Polido, A., Pires, S. M., Rodrigues, C., & Teles, F. (2019). Sustainable development discourse in Smart Specialization Strategies. Journal of Cleaner Production, 240, 118224.
https://doi.org/10.1016/j.jclepro.2019.118224

Sustainable Development discourse in Smart Specialization Strategies: exploring implications from Portuguese Centro Region

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Abstract

Smart Specialization Strategies have been used to implement European Union Cohesion Policy in recent years, aiming to achieve economic, social and territorial development by reducing disparities between regions. The European Union often declares an alignment between Cohesion Policy, Smart Specialization Strategies and the United Nations Agenda 2030. However, and despite the recurrent Sustainable Development discourse present in the European political agenda, it is not evident that Smart Specialization Strategies integrate Sustainable Development goals and practices. Hence, this paper aims to explore and discuss the degree of embeddedness of the Sustainable Development discourse in the Research and Innovation Strategies for Smart Specialization, using the Portuguese Centro Region as an exploratory study. In this research a content analysis of the Centro Region Smart Specialization Strategy was used for data collection and analysis, framed by the 17 goals of Agenda 2030 and their targets. Results show a good embeddedness of the overall goals of Agenda 2030, but a lower integration of the targets, suggesting that this strategy needs to be revisited to further integrate Agenda 2030. Moreover, the Centro Smart Specialization Strategy has a strong alignment with the goals related with economic and environmental issues, almost disregarding social aspects. These findings are amplified by the fact that this strategy is mainly being implemented through projects financed under the economy pillar. Finally, there is evidence about the need of developing regional innovation policies towards sustainable development from the regional to the national level. Overall, it is critical to enlarge the debate on how Smart Specialization Strategies can be an effective engine for a new development trajectory for European regions assuming the Agenda 2030 as a framework for the necessary change.

Keywords: Regional Innovation Systems; Sustainable Development Goals; Smart Specialization; Sustainable Innovation; European Union; Portuguese Centro Region

1. Introduction

At a global and local level, societies are now faced with unprecedented environmental, social and economic challenges (Sachs, 2012), which had been timely warned (see Carson, 1962; Meadows et al., 1972). With the compromise of *Transforming our world: the 2030 Agenda for Sustainable Development* (United Nations, 2015) the international community has come to recognize the need for changing the development trajectory of countries and regions (Spangenberg, 2017). Agenda 2030 comprises 17 Sustainable Development Goals (SDGs)[1] and a total of 169 targets (United Nations, 2015), focusing on five key themes: people, planet, prosperity, peace, and partnership (commonly known as 5P's). It is applicable to all UN Member States (United Nations, 2015), but needs to be developed on a country basis, with each country setting their own national targets (Colglazier, 2015). The SDGs have been criticized because of their lack of concrete guidelines for action (Colglazier, 2015) and because the majority of the targets are not well formulated (Spangenberg, 2017). Despite the criticisms, Agenda 2030 constitutes a well-recognised framework to forward sustainable development. An increasing body of literature is acknowledging that radical and systemic innovations are paramount to address sustainability challenges, which can be put forward by institutions, communities, regions, and others (Boons et al., 2013; Silvestre and Ţîrcă, 2019), and a mean to achieve the Sustainable Development Goals (Lupova-Henry and Dotti, 2019).

At the European Union (EU) level, in the communication *Next Steps for a Sustainable European Future* (European Commission, 2016a), the EU shows the ambition towards being a leader in the implementation of Agenda 2030. Furthermore, it is stated that *"[t]he EU was instrumental in shaping the global 2030 Agenda, which is fully consistent with Europe's vision (…)*" (European Commission, 2016a, p. 3). In effect, since the publication of the *Brundtland Report* the EU claims that the concept of

[1] SDG 1 – No poverty; SDG 2 – Zero hunger; SDG 3 – Good health and well-being; SDG 4 – Quality education; SDG 5 – Gender equality; SDG 6 – Clean water and sanitation; SDG 7 – Affordable and clean energy; SDG 8 – Decent work and economic growth; SDG 9 – Industry, innovation and infrastructure; SDG 10 – Reduced inequalities; SDG 11 – Sustainable cities and communities; SDG 12 – Responsible consumption and production; SDG 13 – Climate action; SDG 14 – Life below water; SDG 15 – Life on land; SDG 16 – Peace, justice and strong institutions; SDG 17 – Partnerships for the goals.

"Sustainable Development" is at the core of the EU project and has been integrated into the EU Treaties, key cross-cutting projects, sectoral policies, and other initiatives (Pollex and Lenschow, 2018). Also, in these policies, the concept of Sustainable Development was used almost interchangeably with environmental protection, giving less relevance to social and economic issues in the Sustainable Development discourse (Macleod, 2005). Later, Sustainable Development, envisioning a three-pillar paradigm perspective (see Purvis et al., 2018), was mainstreamed in Europe 2020 Strategy (European Commission, 2016a).

Although there are different policy instruments at the EU level, the European Commission (2016b) states that the Cohesion Policy through the European Structural and Investment Funds (ESIF) is key in achieving cross-cutting goals as sustainable development. The Cohesion Policy aims at achieving economic, social and territorial development by reducing disparities between the various regions. It has been implemented through an innovation based policy for regional economic development, specifically through regional innovation strategies for smart specialization (Rinkinen et al., 2016), becoming a central pillar of Europe 2020 Strategy (Carayannis and Rakhmatullin, 2014; McCann and Ortega-Argilés, 2015). The link between the Agenda 2030 and the Cohesion Policy is disclosed by the Commission Staff Working Document (European Commission, 2016b) which argues that the Cohesion Policy may help address 15 out 17 SDGs – all except SDG 2 (Zero hunger) and SDG 14 (Life below water).

Smart Specialization was originally defined as "*a process addressing the missing or weak relations between R&D and innovation resources and activities on the one hand and the sectoral structure of the economy on the other*" (Foray et al., 2011, p. 5), involving an entrepreneurial discovery process (Foray et al., 2011). Recently, this definition was adjusted to address a place-based approach to regional policy employing local knowledge (McCann and Ortega-Argilés, 2015). Smart Specialization is a strategic approach to plan for regional economic development directed at economic diversification, supported by technological, practice, and evidence-based innovations, using a bottom-up approach (Asheim,

2019; Trippl et al., 2019). This approach has a strong focus on economic growth (Lukman et al., 2016), and is linked with the innovation systems scholarship, specifically with the regional innovation systems literature (McCann and Ortega-Argilés, 2015). The innovation systems scholars have a growing interest in environmental and sustainability challenges (Scordato et al., 2018), particularly, regional innovations systems have increasing attention from the field of sustainability transitions (Truffer and Coenen, 2012; van den Heiligenberg et al., 2017).

Overall, it is acknowledged that Regional Innovation Systems have the potential to enhance sustainable development at a sub-national level (Gerstlberger, 2004; Medeiros, 2017), including Smart Specialization, but there is a lack of research focusing on the Sustainable Development discourse embedded in regional innovation. Therefore, it is paramount to understand how Smart Specialization Strategies are devised to embrace sub-national challenges together with the need to create innovative solutions for a new development trajectory addressing people, planet, prosperity, peace and partnership, and assume the Agenda 2030 as a framework for the necessary change.

Research has focused on how sustainable development issues have been integrated into the Structural Funds programmes and the impact on their implementation, looking at specific funded projects (Macleod, 2005), and on the effects of the Cohesion Policy on the Sustainable Development of Romanian regions (Pîrvu et al., 2018). Another study conceptualized an evaluation framework, using indicators, to assess the contribution of the EU Structural Funds to Sustainable Development (Ekins and Medhurst, 2006). However, studies have yet to explore if the sustainable development discourse is present in the Cohesion Policy programmes, specifically in Smart Specialization Strategies.

Set against this background, the main goal of this research is to explore and discuss the degree of embeddedness of the Sustainable Development discourse in the Research and Innovation Strategies for Smart Specialization (RIS3), using the Portuguese Centro Region (hereafter Centro (PT)[2]) as an

[2] According with the NUTS II designation for this region. NUTS refers to Nomenclature of Territorial Units (see Eurostat, 2018).

exploratory case. This research intends to provide critical policy and practice implications for this region as well as to further contribute to question the need to adjust these strategies in their specific context and to argue for the need to deconstruct theory building on regional innovation systems that truly allow for radical and systemic innovations for sustainable development. A content analysis of the Smart Specialization Strategy of Centro Region using the Agenda 2030 as framework was used as the research method, explained in detail in the following section, where the Centro (PT) and the Smart Specialization Strategy are also characterised. This paper furthers unfolds into the results section where the first and second level coding processes are scrutinised, followed by a discussion and conclusion sections.

2. Methods

A content analysis of the Smart Specialization Strategy of the Portuguese Centro Region was used for data collection and analysis, framed by the 17 goals of Agenda 2030 and their targets. The next sections introduce the region and its smart specialization strategy, and systematize the methods used.

2.1. The Portuguese Centro Region

Centro (PT) is an EU NUTS II, located in the Portuguese mainland, and under the Cohesion Policy period 2014-2020 is considered an EU less developed region[3]. It has an area of approximately 28,200 km^2 (31% of Portugal total area) (DGT, 2018) and a total population of approximately 2.2 million residents (22% of the Portuguese population) (INE, 2018a). The region has a diversity of geographical areas and has strong coastal-inland dichotomy (CCDRC, 2011). It also has a multipolar urban system and has essential natural resources, in particular water and forestry (Antunes et al., 2011). In fact, 63% of Centro (PT) area is classified as being forest (INE, 2018b). Additionally, approximately 26% of its population lives in rural areas, ranking first when compared with the population living in rural areas of other Portuguese NUTS II. Additionally, 24% of Centro (PT) population has over 65 years old whereas the Portuguese average is of approximately 22% (INE, 2018a). Regarding Agenda 2030 integration into

[3] Less developed regions or less favoured regions as defined by the European Union through the different funding frameworks 1989/1993, 1994/1999, 2000/2006, 2007/2013, 2014/2020. In 2014/2020 framework Less Developed Regions are defined as regions with a GDP per inhabitant below 75 % of the EU average. For more information on Structural Funds 2014-2020 (ERDF and ESF) eligibility and an illustration of less developed regions in the EU check European Commission (2014).

Centro (PT) strategies, there are no official public guidelines for its implementation at the regional level. Only at the national level, the Portuguese Government strategically decided to give relevance to six Goals of the Agenda 2030: SDG 4 (Quality education), SDG 5 (Gender equality), SDG 9 (Industry, innovation and infrastructure), SDG 10 (Reduced inequalities), SDG 13 (Climate action) and SDG 14 (Life below water) (Cabaço et al., 2017).

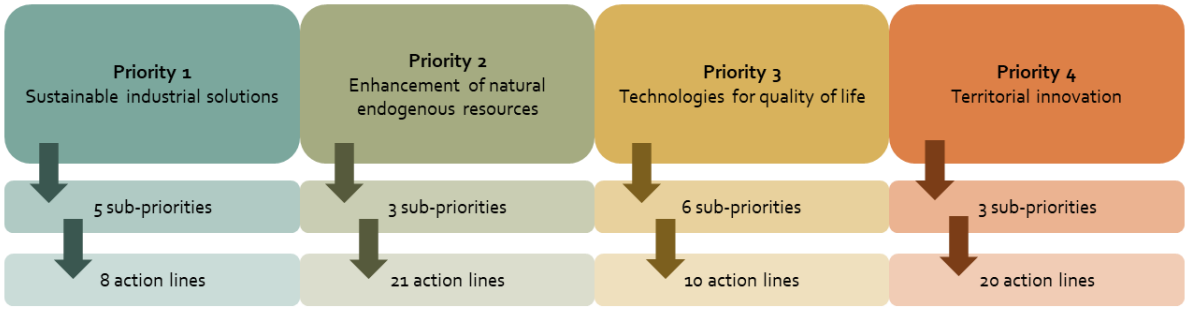
2.2. The Smart Specialisation Strategy in Centro (PT)

The design and development of the Centro RIS3 started at the end of 2012 within the scope of the Centro Region Operational Programme 2014-2020. It is an iterative process, continuously monitored and assessed to allow the adjustment of the priorities and action lines defined, and is still being developed (CCDRC, 2016a). The regional priority areas were shaped from eight areas of differentiation of the region (agriculture (including agro-industry), forest, sea, Information, Communication and Electronic Technologies (ICT), materials, health and well-being, biotechnology and tourism), and four cross-cutting priorities (resource sustainability, human resources qualification, territorial cohesion and internationalization) (CCDRC, 2017, 2016b). These areas and cross-cutting priorities were then developed based on previous knowledge gathered from the regional experience with past cycles of innovation policies, the analysis of the specificities of the Region, and from discussions among the different regional governance bodies (CCDRC, 2016b).

The regional governance model adopted for the construction and development of the strategy was structured on: i) Coordinating Council, led by the regional agency and composed of a group of 20 regional entities, that assumes responsibility for the ongoing management and monitoring of the strategy; ii) Extended Regional Council, that corresponds to a broad Regional Council established in order to represent all relevant regional agents from public administration, scientific and technological system, companies, and citizens. It acts as a forum for the regional ecosystem of research and innovation and it validates the whole process; iii) the Strategic Advisory Group, composed of nearly 20 individuals of recognized merit who have strategic thinking about the region and advisory capacity. It

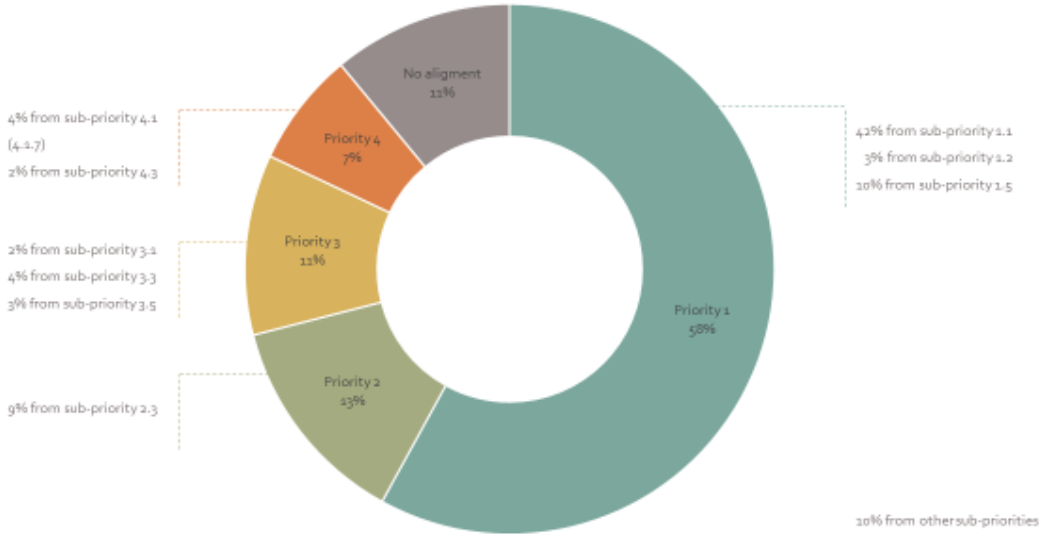
has the task of expressing its views on the whole process or on particular aspects of its development, whenever requested by the Coordinating Council; iv) the Management Team, made up of members of the regional agency, having executive functions and being responsible for streamlining the work, promoting meetings and producing documents and mobilizing the necessary resources; and, v) four Thematic Working Groups, that are the "spaces of entrepreneurial discovery processes", within which the relevant agents in each area are articulated, seeking to stimulate innovation and internationalization, cooperation and networks (CCDRC, 2016c). This process was designed through a bottom-up approach, devised by 577 different stakeholders included in the four Thematic Working Groups.

From this process, the final four regional priority areas for the development of research and innovation projects were defined as: (1) sustainable industrial solutions, (2) enhancement of natural endogenous resources, (3) technologies for quality of life, and (4) territorial innovation (CCDRC, 2016a) (see Figure 1). These priorities further unfold into sub-priorities and each sub-priority are divided into action lines (see also the Appendix).



Source: Adapted from CCDRC (2016a).
Figure 1 – Scheme of Centro RIS3 priorities

Regarding the implementation of the Centro RIS3, data from the Regional Agency shows that from the 3025 funded projects subject to an analysis of its alignment with the Centro RIS3, the majority is aligned with Priority 1 (CCDRC, 2018a). Figure 2 shows the alignment of funded projects by Centro RIS3 priorities and sub-priorities in 2018.



Source: Adapted from (CCDRC, 2018a).
Figure 2 – Alignment of funded projects by Centro RIS3 priorities and sub-priorities (in percentage)

2.3. Data collection and analysis

A content analysis process (see Figure 3) was developed to the 59 Centro RIS3 action lines using Agenda 2030 Sustainable Development Goals as a framework of analysis (see Table A. 1 for a description of the Centro RIS3 action lines). Content analysis is a systematic approach for examining the content of information in documents (Bardin, 2018), enhancing research transparency, allowing for reproducibility and reducing subjectivity (Bryman, 2012). Even though it is used a qualitative approach, this type of analysis provides results that are quantifiable in terms of frequencies of categories, as several authors acknowledge (e.g., Bryman, 2012; Krippendorff, 2004). The method is commonly applied in sustainability research (e.g., Ramos et al., 2015; Xia et al., 2018) as well as in regional studies (e.g., Rinkinen et al., 2016).

To develop this content analysis it was used a two-level approach. In the first level, the 59 Centro RIS3 action lines were coded against the SDGs overall aims. In the second level, the 59 action lines were coded against the SDGs targets. All the SDGs were considered for the analysis, however, from the 169

targets, 6 were excluded[4] because they exclusively focus on developing countries, least developing countries, or small islands developing states and do not apply to the European and Portuguese context, where the Centro Region is located. Therefore, in total, the 17 SDGs and 163 targets were considered for the content analysis process.

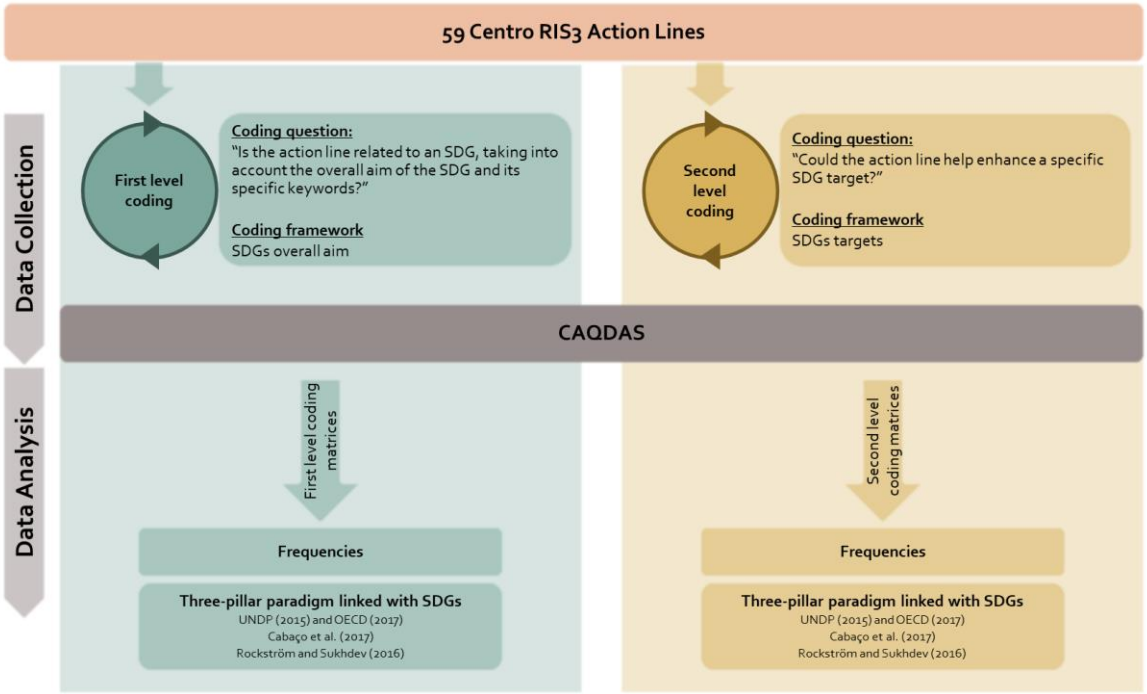
In the first level coding, the main coding question addressed was "Is the action line related to an SDG, taking into account the overall aim of the SDG and its specific keywords?". All SDGs that answered the question were coded in each action line, meaning that one action line could be coded with more than one SDG. In the second level coding, the main coding question asked was "Could the action line help enhance a specific SDG target?". The action lines were coded with a specific target when the action line could, in some way, follow its keywords or help to enhance it. One action line could be coded with more than one target. The coding was iterated three times for consistency purposes and to limit subjectivity. Subsequently, a final analysis was done to check for coherence, and was discussed among the authors. The data collection and analysis process used a computer-assisted qualitative data analysis software (CAQDAS), specifically WebQDA (Costa et al., 2018), allowing for a systematic analysis of the results.

The data was analysed through output matrices from the CAQDAS using 0 when an action line was not coded with a specific SDG or target, or 1 when an action line was coded with a specific SDG or target. The data was analysed through absolute frequencies and it was further categorized into a three-pillar paradigm approach, encompassing environmental, social, and economic factors (for a comprehensive discussion see Purvis *et al.* (2018)), using three different conceptual frameworks linking the SDGs with the three-pillar paradigm.

The first conceptual framework is followed by UNDP (2015) and OECD (2017) where the SDGs are linked to the 5P's as follows: (i) people (social) comprises SDG 1 to SDG 5, (ii) planet (environment)

[4] The SDG targets excluded were: 10.a, 11.c, 13.b, 17.5, 17.11, 17.12

covers SDG 6, and SDG 12 to SDG 15, and (iii) prosperity (economy) includes SDG 7 to SDG 11. The second conceptual approach is stated at Cabaço *et al.* (2017), where the SDGs are clustered as people (SDG 1 to SDG 6), prosperity (SDG 7 to SDG 10), and planet (SDG 11 to SDG 15). Additionally, in these two interpretations, peace is linked with SDG 16, and partnership relates to SDG 17, however, outside of the three-pillar paradigm. The third conceptual framework is proposed by Rockström and Sukhdev (2016) (see also Folke et al., 2016; Rockström and Sukhdev, 2014). These authors match the biosphere goals to SDG 6, SDG 13, SDG 14, SDG 15, the societal goals are SDG 1 to SDG 5, SDG 7, SDG 11 and SDG 16, and the economic goals are SDG 8 to SDG 10, and SDG 12. These are crossed by one transversal goal (SDG 17).



RIS3: Research and Innovation Strategies for Smart Specialization; SDG: Sustainable Development Goal; CAQDAS: Computer-Assisted Qualitative Data Analysis Software.
Figure 3 - Schematic representation of the content analysis process employed for data collection and analysis

3. Results

This section systematizes the results of the content analysis and further unfolds into three subsections. The first subsection overviews the coding of the action lines with the 17 SDGs and its targets, by Centro RIS3 priority, and contextualizes the subsequent detailed results for each level

coding. The second subsection analyses in more detail the action lines coded with SDGs overall aim. The third subsection scrutinises the action lines coded with SDG targets.

3.1. Overview of the coding results of the first and second level coding

The content analysis results show that 80% (47 out of 59) of the total action lines of Centro RIS3 were coded *at least once* against the SDGs overall aims (first level coding), whereas, in the second level coding it was possible to match 44% of the action lines (26 out of 59) with specific SDGs targets (see Figure 4). Priority 3 focusing on technologies for quality of life was the only priority with all action lines coded in the first level, whereas in the second level coding it was possible to code only one action line. Regarding Priority 1, emphasising sustainable industrial solutions, from the 8 action lines, 7 were coded in the first level coding, and 4 could be coded with specific targets (second level coding). In Priority 2, that promotes the enhancement of natural endogenous resources, from the 21 action lines, 17 (approx. 80% of the action lines) were coded in the first level, contrasting with the 11 action lines coded *at least once* in the second level, representing roughly 52% of the action lines. Finally, Priority 4 specifically addressing territorial innovation, had the smallest percentage of action lines coded against the SDGs overall aims (65%). Nonetheless, it had the smallest difference among the four Priorities between the number of action lines coded in the first and second level coding (15%). These results show the difficulty of coding Centro RIS3 action lines with SDGs specific targets, providing the ground to consider a certain distance between the strategy and the targets proposed by Agenda 2030.

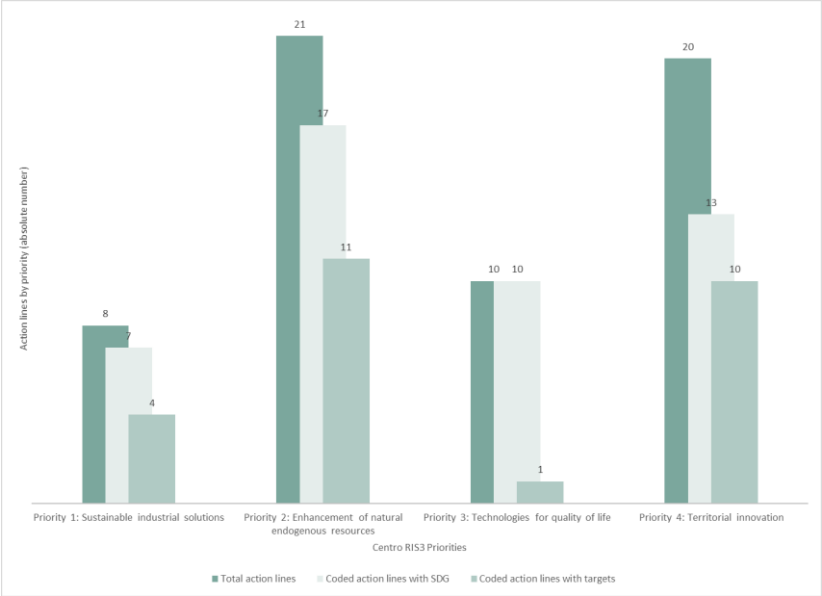


Figure 4 – Number of total action lines by priority coded at least once with the Sustainable Development Goals framework (first and second level coding).

3.2. Centro RIS3 link with the SDGs overall aims (first level coding)

In the first level coding, the action lines of each Priority were coded with the SDGs overall aims to understand if these were tackled in some way in the Centro RIS3 (see Figure 5).

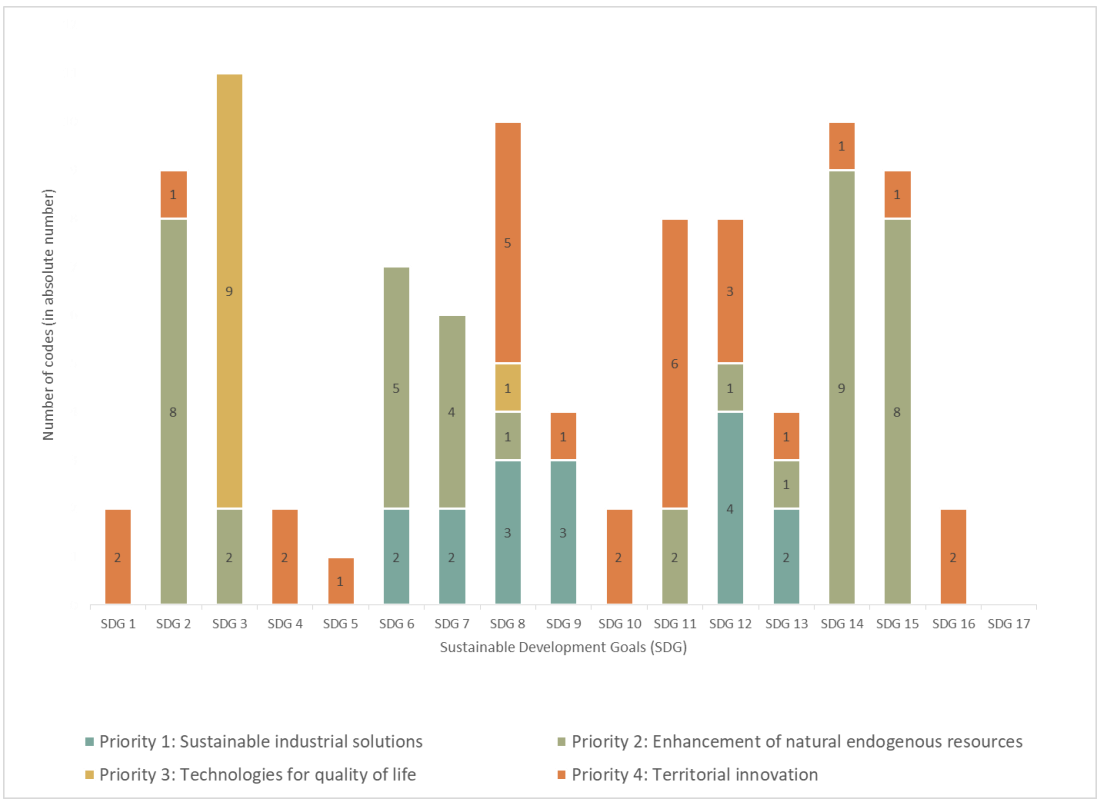


Figure 5 – Results for the Centro RIS3 action lines coded with the 17 Sustainable Development Goals overall aims (first level coding).

With the exception of SDG 17 (Partnerships for the goals), all SDGs are in some way addressed in Centro RIS3 (see Figure 5). SDG 3 (Good health and well-being) was the most coded in a total of 11 action lines from two different priorities – Priority 3 (Technologies for quality of life) and Priority 2 (Enhancement of natural endogenous resources). Following, SDG 8 (Decent work and economic growth) and SDG 14 (Life below water) were coded in 10 action lines each. It is also possible to observe that SDG 8 was coded in *at least one* action line in the four Priorities. The least coded was SDG 5 (Gender equality), coded in 1 action line from Priority 4 (Territorial innovation).

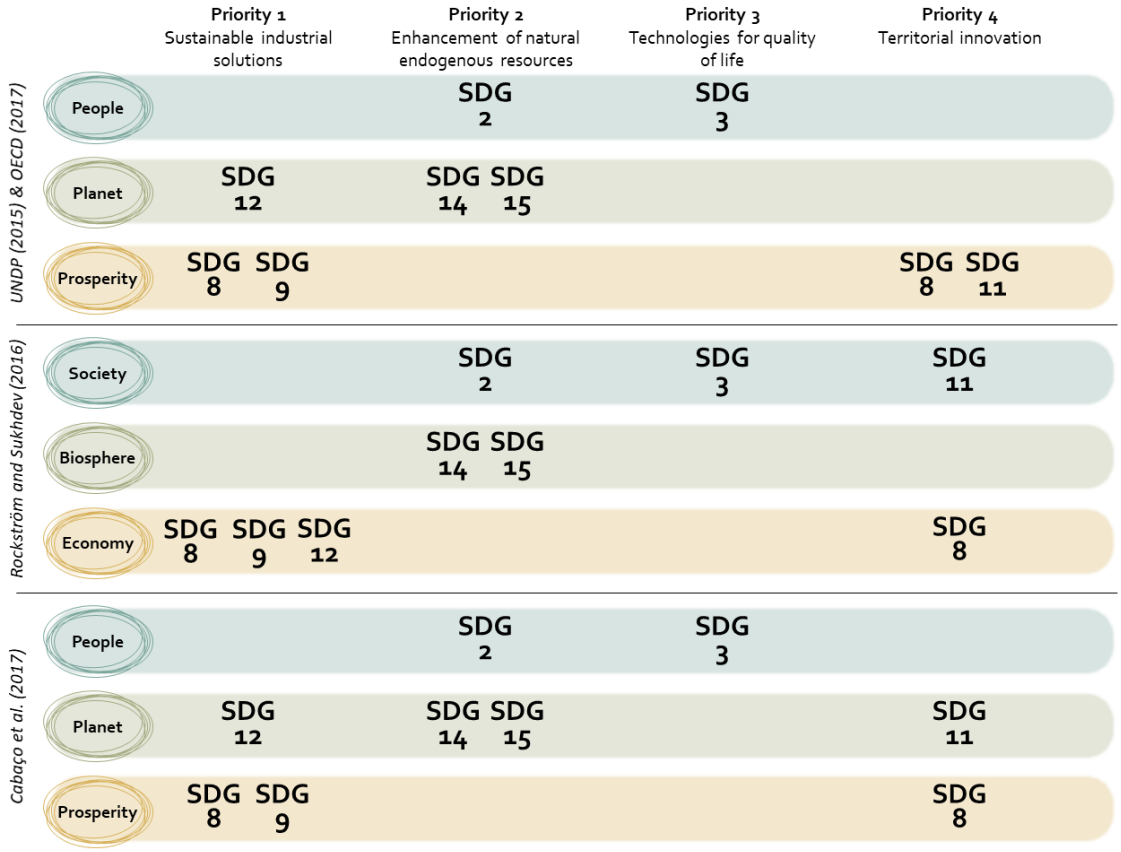
Analysing now the results from the perspective of the four priorities, it is possible to verify that Priority 1 (Sustainable industrial solutions) was coded with 6 different SDGs (SDG 6, SDG 7, SDG 8, SDG9, SDG 12, and SDG 13). Within this Priority, the most relevant was SDG 12 (Responsible consumption and production) coded in 4 action lines, followed by SDG 8 (Decent work and economic growth) and SDG 9 (Industry, innovation and infrastructure) with 3 action lines coded each. As observed previously in Figure 4, 7 out of 8 action lines were coded, and 3 of them were coded with more than one SDG (see Table A. 1 for full coding results). These results are not surprising because these action lines focus on issues such as efficient use of resources, circular economy and industrial production systems.

As for Priority 2 (Enhancement of natural endogenous resources), it was possible to code 17 action lines out of 21 with 10 different SDGs. The results show that there is a predominance of SDG 14 (Life below water) with 9 action lines coded with this SDG. Following, SDG 15 (Life on land) and SDG 2 (No hunger) were coded in 8 action lines each. These results reflect the main topic of Priority 2, showing a predominance of issues related with conservation and management of terrestrial and marine biodiversity and ecosystems services.

Priority 3 (Technologies for quality of life) had all the action lines coded in the first level with 9 out 10 being coded in SDG 3 (Good health and well-being). This priority has the most specialized focus and this is reflected on the number and type of SDGs coded.

In Priority 4 (Territorial innovation) it was possible to code the action lines against 13 different SDGs. This Priority has the most diverse set of SDG coded, in the first level. There is a predominance of SDG 11 (Sustainable cities and communities) coded in 6 action lines, followed by SDG 8 (Decent work and economic growth) coded in 5 action lines. Interestingly, action line 4.1.3, related to the development of innovative projects in the area of Nature Economy, Green Economy and Low Carbon, was coded with 8 different SDGs of which SDG 9, SDG 13, SDG 14 and SDG 15 were coded only in this action line, in this priority (see Table A. 1).

Overall, with these results, it could be suggested that Centro RIS3 is strongly linked with SDG 3 (Good health and well-being), SDG 8 (Decent work and economic growth) and SDG 12 (Responsible consumption and production). SDG 17 (Partnerships for the goals) is disregarded by Centro RIS3. Looking at the individual priorities, the results show an alignment with SDG 2 (Priority 2), SDG 3 (Priority 3), SDG 8 (Priority 1 and 4), SDG 9 (Priority 1), SDG 11 (Priority 4), SDG 12 (Priority 1), SDG 14, and SDG 15 (Priority 2). It is possible to see a certain mismatch between the national Agenda 2030 priorities defined by the Portuguese national government and those of the Centro regional strategy. Namely, SDG 4 (Quality education), SDG 5 (Gender equality), SDG 10 (Reduced inequalities) and SDG 13 (Climate action) are not directly emphasised by the 4 main priorities. Figure 6 displays the clustering of these results with the three-pillar paradigm approach, according to the different conceptual frameworks previously described, showing a greater concern with issues related with the environment (planet) and economy (prosperity), and less with social (people) issues.



Sustainable Development Goals (SDGs) logos were retrieved from United Nations (2019)

Figure 6 – Most represented SDGs in the 1st level coding clustered with the three-pillar paradigm (environmental, social and economic) frameworks from UNDP (2015) and OECD (2017), Rockström and Sukhdev (2016) and Cabaço et al.(2017).

3.3. Centro RIS3 link with the SDGs targets (second level coding)

The second level coding aimed at understanding if the action lines could enhance specific SDGs targets. Overall, a total of 50 out of 163 targets of the SDG framework (31%) matched *at least once* with Centro RIS3 action lines (see Figure 7).

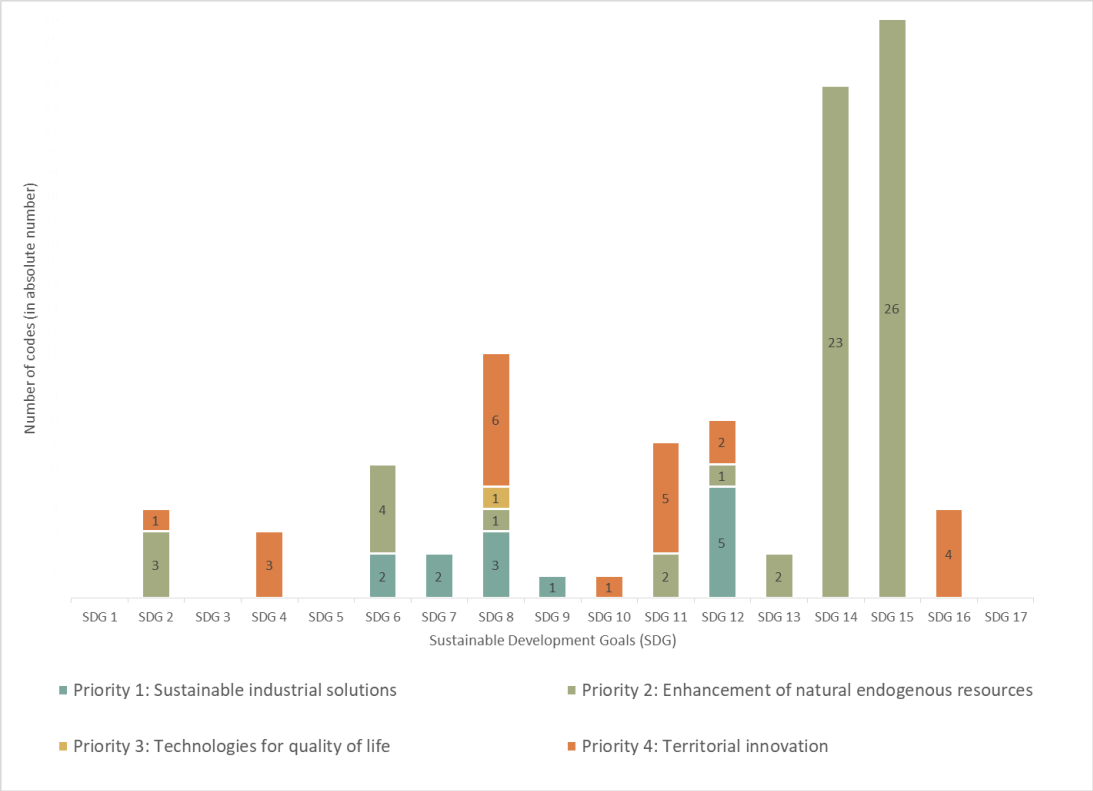
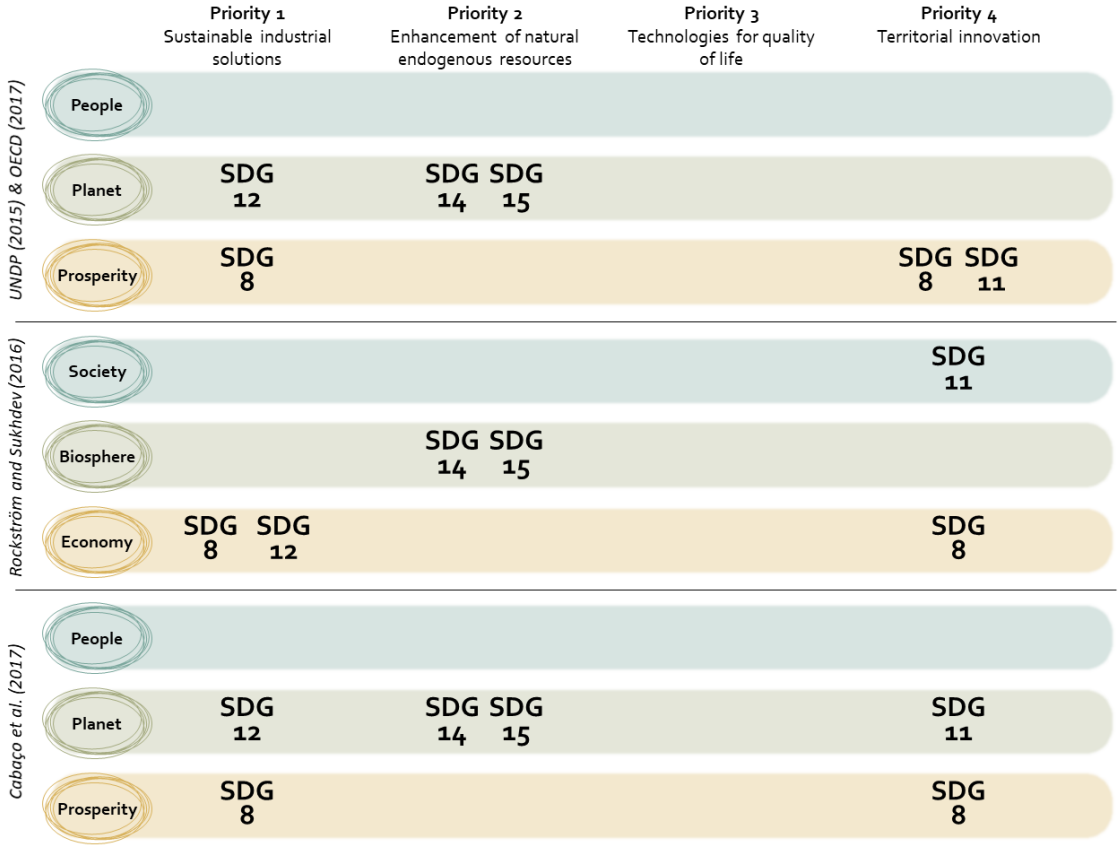


Figure 7 – Coding results for the Centro RIS3 using Sustainable Development Goals specific targets as framework (second level coding).

From the data in Figure 7 it stands out that there were no Centro RIS3 action lines coded with targets from SDG 1 (No poverty), SDG 3 (Good health and well-being), SDG 5 (Gender equality), and SDG 17 (Partnerships for the goals). The fact that SDG 3 (Good health and well-being) was not coded in the action lines highly contrasts with the results from the first level coding where it was the most coded SDG. An explanation for this is that the level of detail of SDGs targets would demand from RIS3 a more specific and focused formulation of coherent actions, which were easier to frame under the generic design of overall aims (as considered in section 3.2.). Furthermore, SDG 15 (Life on land) was the most coded with a total of 26 action lines, followed by SDG 14 (Life below water) with 23 action lines coded with it. The third most coded was SDG 8 (Decent work and economic growth) with 11 action lines, followed by SDG 12 (Responsible consumption and production) with 8 action lines coded. Interestingly, a major difference can be seen between the number of action lines coded with SDG 14 or SDG 15 to the number of the action lines coded by the third SDG most coded (SDG 8).

As regards to the specific results by individual priorities, in the second level coding, it can be observed that action lines of Priority 1 (Sustainable industrial solutions) are linked to targets from 5 out of 6 of the SDGs identified in the first level coding (SDG 6, SDG 7, SDG 8, SDG 9, and SDG 12; only SDG 13 is not coded). Also, there were 3 action lines coded with a SDG overall aim that were not coded with specific SDG targets (see Table A. 1). Similarly to the first level coding, SDG 12 (Responsible consumption and production) had the most specific targets coded in this Priority (see Figure 7) followed by SDG 8 (Decent work and economic growth) with 2 targets coded in 3 action lines. In Priority 2 (Enhancement of natural endogenous resources), it was possible to code 11 action lines with targets from 8 out of 10 of the SDGs coded in the first level (SDG 2, SDG 6, SDG 8, SDG 11, SDG 12, SDG 13, SDG 14, and SDG 15; no codes for SDG3 and SDG7). In line with the results from the first level coding, there is a predominance of SDG 14 (Life below water) and SDG 15 (Life on land), where target 14.2 related to sustainably manage marine and coastal ecosystems was the most coded with a total of 6 action lines coded with it. However, contrasting with the first level coding, SDG 2 (No hunger) decreases its significance in the second level. Additionally, it is important to note that action lines 2.1.2 and 2.1.3 together were coded 17 and 16 times with targets from both SDG 14 and SDG 15 respectively (see Table A. 1), meaning that more than half of the codes for these SDGs were done in these two action lines. As for Priority 3 (Technologies for quality of life), and in contrast with the first level coding, it was not possible to code the action lines with specific targets from SDG 3 (Good health and well-being). This priority had only one specific target coded related with SDG 8 (Decent work and economic growth). For Priority 4 (Territorial innovation) it was possible to link it with specific targets from 7 out of 13 SDGs identified in the first level (SDG 2, SDG 4, SDG 8, SDG 10, SDG 11, SDG 12 and SDG 16; no codes for SDG1, SDG5, SDG9, SDG13, SDG14 and SDG15). From the 20 action lines, 10 were coded with a total of 22 targets. Both SDG 8 (Decent work and economic growth) and SDG 11 (Sustainable cities and communities) had 5 targets coded each, which to some extent reveals a different perspective from the first level coding, where SDG 11 was predominant. It also needs to be highlighted that SDG 4, SDG 10, and SDG 16 were only coded, in the second level, in Priority 4 (see Table A. 1 for further details).

In summary, the results from the second level coding confirm the link of Centro RIS3 with SDG 8 (Decent work and economic growth) and SDG 12 (Responsible consumption and production). Also, indicate the importance of SDG 14 (Life below water) and SDG 15 (Life on land) for the Centro RIS3. In this level coding, besides disregarding SDG 17 (Partnerships for the goals), which is similar to the first level coding, Centro RIS3 does not consider SDG 1 (No poverty) and SDG 5 (Gender equality). Looking at the individual priorities, the results show an alignment with SDG 8 (Priority 1 and Priority 4), SDG 11 (Priority 4), SDG 12 (Priority 1), SDG 14, and SDG 15 (Priority 2). This reinforces the mismatch with the national SDG priorities set by the Portuguese government, not giving an emphasis to SDG 4 (Quality education), SDG 5 (Gender equality), SDG 10 (Reduced inequalities) and SDG 13 (Climate action) in the 4 main regional priorities. Figure 8 presents the clustering of these results with the three-pillar paradigm approaches. The most coded SDGs are linked with environment (planet) and the economy (prosperity). Social (people) SDGs disappeared from the most coded (except in the classification by Rockström and Sukhdev (2016).



Sustainable Development Goals (SDGs) logos were retrieved from United Nations (2019).

Figure 8 – Most represented SDGs in the 2nd level coding clustered with the three-pillar paradigm (environmental, social and economic) frameworks from UNDP (2015) and OECD (2017), Rockström and Sukhdev (2016), and Cabaço et al. (2017).

4. Discussion

This section explores the significance of the results and gives recommendations as to forward regional innovations systems policy and practice towards sustainable development.

4.1. Embeddedness of the Sustainable Development discourse in Centro RIS3

Despite results showing there is a good embeddedness of Centro RIS3 with the SDGs overall aims, in line with EU policies (European Commission, 2016a), the analysis done to the SDGs specific targets shows a lower integration. These results may be explained by the fact that Centro RIS3 started being designed in 2012, before the Agenda 2030 was set in place. Even though CCDRC (2016a) states that Centro RIS3 is an iterative process still being adjusted, it can be suggested that to successfully integrate SDGs and targets in RIS3 it is necessary that institutions embed the sustainable development discourse in their missions and particularly since the beginning of strategy formulation, in line with what is argued

by Spangenberg (2017). Also, it may reflect a lack of information at the regional level to understand how SDGs could be integrated. At the same time, these results may support what is advocated by Colglazier (2015) and Spangenberg (2017), that SDGs targets are not suited for all contexts and are not well formulated. Nonetheless, with EU's historic claim of integrating Sustainable Development in its policies, including in the Cohesion Policy, as discussed by Pollex and Lenschow (2018) and Macleod (2005), it would be expected to find a greater degree of embeddedness of SDGs and targets in Centro RIS3.

Interestingly, the Centro RIS3 action lines are more aligned with economic and environmental SDGs than with social SDGs. In fact, social SDGs almost disappeared in the second level coding, having an exception on the classification by Rockström and Sukhdev (2016) that consider SDG 11 as a social (people centred) goal. These results are two fold, on one hand the EU has been enforcing for many years environmental sustainability policies, developing different legal (command-and-control), economic and voluntary (more cooperative) instruments to support the integration of environmental conservation and management issues into sectoral policies as suggested by Macleod (2005). This EU enforcement has been a key influence for member states and particularly for Portugal and its regions, although many particular domestic institutional issues (e.g. territorial structure, policy saliency and trust among actors) determine the way each region deals with this issue (Fernández et al., 2010). On the other hand, the Cohesion policy mainly addresses regional economic development (Lukman et al., 2016), which gives no surprise to the economic emphasis in the Centro strategy. Nevertheless, it would be expected to have a stronger prominence on social issues, particularly in a region that faces difficult characteristics of rural landscape, critical issues of population ageing, and other abovementioned social challenges (see section 2.1.). These results suggest a gap between the cohesion needs in the Centro (PT) and the action lines of the Centro RIS3.

Intertwining the results with sub-priorities with more projects funded so far (evidenced in Figure 2), specifically sub-priorities 1.1 and 1.5, it is possible to note that both these sub-priorities were coded

with SDG 9 in the first level coding and not coded in second level. SDG 9 is an economic SDG, in the three-pillar paradigm perspective. Despite the strong component of the environment in the RIS3, most of the funded projects are related with the economy area, specifically industry, innovation and infrastructure. This strengthens the previous results showing the economic emphasis of Centro RIS3, and is in line with what is further argued by Ekins and Medhurst (2006). The wide ranging of the RIS3 is therefore undermined as well as the environmental and social pillars for an effective sustainable development in the region, and it is not evident the effort of the strategy to integrate Sustainable Development goals and practices.

Finally, it is noted the mismatch between the most coded SDGs in Centro and the ones prioritised at the national level. With the exception of SDG 14, Centro RIS3 is not aligned with the envisioned strategic areas at national level. One explanation for this is that Centro RIS3 was developed before the definition of these national priorities (Cabaço et al., 2017). These results may indicate the importance of developing regional innovation policies towards sustainable development from the regional to the national level as suggested by Pîrvu *et al.* (2018).

4.2. Forwarding sustainable development through regional innovation systems: recommendations for policy and practice

As discussed in the literature (see Gerstlberger, 2004; Macleod, 2005), Regional Innovation Systems through Smart Specialization may help enhance Sustainable Development at regional level, however, results suggest that Centro RIS3, at this point, is not framed to respond to the systemic challenges of sustainable development. From this research three main recommendations emerged to advance sustainable development in the Centro (PT) through regional innovation systems: assess the Sustainable Development challenges and needs at the regional level, using the Agenda 2030 as framework; monitor the type of projects financed to understand which SDGs and targets are being addressed through the implementation of the Centro RIS3; and, adjust the Centro RIS3 to the Sustainable Developments needs of the region using a bottom-up approach:

i) Assess Sustainable Development challenges and needs at the regional level: It is necessary to develop regional innovation systems that enhance sustainable development to understand what are the needs under the Agenda 2030 framework at the regional level, as envisaged by Macleod (2005). The assessment of these challenges and needs could be possible through the development of an *ex-ante* evaluation or through a regional monitoring system aligned with the Agenda 2030 indicators. This regional monitoring system could be critical not only to allow comparison with European and national trends but also to clearly assume SDGs as an embedded policy and practice.

ii) Monitor the implementation of Centro RIS3 (2014-2020) through an SDG perspective: Intertwining with the previous recommendation, and in line with the recommendation by Ekins and Medhurst (2006), it is suggested to put in place the monitoring and evaluation of the projects financed by Centro RIS3 through an SDG perspective. Even though Centro (PT) regional administration already monitors the projects financed by sub-priorities, it would be interesting to disaggregate the analysis by action lines. Then, using the results from this research, specifically Table A. 1, it would be possible to match the projects financed with the SGDs overall aims. This procedure would help to map the SDGs that are being addressed through RIS3.

iii) Re-think the Centro RIS3 using a bottom-up approach: With the information received from the assessment of the Sustainable Development challenges and needs, and the monitoring of the implementation of Centro RIS3, it would be possible to re-think the action lines and priorities, and iterate a new strategy. This iteration should seek the enhancement of the bottom-up process – the entrepreneurial discovery process, through the identification of stakeholders that are underrepresented in the governance structure, in agreement with what is suggested by Bowen et al. (2017).

These recommendations could be implemented through a dedicated committee for Sustainable Development, placed within the governance structure of Centro RIS3, to inform and advise the different

RIS3 governance bodies. Overall, it is critical to enlarge the debate on how Centro RIS3 can be an effective engine for a new regional development trajectory that effectively addresses people, planet, prosperity, peace and partnership and assume the Agenda 2030 as a framework for the necessary change.

5. Conclusions

This paper set out to explore and discuss the degree of embeddedness of the Sustainable Development discourse in Research and Innovation Strategies for Smart Specialization of European Union regions, using evidence from Portuguese Centro Region. One of the most significant findings to emerge from this study is that Centro RIS3 needs to be revisited if it aims to help address SDGs specific targets. A second finding shows that social issues are disregarded in Centro RIS3 despite the overall aim of Cohesion Policy emphasising social development towards reduced disparities between regions. The third finding regards the fact that the implementation of Centro RIS3 is mainly being done through projects financed under the economy pillar, strengthening the previous results, and showing a greater alignment of Centro RIS3 with economic growth while disregarding environmental and social issues. A fourth important finding reinforces the need to develop regional innovation policies towards sustainable development with an alignment from the regional to the national level. To address these findings it is recommended that the Centro region assesses its particular Sustainable Development challenges and needs, using the Agenda 2030 as framework; monitors the type of projects financed, taking into account the correspondence between SDGs and Centro RIS3 action lines; and, fine-tunes the strategy, using the information gathered in the previous phases, and enhancing the entrepreneurial discovery process.

Since the study was limited to the Centro (PT), it is not possible to generalise to other European regions. Notwithstanding these limitations, it is critical to debate the role of Smart Specialization Strategies if they aim to act as an effective engine for reducing disparities while framed by sustainable development discourses. European regions need to create innovative solutions, through the Cohesion

Policy instruments, to embrace their particular challenges and promote a stronger discourse and practice towards sustainable development. A theoretical contribution can be put into attention calling for a more mission oriented approach to regional innovation systems and cohesion policies in order to face systemic and global challenges. Clearly this is still needed in the case of Centro (PT).

Despite its exploratory nature, the findings of this research contribute for the enhancement of regional innovation policy and practice towards sustainable development by offering insights into the challenges that one particular regional strategy faces to embrace and interconnect with the Agenda 2030. This research provides a comprehensive investigation on the embeddedness of the Sustainable Development discourse in Smart Specialization Strategies. Nonetheless, these findings need to be strengthened by looking deeper at the design process of Centro RIS3, through interviews to the actors involved, to understand how the bottom-up process was developed from its inception. Also, further research should focus on other regions in the EU to confirm or conflict with these results. It would be interesting to enlarge the debate on how Smart Specialization Strategies can be an effective engine for a new development trajectory for these regions that successfully target people, planet, prosperity, peace and partnership (the 5Ps) and assume the Agenda 2030 SDGs as a framework for the necessary change. Also, future research could examine the type of projects financed under the ESIF (at sub-national, national and European level), and analyse whether these may help enhance Agenda 2030 in practice.

Appendix

Centro RIS3 priorities and action lines

Priority 1 is grounded in the sustainable optimization and development of the regional industry through the adoption and transfer of technologies, use of best available practices, efficient use of resources, and valuation and recycling (including upcycling) of waste. This priority is closely linked with the concept of Circular Economy and Industry 4.0. Regarding Priority 2, the emphasis is on the conservation, sustainability, management and monitoring of the natural resources of the region, as well

as the development of processes, products or services promoting innovation through its natural endogenous resources. Priority 3 is focused on health promotion and disease prevention at multisectoral and multidimensional level. Finally, Priority 4 develops on different dimensions of territorial innovation. It focus on rural innovation linking it to the green economy, innovation associated with low density territories embracing mobility and access to public services topics, and innovation leading to smart, sustainable, and creative cities. Therefore, in total, the 17 sub-priorities and 59 action lines provide a roadmap map for the assessment of the investments in research and innovation in the current programming period (CCDRC, 2017). Table A. 1 unfolds the Centro RIS3 action lines and shows the full results of the content analysis.

Detailed results for the first and second level coding of the Centro RIS3 action lines

Table A. 1 – Detailed results for the first and second level coding of the Centro RIS3 action lines

ACTION LINES*	SDG CODED *first level coding*	TARGETS CODED *second level coding*
1. Sustainable industrial solutions		
1.1. Development of sustainable processes, materials and systems with higher added value for the region		
1.1.1. Promotion of projects involving the development of sustainable and innovative processes, materials, products or systems with greater added value for the industry and the region.	SDG 9	-
1.2. Efficient use of resources and reduction of the environmental impact of production processes		
1.2.1. Promotion of projects leading to the efficient use of resources (energy, water and materials) including decarbonisation and reduction of other impacts, as well as, valorisation of mineral resources of the region.	SDG 6; SDG 7; SDG 8; SDG 12; SDG 13	6.4; 7.3; 8.4; 12.2
1.3. Sustainability assessment of processes, products and systems		
1.3.1. Promotion of projects that focus on the principles of circular economy for the transformation and modernization of the various industrial sectors of the region, giving them greater added value and greater global competitiveness	SDG 6; SDG 7; SDG 8; SDG 12; SDG 13	6.4; 7.3; 8.4; 12.2; 12.4; 12.5
1.3.2 Promotion of projects that use the evaluation of the sustainability of processes, products and systems as an eco-innovation tool	SDG 12	-
1.3.3. Valorisation of waste in processes, products and systems in industrial symbiosis through recycling, reuse and recovery of waste and by-products as secondary raw materials	SDG 12	12.5
1.4. Industrial Modernization through "Human-Centered Production"		
1.4.1. Promotion of projects that contribute to the change of industrial production systems, according to the concept of valuing	SDG 8; SDG 9	8.3; 9.2

ACTION LINES*	SDG CODED *first level coding*	TARGETS CODED *second level coding*
the human being in the factories of the future, adding the concepts of process dematerialisation (Industry 4.0) and highlighting the noblest and highest value tasks added to the human being in production and associated services		
1.5. Valuing advanced and / or emerging technologies in innovative eco-processes, products and eco-systems with higher added value		
1.5.1. Promoting the incorporation of advanced and / or emerging technologies (EICT- Electronic, Information and Communication Technologies, micro and nanotechnologies, micro and nano materials or other functional additives) that capitalize on the region greater added value in industrial processes and products.	SDG 9	-
1.5.2. Crossing experiences between different value chains, from innovation to entrepreneurship, from business models to support and logistics services.	-	-
2. Enhancement of natural endogenous resources		
2.1. Preservation and sustainability of endogenous natural resources		
2.1.1 Promotion of projects for the knowledge and enhancement of ecosystem services (support, regulation, production and cultural services), including forms of recovery that are constituents of well-being (including safety, raw materials and essential goods, health and social relations)	SDG 3; SDG 14; SDG 15	14.a; 15.1; 15.a
2.1.2. Development of projects for knowledge, focused on the interaction between ecosystems and humans, promoting and valuing positive balances, or, in cases of negative imbalances and degradation, promotion of innovative projects and methodologies for proper restoration, rehabilitation and reconversion	SDG 14; SDG 15	14.1; 14.2; 14.3; 14.4; 14.5; 14.6; 14.a; 14.b; 14.c; 15.1; 15.2; 15.3; 15.4; 15.5; 15.6; 15.7; 15.8; 15.a
2.1.3. Promotion of projects that contribute to the knowledge, conservation, protection, valorisation and sustainability of biodiversity throughout the territory, favouring native species and endogenous genetic resources - animals, plants and microorganisms	SDG 14; SDG 15	14.2; 14.3; 14.4; 14.5; 14.6; 14.a; 14.b; 14.c; 15.1; 15.3; 15.4; 15.5; 15.7; 15.8; 15.a
2.1.4. Promotion of life cycle assessment, sustainability and valorisation of endogenous natural resources: geological resources (such as natural mineral waters, thermal springs, minerals, etc.), energy, water, marine, genetic, agricultural and forestry resources, among others.	SDG 2; SDG 6; SDG 7; SDG 14; SDG 15	2.4; 2.5; 6.3; 6.6; 14.2; 15.2; 15.4; 15.6
2.1.5. Promotion of projects for the prevention, risk assessment, mitigation and control of pests and diseases in the agro-food and agro-forestry sectors	SDG 2	2.4
2.1.6. Promotion of projects with a view to enhancement and sustainability of the natural and landscape heritage of the region	SDG 11	11.4
2.2. Monitoring and integrated management of endogenous natural resources		
2.2.1. Promotion of projects for the implementation of local and remote systems of mapping, inventorying and monitoring of natural endogenous resources, lato sensu (such as geological, energy, water, marine, genetic, agricultural and forestry resources, among others)	SDG 2; SDG 6; SDG 7; SDG 14; SDG 15	14.2; 15.2

ACTION LINES*	SDG CODED *first level coding*	TARGETS CODED *second level coding*
2.2.2. Promotion of projects to promote the development of technologies and products to support the monitoring and integrated management of marine, agricultural and forestry ecosystems (including, inter alia, fishing, fruit and wine, olive growing, etc.)	SDG 2; SDG 14; SDG 15	14.2; 14.4; 15.2; 15.4
2.2.3. Promotion of projects that promote intelligent specialization, combining TICs and exploitation activities of endogenous natural resources, such as maritime activities (Smart Coast), agricultural activities (SmartFarm), etc.	-	-
2.2.4. Promoting territorial monitoring projects and integrated risk management (climate change, droughts and floods, contamination of groundwater and aquifers of natural mineral waters, fires, genetic erosion, invasive species, pests and diseases, coastal dynamics, extreme events , etc.)	SDG 6; SDG 11; SDG 13; SDG 14; SDG 15	6.3; 11.b; 13.1; 13.2; 14.2; 15.3; 15.8
2.2.5. Promotion of projects for the biological, physical-chemical and sensorial characterization of natural and agri-food products, including traditional cultivars with potential for innovation	SDG 2	-
2.3. Development of products, processes and services aiming at boosting chains of value associated with endogenous natural resources		
2.3.1. Promotion of projects leading to the implementation of the integrated bio-refinery concept in the forest and agro-food industries	SDG 7	-
2.3.2. Promotion of research and technological development projects in the field of renewable energies (biomass, solar, marine, hydroelectric and geothermal)	SDG 7	-
2.3.3. Promotion of projects for the valorization of forest products and by-products, agri-food, fisheries and aquaculture, and the prospection of bioactive compounds and products for health and well-being	SDG 2; SDG 3; SDG 14; SDG 15	-
2.3.4. Promotion of projects for the development and application of innovative and precision technologies in the agro-food, forestry and fisheries sectors, improving food quality and safety and the creation of new value-added products	SDG 2	-
2.3.5. Streamlining sustainable aquaculture projects in the coastal environment and aquaculture in inland waters to support the ecological and productive valuation of ecosystems, which will boost the emerging sector of "blue biotechnology"	SDG 2; SDG 6; SDG 14	-
2.3.6. Promotion of projects to develop sustainable technologies for recovery and valorisation of wastewater and effluents resulting from economic activity	SDG 6; SDG 11	6.3; 11.4
2.3.7. Promotion of projects to exploit the region's geological resources, especially in the application of new technologies for the detection and exploration of deep deposits (sea and land) and low concentration metal deposits	-	-
2.3.8. Development, certification and promotion of products and services with high potential for new markets	-	-
2.3.9. Promotion of projects to develop products, services and technologies to support logistics and more efficient and secure	-	-

ACTION LINES*	SDG CODED *first level coding*	TARGETS CODED *second level coding*
distribution chains, including the valuation of production processes and marketing practices		
2.3.10. Promotion of projects to improve the efficiency of the use of resources in value chains	SDG 8; SDG 12	8.4; 12.2
3. Technologies for quality of life		
3.1. Development of innovative health prevention actions and systems		
3.1.1. Encouraging the emergence of products and services that contribute to health promotion and maintenance	SDG 3	-
3.1.2. Promotion of technologies for remote management and monitoring and technologies that encourage healthy behaviour by taking advantage, for example, of using "serious games", virtual reality or "internet of things"	SDG 3	-
3.2. Development of innovative actions and systems that facilitate the early diagnosis in health		
3.2.1. Promotion of identification and / or validation of bio-markers, health data integration platforms, remote monitoring, predictive environments, precision medicine, personalized medicine and assessment of predisposition to the disease	SDG 3	-
3.3. Development of new treatments and therapies (e.g. cellular, genetic, biological, pharmacological, regenerative, among others)		
3.3.1. Promotion of research platforms, preclinical, clinical and clinical trials	SDG 3	-
3.3.2. Promoting participation in translational research networks	SDG 3	-
3.3.3. Development and validation of new therapies, including precision therapies (e.g. pharmacological, gene and cell), new materials (e.g. biomaterials) and medical devices	SDG 3	-
3.4. Development of innovative actions and systems that promote active and healthy aging, inducers of independent living, that cross the different care networks (health care and social support)		
3.4.1. Promotion of support and monitoring technologies with impact on the aging process (preventive, therapeutic, occupational and social)	SDG 3	-
3.4.2. Development of value-added services in the region (such as early adopters) to facilitate the inclusion of the same products and services in international value chains	SDG 3	-
3.5. Adoption of platforms for the promotion of interoperability between systems, solutions for citizen-centred solutions		
3.5.1. Incorporation of advanced technological concepts that promote the integration between health care, social support and well-being, contributing to the emergence of digital solutions focused on the citizen	SDG 3	-
3.6. Promotion of actions to strengthen the bet on Health Tourism and Well-being		
3.6.1. Intersectoral cooperation in health and wellness tourism, research, innovation and training	SDG 8	8.9
4. Territorial innovation		

ACTION LINES*	SDG CODED *first level coding*	TARGETS CODED *second level coding*
4.1. Promotion and stimulation of innovation projects anchored in the territory		
4.1.1. Development of information systems and technologies that promote opportunities and resources and minimize security risks (eg cybersecurity)	-	-
4.1.2. Development of the Creative Economy	SDG 8; SDG 12	8.9; 12.b
4.1.3. Development of innovative projects in the area of Nature Economy, Green Economy and Low Carbon	SDG 1; SDG 8; SDG 9; SDG 11; SDG 12; SDG 13; SDG 14; SDG 15	-
4.1.4. Development of projects that promote healthy eating systems	SDG 2	2.2
4.1.5. Valorisation and innovation in rural productive chains (promoting short marketing chains)	-	-
4.1.6. Promotion of projects that ensure accessibility to goods and services and the improvement of the quality of life, especially in low density areas	SDG 10; SDG 16	16.6; 16.7
4.1.7. Promotion of sustainable, creative and intelligent cities	SDG 11	
4.1.8. Development of intelligent networks and systems (eg energy, water, communications and mobility, in particular open data format)	-	-
4.1.9. Promotion of projects aimed at the revitalization of cultural heritage (built or immaterial)	SDG 11	11.4
4.1.10. Development of innovative habitat solutions that respond to sociodemographic needs and trends (active aging, autonomy of the elderly population, developmental spaces according to needs, motor difficulties, etc.)	SDG 11	11.2; 11.7
4.1.11. Promotion of new models of participation in the development of cities (city making) and territorial governance	SDG 11; SDG 16	11.3; 16.6; 16.7
4.1.12. Development of new solutions and services that promote the relationship between rural space and urban space	SDG 11	11.a
4.2. Promotion of social innovation initiatives		
4.2.1. Development of innovative projects that focus on the issues of social inclusion, in particular poverty (urban and rural), unemployment, training of young people and the inclusion of disadvantaged groups	SDG 1; SDG 4; SDG 5; SDG 8; SDG 10	4.4; 4.5; 4.6; 8.5; 8.6; 8.8; 10.2
4.2.2. Promotion of innovative teaching models and integrators of teaching / learning	SDG 4	-
4.2.3. Development of innovative solutions that generate new forms of employability and self-employment	SDG 8	8.3
4.3. Development of innovative proposals for the qualification of tourism in the region		
4.3.1. Development of differentiated and customized tourism projects (taylor made) that contribute to the sustainability of the destinations	SDG 8; SDG 12	8.9; 12.b
4.3.2. Structuring of combined and / or composites tour packages, including products from outside the region	-	-
Insertion of regional products into larger-scale tourist packages (national and international)		

ACTION LINES*	SDG CODED *first level coding*	TARGETS CODED *second level coding*
4.3.3. Insertion of regional products into larger-scale tourist packages (national and international)	-	-
4.3.4. Development of a highly innovative tourist accommodation network	-	-
4.3.5. The value of the assets / differentiating resources of the region in the structuring of tourism products that are also differentiated (quality rural tourism, thermal baths and wellness tourism, tourism, experiences tourism, sustainable tourism, cultural tourism, surf,…)	-	-

*The Action Lines were retrieved from CCDRC (2017). Free translation done by the authors.

Acknowledgements

This research was developed under the support of the Research Program "CeNTER - Community-led Territorial Innovation" (CENTRO-01-0145-FEDER-000002), funded by *Programa Operacional Regional do Centro* (CENTRO 2020), ERDF, PT2020. The funding source had no involvement in the development of the research or in the preparation of the article. Additionally, the authors would like to thank Cláudia Figueiredo and Nicolas Morgenstern for the constructive feedback on the results and the anonymous reviewers for their time and effort in reviewing our paper.

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