies and actions extremely important. When the global goes local, technology and citizens must meet face-to-face and create an inclusive innovation ecosystem that contributes to more socio-economic and sustainable development. A long-term specialization strategy, focused on innovation and using intensive technology, capable of delivering incremental digital transformation to citizens and companies, is a key driver to boost regional socio-economic development. The design of a digital transformation strategy must be supported by a real and accurate state-of-the-art assessment, and by the definition of ambitious goals and realistic activities. The combination between digital infrastructures, in continuous development, an education ecosystem delivering the needed human resources with an open spirit for entrepreneurship, innovative public procurement aligned with regional capabilities and supply-chain, R&D capable of delivering rapid responses and also breakthrough radical innovation, region-wide adoption and usage of standards and best practices, along with continuous monitoring and assessment, can produce the best results, thus contributing to incremental and accelerated economic development. Hosting innovation and digital transformation in the scope of a regional digital innovation hub represents a strategic movement, critical to the regional consolidation of technology services and to change the development paradigm from traditional to a more technology-based one.

Keywords: Digital Transformation, Technology, Digital Innovation Hub, Specialization, Strategy, Policies.
JEL classification: O30, O32, O36.

1. DIGITAL TRANSFORMATION AS A KEY DRIVER TO BOOST REGIONAL DEVELOPMENT IN LOW-DENSITY REGIONS

The speed of local development is directly connected with economic power, social cohesion and high cultural knowledge, making developed regions more competitive and capable of increasing the gap between themselves and low-density, less developed regions. In a world of constant change and innovation, the opportunities for low-density regions lay on digital transformation and structured innovation frameworks, and also on smart specialization. To bridge the gap, facing the lack of human and financial resources, regions urge to use technology and high-end capabilities to leap faster into the future and to reach better levels of competitiveness and development. The next “digital decade”, as the European Commission names it, can change the game and bridge the gap between regions and communities, giving birth to new opportunities and placing innovation challenges everywhere and for everyone. In the era of supercomputing, artificial intelligence and cyberthreats, but also of pandemics and wars, it is crucial to invest in selected strategic areas of specialization (otherwise called “smart specialization”) that can bring aboard new technologies to accelerate socioeconomic

development, produce intelligent knowledge, enhance local cultural heritage and improve welfare, setting a legacy for future generations. This is the time for responsibility and choices. If in past European programs, the strategy was to split funding to promote growth, now is the time to opt, to make choices and to concentrate resources on strategic smart priorities for local development. It is against human nature to completely exclude something and be forced to choose, but important choices are mandatory. We live under constant change and in a time of scarce resources, so regions need to make hard but important strategic choices regarding specialisation – more than three areas is too much, but ten areas makes it definitively impossible to maintain strategic focus! Another challenge is to work together in the same competitiveness tracks, pursuing the same goals and impact results. Low-density regions need to look sharply at their natural and technological capabilities, at present and future niche opportunities, and at potential competitive advantages, to design a long-term strategy to implement collectively, so they can reach positive impact results. The definition of this strategy must be done in a bottom-up, pick-the-right-choice process, involving and committing all stakeholders in a quad-helix approach, easily explained to all levels of the population (maybe using different narratives, but the same goal). Clearly, the choices are not only technology-based or competitiveness-based, but also social and cultural, natural and human, responding to social, ageing, health, environmental, economy and poverty challenges and possible solutions – as I like to call it, "the societal challenges". In this global world, we need to remember that no single human lives in a global reality, but rather a local one, and our first obligation as innovators is to design and implement strategies to respond to local, real and physical challenges, using digital transformation and energy transition as drivers of development. Technology and digital, energy and environment are not only tools for development, but also drivers of innovation and socioeconomic development.

To achieve better development levels and bridge the gap, regions must implement a quadruple-helix model with all the stakeholders, including Academia from all levels, public policies organizations, companies and citizens, in a long-term strategy that commits everyone. This partnership must focus on setting up a common and collaborative framework of shared services to support innovation, connect Academia and researchers to companies, promote innovative public procurement, set up an adequate workforce match between demand and offer, increase entrepreneurship and accelerate the development of innovative products and services.

Let us consider the definition of Smart Specialization from the European Commission to set the bases for discussion of possible actions comprised in this transformational specialization strategy for a low-density region. To do that, we need to read the goals of smart specialisation strategies:

- "Smart specialisation is a place-based approach, meaning that it builds on the assets and resources available to regions and Member States and their specific socio-economic challenges in order to identify unique opportunities for development and growth;
- To have a strategy means to make choices for investment. Member States and regions ought to support only a limited number of well-identified priorities for knowledge-based investments and/or clusters. Specialisation means focusing on competitive strengths and realistic growth potentials supported by a critical mass of activity and entrepreneurial resources;
- Setting priorities should not be a top-down, picking-the-winner process. It should be an inclusive process of stakeholders' involvement centred on "entrepreneurial discovery" that is an interactive process in which market forces and the private sector are discovering and producing information about new activities, and the government assesses the outcomes and empowers those actors most capable of realizing this potential;
- The strategy should embrace a broad view of innovation, supporting technological as well as practice-based and social innovation. This would allow each region and Member State to shape policy choices according to their unique socioeconomic conditions;
- Finally, a good strategy must include a sound monitoring and evaluation system as well as a revision mechanism for updating the strategic choices."

Both the European Commission (Smart Specialisation Platform) and OECD (OECD Smart specialisation) see smart specialization as a strategic move for regions to accelerate innovation development. Defining a digital-based smart specialisation is crucial to speed up development and reach ambitious goals and impact results. This does not mean that digital is the unique solution, but

instead that we use innovation and digital technologies in everything we do to reach our goals, which, in the end, are centred on socioeconomic development.

Together, smart specialization and digital transformation strategies, recognized by the community and with committed stakeholders, play a significant role in changing innovation development in low-density regions. Even with good specialization strategies on paper, regions are failing to overcome their competitiveness challenges and lacking behind more developed regions, but new opportunities are arising from the democratization of high-end technologies and from the re-emerging importance of local dimension.

2. STRATEGIC PILLARS TO BOOST INNOVATION BASED ON DIGITAL TRANSFORMATION AND HIGH TECHNOLOGY

In supporting innovation, several pillars are key for regions to be able to consolidate and transform the local economy, implementing long-term structural and incremental actions. Some common pitfalls of recent strategies include: not using the real baseline and define incremental actions; not setting common collective goals and committing people to them; not formalizing leadership to work the priorities together with stakeholders; not formalizing the flagship of specialization and digitalization. In this text, key strategic pillars are seen as mandatory to support innovation. The sum of all does not solve the lack of innovation or entrepreneurial spirit in a low-density region, but not addressing each of them makes the "consortium" for development weak and incomplete.

Infrastructures are many times confused with bad, expensive and underrated impact, but also "easy" investment priorities. In the first three cases, this happens because people typically confuse old roads or other more "construction-based" investments with entrepreneurial support facilities, connectivity or energy infrastructures, supercomputing or other highly intensive in technology or innovation, where large investments are still needed. This does not mean that investments in infrastructures are all good, but a lot of work is yet to be done on **digital infrastructures**. Regions fail to design new programmes and investments on digital infrastructures when they do not map and detail the existing landscape, learn from mistakes and take corrective actions, and when they try, as it often happens, to rebuild rather than upgrade. More than expected, decision-makers give-up on digital infrastructures because impact and results are long-term (example: broadband bottom-up initiatives disappearing). Investments to build digital infrastructures need to be planned to start from where we stand, what we have and how it is used, designed in an incremental long-term roadmap to deliver support to innovation. How can one plan investment on broadband without having detailed mapping of infrastructures and service availability, assessing citizens uptake, present and future services? We must avoid the common mistake to alienate infrastructures and assets without evaluating real impact, looking at the past, learning from previous errors to consider good practices and lessons learned. Mapping infrastructures and existing connections in the ecosystem makes it easier and more effective to invest incrementally on new and advanced digital infrastructures.

Innovation consumes a substantial number of resources, both technology assets and human-resource, and many regions are not capable of producing or attracting enough people to support rapid development. This is because more developed regions are more attractive and innovative, pulling most resources available, but also because less developed regions do not set long-term specialization strategies to "produce" and attract valuable qualified human resources. Having no intention of advocating an education regionalization strategy, regions need, nonetheless, to define their specialization strategy and align the **education factory ecosystem** to support and prioritize strategic areas. Regions' decision-makers need to better understand that education, although not locally or regionally-based, needs a strategic alignment between what Academia delivers and what the market demands to reach a more competitive economy. People need to be attracted to choose the jobs of the future, with the correct and adapted skills needed to increase economic development. This must be done in a continuous timeframe of ten years adapted to market needs and expectations (example: Aerospace response provided by IEFP for Embraer in Évora). Question: "What is the expertise needed to support market development in the local ecosystem for the next ten years? Is the Academia producing the resources needed by companies and the public sector?" If the answer is no, the region is probably investing in human resources which face the risk of increasing unemployment with repeated re-training schemes or chancing the loss of valuable and expensive resources to other geographies.

It is crucial to create and effectively support an **entrepreneurial ecosystem** adapted to the region's priorities and strategy, committed to the specialization goals, aligned with the best practices and

international standards, to be able to reach long-term innovation results and structural impact at a local and regional level. The low-density regions tend to have short-term innovative Startups and a zero-retention capability in the medium-long term.

The use of **innovative Public Procurement** to accelerate innovation in local SMEs is crucial to promote impact using public sector resources, mainly in the areas aligned with regional smart specialization priorities. As of today, public procurement procedures and rules can prioritize local versus global. The public sector needs to make its investments in innovation and services using these instruments to help the local economy and promote augmented impact results, capable of producing more value for the resident population.

Applied and fundamental R&D are critical and must be aligned, respectively, with the short-medium and long-term specialization strategies. The first one, as a contribution to innovation transference to SMEs, capable of delivering new products and services, and the second as an input and driver to new strategic areas to create new high-added-value business ideas. Regions need to change their research and innovation schemes, involving Academia and SMEs to create incremental value for regional development, adopting a set of structured processes that can transform the technology transfer mechanism as a pillar to these regions' growth.

Standards and best practices are typically used in more developed regions where the importance of these "rules" makes the competitiveness process more structured and incremental, avoiding knowledge loss, unexpected results, incomplete or misunderstood activities, and many more downfalls in project development. To improve management and control of activities, both in operations and projects inside the innovation specialization strategy, a set of basic best practices and standards must be integrated. Some examples: the ability to manage innovation in an incremental structure using a controlled and managed system aligned with "ISO 56002 - Innovation management system"; using quality standards like "ISO 9001 – Quality management system", "ISO 20000 IT service management" in product and services development; adopting project management best practices to better understand, negotiate, control, and deliver projects, taking as best example IPMA Standards (International Project Management Association), Open PM² published by the European Commission (in Portugal, see APOGEP Portuguese Association of Project Management/Associação Portuguesa de Gestão de Projeto and be part of the local community in methodology for managing projects). Typically not adopted, but crucial, is the **risk analysis and management** that supports the ability to manage, mitigate and solve risks inside the development stages – risk management should be addressed into all previously mentioned action items.

Low-density territories face a big challenge when we look at emerging **advanced technologies and Europe's priorities for digital transformation**, like artificial intelligence, supercomputing and cybersecurity, where resources, competencies and skills are crucial to accelerate regional local development. The challenge faced by these regions rests on bridging the gap between these technologies and areas, both in companies and in civil society, offering people the effective usage of advanced resources like supercomputing, artificial intelligence and cybersecurity tools. The knowledge gap makes it hard to democratize the usage by companies, mainly SMEs, in the development of new products and services, and increases the gap between competitive and cohesion regions. If we look at supercomputing or high-performance computing, HPC (see Supercomputing in the DIGITAL Europe programme), and if we do not go too deep, leaving a more detailed analysis to specialized and highly trained researchers in Academia, the usage of these resources is not common, making the adoption processes by SMEs extremely complex and forcing distinct approaches when compared to common computing resources. The democratization of these supercomputing resources is fundamental to speed up the development of new products and services and to place European companies in the worldwide spectrum. Because this is a challenge and the gap that separates the companies from the daily usage of these tools is quite big, a new capacity-building program is needed, to train engineers and specialized human resources, capable of bringing advanced resources into innovation in SMEs.

Continuous monitoring and assessment to capture lessons learned and name areas for improvement within a program or project, to help following activities and to avoid mistakes and pitfalls in the future. To prevent repeated hazards and unrealistic/misplaced starts, the information produced should be shared with the community, widely spread, and formally approved. This recurrent procedure supports future activities and can lead to improvements in the innovation framework and ecosystem.

Finally, human development must consider **sustainability** and **welfare**, in a search for a better and fairer society, aligned with the United Nations Sustainable Development Goals. Cities, as drivers of

innovation and economic growth, need something to change and to respond to citizens' demands and ambitions, in order to become **smart cities** capable of changing daily in response to current transformation undergoing processes, more digital but closer to people, smarter and greener, permanently assessing and evaluating their own performance (guidance example: "ISO 37122:2019 Sustainable cities and communities — Indicators for smart cities").

Regions must build up on a sustainable, long-term action plan, and consolidate a strong digital roadmap for innovation that remains solid and incremental through times and policymakers. To foster a solid innovation process that can boost economic development, it is crucial to leap ahead, implementing these action pillars. One possible strategy is to adopt Europe's Digital Europe Program Digital Innovation Hub, to leverage the competitiveness and cohesion of the region in the European landscape of innovation

3. Digital Innovation Hub in Alentejo

In Alentejo, a specialized DIH should be designed and developed to support structural and incremental innovation, democratizing access to advanced technology knowledge, and consolidating competence centres, capable of attracting highly qualified/specialized human resources and closing the competitiveness gap between this region and other Portuguese and European regions. The main goal is to boost innovation in emerging sectors such as aerospace, digital health, and critical digital technologies (ICT in critical and added value emerging areas, including supercomputing and cybersecurity), which are the most promising, integrated into traditional and consolidated traditional sectors (agriculture, tourism). Other goals include the development of a collective agreement through the establishment of an innovation culture that is inclusive, open, and transparent; a common strategic policy involving not only companies, but also important civil society stakeholders (researchers, policymakers, NGOs...), working together to create a sustainable innovation impact on ethics, science, education, governance and public engagement. Therefore, cooperation and teamwork must be promoted to smoothly achieve agreed actions on innovation policy. This comprises the definition and implementation of a **regional development strategy that reinforces the regional smart specialization**, with effective and adapted public policies, including innovation as a priority and the support of bottom-up initiatives, structured in a formal process-driven ecosystem, auditable and measurable (nor casual or cyclical, but structural and incremental). This innovation strategy also needs to be democratized and adopted by most organizations, companies or public authorities, citizens and visitors, in a long-term strategy, and it should avoid the common pitfall of writing documents for storage and not for action. It must promote a region with a fair connection between economy and social development, responding to societal challenges and improving the quality of life of citizens, searching for **social sustainability**, where culture and heritage, environment and energy transition are key. The smart specialization strategy for digital transformation and innovation, Alentejo's DIH strategy, must have strategic priorities, of which the following ones are the most promising.

Economic Development in Emerging Sectors, such as Aerospace, Digital Health, and Critical Digital Technologies: Designing and delivering services to improve innovation and management in public administration and SMEs, to stimulate the acquisition of new knowledge and skills that could lead to higher levels of innovation or higher quality innovation, to make the ecosystem succeed; increasing collaboration between all stakeholders, identifying common interests and achieving higher levels of innovation. Initiatives which support innovation ecosystems offer measures to attract foreign talent to better address the modernization of regional industries. It is easy for an organization to get "locked in", especially once the chosen path has been proven successful in the past, but we live in a time of globalization, digitalization and perpetual market change, and not only those skills that took us so many years to acquire can be learned rapidly by potential rivals in other part of the world, but also the sectors we used to live by are left behind by technical progress; therefore, it is necessary to be dynamic, open to change and modernization, and to avoid rigidity. An effective way to elude getting "locked in" and to remain creative and able to find new capabilities that improve and complement the old ones is by fostering diversity and diverging perspectives, features that are especially present outside one's territory.

The identification of these three emerging sectors, in the context of smart specialization, creates the ability to combine investments and collective efforts to boost economic development. The list below supplies some insights for each of them.

Digital Services for Health (e-Health): Taking the opportunity created by a new regional central hospital campus and a large ambition in Academia in the field of eHealth to engage new innovative ecosystem build-up that can generate new opportunities and economic value. The main focus should be to promote innovation in the fields of healthy ageing, leveraging Active and Healthy Living in the Digital World, research and innovation fields supported in key areas for the health ecosystem, namely brain-cardiovascular, obesity, onco-surgical, emergency response and advanced medical homecare, all based on a new philosophy with intensive use of technologies like Internet of Things, telemonitoring, cognitive computing and Augmented Intelligence (AI) to improve quality services in self-care and care network response. The key investment in the new hospital and R&D focused on active and healthy ageing provides challenges for the Hub to design, develop and support strong capabilities to boost innovation projects in this area of eHealth, creating not only a better quality of life, but also economic opportunities to companies deploying these types of services. The DIH supports the innovation ecosystem through the implementation of a complementary and alternative public health care model, with intensive use of information technologies, IoT sensors and computational reasoning, to help the support network. This culminates in a new care delivery paradigm for the senior population, a segment subject to a high growth in recent decades. This novel approach and proposed activities are based on recognized research from the University of Évora, focused on the person and their overall health-disease reality, as opposed to traditional models that focus on specific pathologies. Through this model, and based on a careful process focused on the people in need of care and their caregivers, which are considered members of the healthcare team and co-producers of care, it is possible to activate the most suitable care provider and to ensure the most effective care, both for people and the health system. Alentejo Central is a Reference Site in the European Innovation Partnership on Active and Healthy Ageing (EIPonAHA) and has a strong partnership focused on strengthening local and regional research and innovation in this sector. EIP on AHA brings together all the relevant actors at the European, national and regional levels across different policy areas to handle a specific societal challenge and involve all the innovation chain levels. It focuses on the active and healthy ageing of the European people. Some key activities in this area are: living labs on technology solutions for healthy active ageing; Central Hospital Campus hosting for innovative companies, prioritizing SMEs and Startups; connectivity and technology transfer between health services, Academia & Research and companies; systems and process integration; entrepreneurial support and project acceleration on eHealth.

Aerospace Cluster: The aerospace sector is a big challenge for Portugal, as it currently is one of the most growing sectors in relative terms. The consolidation and long-term resilience of this industrial sector are key elements, both at regional and national levels. Innovation transfer and cooperation between local, national, and European stakeholders is critical to consolidate and support further development of the installed companies and corresponding supply chain. One of the weaknesses of this sector is a lack of SMEs in the leading companies' supply-chain, because of the hard and costly requirements in certifications to enter the leading companies' ecosystem. The Hub provides support to innovation and cooperation to increase proximity supply-chain participation of SMEs. AED Cluster Portugal (Aerospace, Space and Defence Cluster Portugal) has its headquarters in Évora, acting as a "Strategic National Competitiveness Cluster" for aerospace, space and defence industry and interface organizations. Already involving more than 70 organizations established in Portugal, the Cluster gathers the main stakeholders from the three sectors, acting as an entry point and a one-stop-shop in Portugal for all national and international players. In the context of a DIH, the focus must be to build up local specialization in the aerospace sector and to boost more innovation and applied research to innovation, contributing to a fast-growing movement in this sector, with high-end industry and services available, and investments providing and consuming innovation capabilities and resources.

Critical Digital Technologies: Promoting digital transformation in companies, especially SMEs, public administration and citizens, developing bottom-up strategies and activities to boost the digitalization of the economy; supporting organizations to define and implement digital strategies aligned with national and European roadmaps. In an increasingly digital age and as technology continues to evolve, organizations need to align their digital strategy to stay innovative, agile and present in an increasingly global marketplace. Experts supply organizations consultancy to set the right path for digital transformation, designing and implementing innovative solutions in key areas of innovation, and enable organizations to streamline processes and simplify the way they work, making them more efficient and dynamic. Regions can foster an innovation wave to boost technology adoption and support cities, territories and organizations to develop a comprehensive and high-tech digital transformation strategy (ICT, Energy, Innovation, Industry 4.0, Security), improving their business

processes through ICT. (1) **High-Performance Computing (HPC)** activities, including those involving the processing, reduction and data analytics of massive volumes of data using supercomputer facilities (high-performance data analytics), in Alentejo, are led by the University of Évora and its Computational Astrophysics Group, which has large expertise in the field, acquired over the years. This allowed the University to be involved and to lead national and international consortia on HPC, HPDA, twinning and mentoring. The HPC resources include the OBLIVION and VISION supercomputers, a state-of-the-art and flagship machine of the Alentejo region, with the highest performance in the country. These supercomputers are hosted at Decsis Datacentre in Évora, a unique infrastructure in the national landscape as a next-generation critical infrastructure for computing resources. (2) **Broadband** is essential to design and support bottom-up initiatives and public policies to ensure that all communities of SMEs and citizens have access to high-speed broadband and cloud computing services, allowing everyone to benefit equally from the opportunities brought by connectivity into health, education, business and more. The Hub innovation team sets up an interface to support requests for broadband from SMEs and citizens, and aggregates needs and opportunities, dialoguing with service providers to deliver a solution for broadband access. (3) **Cybersecurity** using applied research and innovation to support the development of cybersecurity systems embedded in product development, advanced and new monitoring services for cybersecurity in the aerospace industry, high-performance computing systems and eHealth technologies. The DIH delivers a cybersecurity framework to support safe product and services development in aerospace, eHealth and technology systems used in industry and citizens, promoting resilience and security compliance to products and services developed within the regional scope of innovation.

Cross-Sector Cooperation: Cross-sector activities are in place to identify and promote technology and innovation transfer from DIH emerging sectors (eHealth, aerospace and industry, and ICT) to more traditional, consolidated sectors of the local economy, like the agrifood industry, tourism or social innovation. Examples of cross-sector cooperation to traditional sectors are: aerospace to precision agriculture; ICT for the third sector; eHealth for tourism. Digital innovation transferability from emerging and edge-technology sectors (ICT and aerospace) to traditional mainstream sectors like agrifood and tourism are essential to boost local and regional development and to improve convergence at national and European levels.

The framework of the Hub can deliver services to support innovation (examples):

Common technology services, including digital maturity gap analysis; strategies design for digital transformation and smart cities; project management for digital transformation activities with multi-vendor and multi-technology scenarios (PMO); lifecycle and operation management of digital infrastructures and services; innovation strategies for city ecosystems; cybersecurity capabilities and response procedures; regulatory, technical and financial guidance to help citizens, SMEs and policymakers on broadband deployment; consultancy and advisory on broadband development; support in the aggregation of demand for high-speed broadband; integration of the European Digital Single Market at regional level; broadband mapping; high-performance computing; ICT managed services; multilanguage neural network models; cognitive machine leaning processing; prototyping; simulation for aerospace and eHealth.

Digital twinning for manufacturing excellence through virtual factory replication, using available resources and competence centres to support innovation in product development, using digital twinning based on HPC, IoT, AI and augmented reality to optimize the development, production, and continuous improvement of industrial process. The high-end factories of the future must take on this new age of constant change and reduced innovation cycles with a different approach and effective usage of available supercomputing, HPC resources to deliver projects that meet the market demands. Time is crucial and only an effective usage of advanced digital resources, through both machine and human resources, creates competitive regions and a competitive industry.

Cybersecurity by design to have security guidelines and practices in every product and service, to reach elevated levels of safety to protect users and goods from harm.

Experimentation and development to make available an adequate environment involving users to test and improve products and services, using some available resources like free tech zones (example: drones and plane testing between Ponte de Sor, Évora and Beja); living labs (example: Évora Decarbonization Living Lab).

Project management services supporting a world of changing projects to improve delivered results and impact on economic development, using recognized European guidelines and best practices like

Open PM². Let us be clear: the lack of a formal project methodology increases the risk of developing bad projects and ending up with low-impact results. Scarfed resources should lead low-resource regions to improve these capabilities and, overall, to achieve a more efficient project implementation.

The Hub must be designed as an **open innovation ecosystem**, delivering a one-stop-shop to innovation, forming a combined service catalogue. Participation is open to newcomers that can bring complementary competencies or infrastructures and are willing to include themselves and their resources in the main goal of supporting the local innovation framework. In this context, other leading companies in the region will be called upon to contribute to the ecosystem build-up and consolidation of the value-chain in their line of business, sharing unique infrastructures (ex. TE factory in Évora, with excellence and unique capabilities).

4. Conclusions

The design and implementation of a smart specialization strategy supported by a strong digital transformational strategy is critical to the delivery of an incremental and structural innovation framework to boost regional development. This article is based on a careful analysis of the mistakes and challenges regions face in the current scope of innovation development, identifying important pillars and actions to bridge the innovation gap when compared to more competitive regions. The ability to implement these actions depends on the region stakeholders' capability to define, implement and lead an incremental and region-wide innovation framework. A strong focus on the pillars described a set ground for reducing the development gap between low-density and more developed regions. Raising the community's awareness and commitment to the same strategy and activities, in a quad-helix ecosystem, can lead regions and citizens to a more efficient and long-term sustainable development. Delivering a Digital Innovation Hub in regions like Alentejo can contribute to consolidate and boost innovation in companies and to deliver new innovative products and services, transforming the current landscape and bridging the development gap between these and more developed regions in Portugal and Europe. The achievement of these results depends mostly on local capabilities and structural alignment between decision-makers, companies' strategies and social society engagement.

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