

Madeira, Paulo Miguel; Vale, Mário; Mora-Aliseda, Julián

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Article

Smart Specialisation Strategies and Regional Convergence: Spanish Extremadura after a Period of Divergence

Paulo Miguel Madeira ^{1,2,*}, Mário Vale ³  and Julián Mora-Aliseda ⁴¹ Instituto de Ciências Sociais, Universidade de Lisboa, 1600-189 Lisboa, Portugal² Centro de Estudos Geográficos, Universidade de Lisboa, 1600-276 Lisboa, Portugal³ Centro de Estudos Geográficos e Laboratório Associado TERRA, Instituto de Geografia e Ordenamento do Território, Universidade de Lisboa, 1600-276 Lisboa, Portugal; mario.vale@edu.ulisboa.pt⁴ Departamento de Arte y Ciencias del Territorio, Facultad de Filosofía y Letras, Universidad de Extremadura, 10003 Cáceres, Spain; jmora@unex.es

* Correspondence: paulo.madeira@campus.ul.pt

Abstract: Smart specialization strategies are a new EU approach to cohesion policy, meant to deliver growth and development at EU national and regional level. Bearing in mind its focus on place-based development strategies, this paper intends to shed some light on its appropriateness to tackle uneven development and regional growth divergence. The paper showcases Spanish Extremadura growth trajectory. Extremadura is a poor region in the European context that between 2008 and 2014 diverged from the EU average, despite being eligible for EU funding as a convergence region by cohesion policy. In the 2014–2020 programming period, there was a positive dynamic at the beginning, but from 2017 onwards convergence stopped, which indicates that thematic and regional programmes have not delivered results or have not compensated for higher growth level of other Spanish regions. Moreover, research and innovation strategies for smart specialization (RIS3) seem to have limited impacts on place-based economic transformation in less developed regions. From this example, the suitability of the smart specialisation strategy as the core of cohesion policy in the programming period is discussed. It concludes that this strategy is interesting for intermediate development regions with some industrial base but does not seem appropriate as a convergence driver for poorer regions.

Keywords: regional development; EU cohesion policy; convergence objective regions; RIS3; 2008 crisis; Extremadura; Spain



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1. Introduction

In the years following the financial crisis of 2008 and the planetary recession of 2009, the convergence between the regions of the European Union came to a halt. A process of divergence in development and well-being began that lasted until the middle of the following decade. This happened even though cohesion policy is one of the policies that absorbs the largest share of the joint budget of the EU Member States, whose priorities in that period were focused on competitiveness and employment, following the Lisbon Agenda.

The divergence between the NUTS2 regions of the EU—the scale for which its regional development policy is designed and applied—in the period 2008–2014 is observed whether the variation in GDP in Purchasing Power Standards (PPS)/inhab. (EC 2017, p. 5) or the variation in an index composed of 11 economic, social and demographic indicators (Madeira 2019, p. 202) is used as a criterion. In this article, we use these two measures for the period 2008–2014 and only GDP PPS/inhab. for the period 2014–2019. In the first period, regional divergence occurred with a territorial pattern in which less developed areas of the South, and also Ireland, encompass most of the losing regions, while much of the NUTS2 of the more developed countries in the Centre and North of the EU were winners in relative terms in the same period (O'Brien and Leichenko 2003).

This context affected several less developed regions covered by the Convergence Objective of the European cohesion policy then in place, where development levels diverged from the average. Hence, the cohesion policy in force in the 2007–2013 period was insufficient to prevent the divergence of the weakest regions from a socioeconomic point of view in a context of acute crisis in Europe. This calls into question the appropriateness, for these territories, of its strategy to promote competitiveness and employment, at least during times of deep economic crisis.

The priorities of the 2014–2020 cohesion policy period are, in turn, based on the Europe 2020 growth and jobs strategy, which is grounded in the concept of smart specialisation (EC 2010a). It was from this concept that the regional Research and Innovation Strategies for Smart Specialisation (RIS3) were designed, whose rationale has several aspects in common with the ideas of competitiveness and employment that were at the heart of cohesion policy in the 2007–2013 period. As already mentioned, this approach to the European regional policy has not prevented the divergence of poor regions during its term, so it is important to understand the potential contribution of smart specialisation and RIS3 to the convergence of less developed regions, from a theoretical point of view and in the light of some outcomes already known.

Thus, analysing the concrete functioning of the competitiveness and employment strategy of the 2007–2013 programming period in a Convergence Objective region and understanding its positive aspects and its shortcomings helps to the understanding of the suitability of RIS3 as leitmotiv of EU cohesion policy for the 2014–2020 period. This is based on a perspective according to which one of the fundamental objectives of cohesion policy is to ensure the convergence of the less developed regions. To do so, the example of Spanish Extremadura is used, based on documentary and statistical sources and also on fieldwork carried out in 2017, which included interviews with politicians and academics. Additionally, to understand the general contours of the evolution of this region during the following programming period, in which a RIS3 has been implemented under the strategy for growth and employment, complementary statistical information is used, namely the evolution of GDP PPS/inhab. until 2019, to give an idea of the success of convergence in Extremadura, according to the criterion adopted in the cohesion policy itself.

Starting from the discussion of the concept of smart specialization and its suitability as a basis for a regional development policy that includes the convergence objective (and against the background of what has been learned from Extremadura's trajectory since 2008), the suitability of RIS3 as the centre of cohesion policy in the 2014–2020 programming period is discussed and elements that should be considered in the design and implementation of cohesion policy for the 2021–2028 programming period are provided. This period also begins in a context of acute crisis, arising from the economic and social impacts resulting from the prevailing EU strategy to counter COVID-19, which limited personal contacts and therefore entailed the closure of important parts of economic activity for intermittent periods.

In the following section, the theoretical basis of smart specialisation is presented and RIS3 and its relation to territorial inequalities are discussed. In Section 3, the methodology used is briefly presented. The socio-economic context in Extremadura, the impact of the 2008 crisis in the period up to 2014 and the evolution during the following programming period based on RIS3 are addressed in Section 4. This is followed by a discussion of the role of cohesion policy in the period 2008–2014 and of RIS3 until 2020. Section 6 presents the conclusions and policy implications.

2. Growing Territorial Inequalities and the Logic of RIS3 in the Context of the EU Cohesion Policy

The neoliberal globalisation prevailing since the last decades of the 20th century reinforced some forces acting towards divergence on a regional scale, as it is characterised by the spatial agglomeration of economic activities (Vale 2012; Rodríguez-Pose and Crescenzi 2008). In the EU, as of 2010 there was also a clear trend towards a strong North–South divergence (Hadjimichalis 2018; Hadjimichalis and Hudson 2014; Reis 2011), after the

European sovereign debt crisis and the euro crisis began to make themselves fully felt, following the financial crisis that began in 2008 and the Great Recession of 2009.

However, the divergence within Europe had been going on for quite some time, precisely as a result of globalisation. Since the 1990s, a trend towards divergence within countries was noticed, according to [Farole et al. \(2009\)](#). Why? “Economic integration and globalization are unleashing forces that seem to be benefiting core regions within every country, often to the detriment of the periphery. This is happening virtually all over the world...” ([Farole et al. 2009](#), p. 4). If at this stage there was still no divergence between countries, it later came to happen ([Madeira 2019](#); [EC 2017](#)), with a renewed centre-periphery logic.

It was in this context of increasing concentration of economic activity and growing territorial inequalities in development that EU regional policy departed from the objective that historically justified it—that of achieving balanced territorial development, reducing the differences between regions and the backwardness of the less developed ones. The 1986 Single Act established the framework of the cohesion policy which is still in force today. However, its content has undergone successive changes, depending on the political priorities adopted in each of its programming periods.

Although the Single Act states that, “in particular, the Community shall aim at reducing the gap between the various regions and the backwardness of the least favoured regions”, the successive political priorities have revealed something different. Since then, cohesion policy has increasingly focused on a logic of competitiveness and growth of regional economies, to the extent that convergence is no longer its ultimate goal ([Vale 2014](#), pp. 44–46), although this objective remains in the treaties. The option for research and innovation smart specialisation strategies (RIS3) must also be seen in the light of this evolution.

The smart specialization concept has its origins in the literature that tried to explain the reasons of the productivity gap that emerged between the United States and Europe in the 1990s ([Ortega-Argilés 2012](#)). More specifically, it draws in the role that technology linkages and spillovers between regions, particularly those related to information and communication technologies, played in the explanations of that productivity gap. In this context, a group of academics working for the European Commission suggested the prioritization of a policy logic meant to promote growth in the EU, which was named “smart specialisation”.

From its start, the smart specialisation idea assumed that the potential technological evolution and innovation is somehow context dependent. This implies that innovation systems rely on existing structures and also benefited from, and are conducive to, growth and dynamics of the territories they are embedded in. This idea brought to the forefront that regions usually specialize in different knowledge related sectors, in line with their capabilities ([McCann and Ortega-Argilés 2015](#)). Accordingly, they must focus on certain domains of economic activity. A domain is constituted of the relevant sectors in which a region can more easily apply new technological adaptations and benefit from knowledge spillovers, being the relevant size of that domain conceived in terms of the range of these sectors. The focus on a limited number of sectors also helps to achieve an adequate scale.

To put in place a successful smart specialisation strategy requires a complex process of both discovering the right domains of future specialisation and to avert coordination failures that could prevent the chosen path to deliver a solid regional growth ([Foray et al. 2011](#)). From what is said, it results that smart specialisation is a strategy for growth based on finding the right domain of activities in which to invest on innovation. It is not a strategy for regional convergence within a country or a set of countries, nor is it a strategy for territorial cohesion. It is therefore necessary to look at the process that led to its adoption as the centre piece of EU cohesion policy.

After the 2008 financial crisis, the Greek debt crisis in 2010 and the 2011–2012 eurozone crisis, Brussels adopted a stance favouring policies with interventions focused on growth, development, and institutional and governance reforms ([McCann and Ortega-Argilés](#)

2012, p. 432). So, it adopted the main ideas of the Barca (2009) report for building the cohesion policy for the 2014–2020 programming period, centred on the idea of place-based approaches to policy design. Innovation, environment and inequality were chosen as priorities to these approaches, which are also key priorities on the Europe 2020 Growth Strategy of smart, sustainable and inclusive growth (EC 2010a).

The Barca (2009) report criticized the EU cohesion policy that was in place for allegedly not being goal oriented or results oriented, lacking real ongoing monitoring or evaluation, insufficient use of data for analysis, and failing to distinguish efficiency objectives from social inclusion ones, among other aspects, arguing for a place-based approach for the future programming period. The concepts and ideas of the report draw on previous work from institutions such as the World Bank, OECD, or the IMF. The place-based approach to regional development “explicitly advocates employing appropriately designed local knowledge and learning enhancement tools in regional policy, and the smart specialization argument is one such tool” (McCann and Ortega-Argilés 2015, p. 1295).

The new place-based approach argued for some institutional changes in the application of the EU regional policy. Namely, the establishment of a system of *ex ante* conditionalities to increase the public accountability of the member states. In particular, “regarding the provision of data, the setting of clear policy objectives, transparency over all policy processes and conduct of the policy, and the possibility of sanctions related to nonperformance on these conditionalities” (McCann and Ortega-Argilés 2012, p. 431). On the other hand, the national authorities should have a high degree of freedom and autonomy to design the policies adequate for their specific contexts and problems.

To promote the adequacy of the five funds that finance the cohesion policy investments¹ to the new integrated place-based logic of smart specialisation, the European Commission created the Common Strategic Framework, which translates the objectives of the Europe 2020 Strategy into workable actions of this funds (EC 2012). This was meant to assure the convergence under the same purpose of funding sources related to different agendas, such as skills training, innovation and R&D or infrastructure.

The policies implementation during the 2014–2020 programming period is based on the use of conditionalities and partnership agreements between the member states and the European Commission for the design and functioning of the regional programs. The priorities varied in function of the level of income of the countries, “with wealthier countries having fewer thematic priorities centred relatively more on innovation issues, while poorer countries have more infrastructure funding” (McCann and Ortega-Argilés 2012, p. 433–34). The poorest countries could access a share of 80% of the funding available under the whole cohesion policy instruments.

This approach to regional development based on smart specialisation is a means of ensuring the European strategy for growth and jobs (Europe 2020). It turns out that the most developed regions are better placed than others to benefit from a development strategy based on research and innovation. It is probably because of this that McCann and Ortega-Argilés (McCann and Ortega-Argilés 2015, p. 1295) state that “prima facie, the smart specialization logic appears to discriminate against lagging regions, and to contradict the design, if not the very rationale for regional policy itself”.

Nevertheless, in the same article they argue that smart specialisation can be justified as a tool for EU cohesion policy. One of their main arguments is that smart specialization is a particular case of place-based policies approach to regional development; once place-based is accepted as the focus of the EU cohesion policy (instead of a space neutral approach), smart specialization follows. The other argument relies, according to these authors, on the adoption of smart specialization strategies that assure embeddedness, relatedness and connectivity of the chosen sectors to compose the domain of priorities that will benefit the most of technological adaptations and knowledge spillovers, even though they acknowledge that this may not be straightforward.

As a result of the embeddedness criteria, the region is going to specialize even more, which is not a good option for lagging regions, often with sparse economic and institutional

fabrics. So, it is necessary “to develop a strategy to allow the less prosperous regions actually to diversify” (McCann and Ortega-Argilés 2015, p. 1297). It is argued that this does not counter the smart specialization logic because this logic “promotes the idea of technological diversification within a particular domain which has a realistic specialization advantage” (McCann and Ortega-Argilés 2015, p. 1297). Relatedness is implied in the idea of diversification within a particular domain. Moreover, fostering connectivity is not a problem for peripheral regions, because smart specialization targets the most connected industries in these regions. However, it may lead to some backwash effects.

However, in spite of this, McCann and Ortega-Argilés acknowledge that the possibilities of the smart specialization argument are “very limited” to “very isolated regions” (*ibid*, p. 1298), suggesting that in these cases R&D should not be a priority, endorsing instead investing on connectivity in natural environmental or tourism activities. However, this means that the economies of these regions are likely to remain dependent on less technology-intensive and less productive activities, with a limited range of well-paying jobs. This is a way of consolidating their less developed economic status.

McCann and Ortega-Argilés (2015) did not specify the meaning of “very isolated” in a spatial/territorial context as the one of the EU. It may happen that most regions of a peripheral member state, or at least large parts of these regions, fell on this category, which constitutes a problem for the logic of the EU cohesion policy in relation to the convergence objective regions. Even in more central countries, the neglect of some regions (some of them isolated) may lead to problems of another type, as the geography of discontent literature has shown (Madeira et al. 2021; Gordon 2018; Rodríguez-Pose 2018; Guilluy 2014). The logic of research and innovation smart specialization strategies (RIS3) does not seem important to major cities and metropolitan areas, which tend to have diversified economies with capabilities close to the technological frontier. However, it is well suited to regions with intermediate development in the EU context, many of them being problem regions in richer countries, for instance, those in industrial decline but with some technological capacity.

This shows that the strategy for growth and jobs 2020, with its first priority being based on knowledge and innovation, and its mobilisation of the structural funds for its purposes (EC 2010a), lead to a cohesion policy formulation which was not primarily designed to the convergence objective that should be at the heart of a regional policy at the EU scale. It is important to note that the previous programming period of the cohesion policy (2007–2013) ended with divergence between the NUTS2 regions (Madeira 2019; EC 2017). Its priorities were based on the Lisbon strategy for growth and jobs, of 2005, which lead to a formulation of the regional programmes focused on fostering the competitiveness and employment, including the ones in the convergence objective regions.

Among the existing literature on smart specialization, RIS3 and innovation policy (e.g., Serbanica 2021; Valdmaa et al. 2021; Tsipouri 2017; Rotaru 2015; Morgan 2013), we do not find texts focusing on the question of the potential of this approach to make poorer regions converge with richer ones, particularly in the European context. References to this issue do not abound, either. The main exceptions are the text by McCann and Ortega-Argilés, mentioned above, and also Barzotto et al. (2019). In this last one, the authors acknowledge that lagging regions lack the technological capabilities and networks necessary to fully benefit from RIS3. They therefore explore the importance of fostering extra-regional collaborations for the development of new specialisations in this territorial context.

In the 2007–2013 period, cohesion policy also emphasised knowledge and innovation and most of its structural funds had to be used on actions related with the strategy for growth and jobs (EC 2007), very much based on policies meant to foster competitiveness. However, this did not assure convergence overall, and some convergence objective regions actually diverged. In this period, the above mentioned 2008 financial crisis, the Greek debt crisis in 2010 and the 2011–2012 eurozone crisis had a huge impact on several countries, mostly in the EU south (Hadjimichalis 2018). The euro currency was a factor of divergence.

However, the fact that cohesion policy did not achieve what was supposed to be one of its main objectives in a time of acute crisis raises questions that must be addressed. Additionally, this is even more so when, because of COVID-19, the EU went through a deep recession with foreseeable asymmetric impacts on its countries (EC 2020), hence the need for an EU-wide recovery and resilience facility.

The strategy for smart, sustainable and inclusive growth 2020 and the adoption of RIS3 as the main priority applied to cohesion policy may be seen as the continuation, in a more place-based way, of the Lisbon strategy for growth and jobs and the regional programmes around fostering competitiveness and employment. Thus, having an insight of how the approach in the 2007–2013 period failed its main objectives in a Convergence Objective region helps to see the problems with the approach taken in the 2014–2020 period.

It should be noted that there are no stabilised methods for evaluating RIS3 and that the 2014–2020 programming period is not yet fully closed. Therefore, in addition to the unavailability of some statistical data for 2020 we also have the issue that there is no final information on the entire programming period in question. Thus, the approach to the results of RIS3 in Extremadura that we present has limitations, but it seemed feasible and providing a contribution to a debate that should be made as soon as possible.

3. Methodology

The socio-economic dynamics in Spanish Extremadura is analysed in two distinct periods, 2008–2014 and 2014–2019, to identify the occurrence of convergence or divergence with EU values in each of them. These time frames correspond to the implementation of the European Union Cohesion Policy in the 2007–2014 and 2014–2020 programming periods. For the first of these periods, the results presented, and the discussion, are based on statistical and documentary analysis and fieldwork in Extremadura. For the 2014–2019 period, we used statistical data and documentary analysis. In both periods, we proceeded to longitudinal analyses of the data.

GDP has the advantage of being a widely used measure and therefore facilitates comparison between territories and different periods. However, GDP is also a measure with strong limitations, as it does not account for the various dimensions relating to development and well-being. Therefore, a Regional Development Index (RDI) composed of eleven variables of economic, social and demographic nature was calculated, for the EU as a whole, its Member States and their NUTS2, for the 2002–2014 period (Madeira 2019, pp. 172–75 and 179–83). The variables used (see Table 1) were normalised according to the UNDP (2016) method.

The fieldwork in Extremadura was conducted in the Departamento de Arte y Ciencias del Territorio of the Universidad de Extremadura during the first quarter of 2017. Interviews were conducted with a total of 12 academics, technical experts and political agents. Their main objectives were to obtain information on the suitability of the regional development policy applied in the period under study, whether its application was correct and whether the actions envisaged were the right ones to achieve the objectives. Additionally, also, to what extent its objectives were achieved. They are referred to throughout the article when the information obtained from them is found to be useful.

For the 2014–2020 period, the most relevant EU documents for the adopted cohesion policy approach were analysed, namely the Europe 2020 growth and jobs strategy (EC 2010a), which underpins the adoption of RIS3 in the 2014–2020 programming period of the cohesion policy. Extremadura's RIS3 strategy (de Extremadura [2013] 2016) was also consulted, which allowed identifying its priority sectors for innovation. Based on this, it was possible to identify the most relevant variables to be selected for analysis.

For most of the socio-economic and demographic variables used to characterise the evolution of Extremadura during its RIS3 term, Eurostat only had data available until 2019 when this article was prepared. On the other hand, the sectoral data provided by Eurostat by NUTS2 are rather limited and do not allow to see the evolution of production and employment in all priority sectors of the Extremadura RIS3. However, it was possible

to obtain relevant data regarding the agricultural sector and the most knowledge and technology intensive activities.

Table 1. Regional Development Index (IDR) for the EU.

Subdimensions	Included Variables	Variable Weight
<i>Economic</i>	–GDP/inhab. at current market prices PPS	25%
	–Employment (%) in high-technology sectors (high-technology manufacturing and knowledge-intensive high-technology services)	25%
	–Employment rate (% of employed population to total population)	25%
	–Productivity (GDP at current market prices/number of workers)	25%
<i>Social</i>	–Life expectancy at birth	25%
	–Pop. aged 25–64 with tertiary education (% of total pop.)	25%
	–Pop. aged 18–24 neither in employment nor in education and training (NEET) (% of total pop.)	25%
	–Severe material deprivation rate (% of total pop.)	25%
<i>Demographic</i>	–Average annual population change (%) in the previous triennium	40%
	–Working-age population (15–64 years) (%)	40%
	–Population density (inhab./km ²)	20%
Regional Development Index (RDI)	Economic variables	50%
	Social variables	25%
	Demographic variables	25%

Source: Madeira (2019).

4. Results

4.1. Main Features and Trajectory of the Region

Extremadura is a region with a large, predominantly rural territory, which is peripheral and somehow isolated, since it has no major urban areas and is midway from Madrid to Lisbon. Its GDP per capita in PPS fell by 3.9% between 2008 and 2014, although in 2007 it was included in the “Convergence objective” (for regions with GDP per capita PPS below 75% of the EU-25 average) in the EU cohesion policy eligibility classification (EC 2010b, p. 12). This means that the region diverged from the EU, whose GDP increased by 5.77% in this period.

The 2008 crisis had a strong impact across the EU, but this impact was very different in its various member states, affecting southern countries and Ireland more severely. In the case of Spain, the NUTS2 with the highest GDP per capita PPS were the ones that regressed the least, with Madrid at the top. For Spain as a whole, GDP per capita fell by 4.94% from 2008 to 2014. This means that the 3.9% fall in Extremadura represents a very slight convergence, which can be better described as relative stagnation in the context of the country.

Besides having the lowest GDP per inhabitant of the Spanish NUTS2 in the period here considered, Extremadura is a region with a low population density. Its rate of population with higher education in 2014 (26.8%) was well below the national value in Spain (34.7%) and was also lower than that of the EU (29.3%). A very low percentage of its employed population was working in knowledge-intensive sectors (1.5% in 2014 vs. 3.9% in the EU28) and the proportion of unoccupied young people (NEET rate of 21.1%) was slightly below Spain’s 22.1% but well above the EU’s 16.5%. On the positive side, an extreme poverty rate (as measured by Eurostat’s ‘severe material deprivation’) of 3.8% in 2014 stands out, lower than in Spain (7.1%) and the EU (8.9%).

Until 1800, manufacturing in Extremadura was a very limited activity, and the existing production was suffering from low capitalisation, low productivity and poor quality of its products (Moruno and Preciado 2014, p. 15). Extremadura's participation in the Spanish industrialization up to the 1930s was mainly through the supply of agricultural raw materials for the industrialization of other regions. An "agricultural specialization without industry" took place (Zapata 1996a *apud* Moruno and Preciado 2014, pp. 15–16), with Extremadura participating in industrialization without industrializing itself.

From the 1930s to the present, the region's economy has expanded at a pace similar to that of the Spanish economy as a whole, leading to little convergence with the national mean. Since the 1950's, Extremadura went through a structural change without a clear relative increase in the weight of the industrial sector, that developed centred in the agroindustry. Since then, there has been a rapid and almost uninterrupted convergence of the average levels of GDP per inhabitant in Extremadura (and in Spain) with those in the EU, first interrupted in the crisis of the 1970s and more recently following the 2008 crisis.

4.2. Fall in Line with Spain and Divergence from the EU until 2014

The 3.9% fall in Extremadura's GDP per capita in PPS between 2008 and 2014 has the particular meaning of being recorded in the variable used by the EU to measure regional convergence. The evolution of RDI in Extremadura between 2008 and 2014 was similar to that in terms of GDP PPS/inhab. There was also a decline, in a slightly higher percentage (see Table 2). When comparing the evolution of the RDI in Extremadura with that of the EU and Spain, it can be seen that the divergence with the EU was less intense than in terms of GDP PPS per inhabitant, and the convergence with Spain was significant, although it took place against a backdrop of decline in both cases.

Table 2. Extremadura's evolution before and after 2008.

Space/Time	2002	2008	2014	Δ % 2002–2008	Δ % 2008–2014
GDP PPS/inhab.					
EU	21,100	26,000	27,500	23.22	5.77
Spain	21,100	26,300	25,000	24.64	−4.94
Extremadura	13,500	18,000	17,300	33.33	−3.89
Regional Development Index (RDI)					
EU	0.452	0.491	0.486	8.62	−1.02
Spain	0.477	0.533	0.474	11.74	−11.07
Extremadura	0.359	0.444	0.424	23.7	−4.50

Source: author's calculations on Eurostat data; and Madeira (2019).

Although not as weak as that of Spain as a whole and as that of most of its NUTS2 regions, the behaviour of GDP PPS/inhabitant in Extremadura after 2008 represents a strong deterioration compared to the previous period, both in absolute and relative terms. Between 2002 and 2008, there had been a strong increase in Extremadura's GDP per capita in PPS and convergence with the EU and Spain. A similar trend was recorded in the RDI, but with a less strong increase in its value.

The differences in Extremadura's evolution after 2008 in terms of GDP/PPS inhabitant and RDI are mainly the result of a positive evolution of the variables of a social nature used to calculate the RDI, unlike the variables of an economic and demographic nature (see Table 3). These values are consistent with the information gathered during interviews in the region on the role that cohesion policy played there between 2008 and 2014. Additionally, they confirm the interest in using variables complementary to GDP to measure development and well-being.

The above data suggests that Extremadura has been somewhat protected in the context of the 2008 crisis in Spain, but not enough to prevent its socio-economic situation from deteriorating, both in absolute terms and in the context of the EU. This justifies its choice

as a case study to understand how the cohesion policy and the way it has been applied in this autonomous community contributed to its relative protection, however without preventing its divergence from the EU.

Table 3. Evolution of the main components of Extremadura's RDI before and after 2008.

Space/Time	2002	2008	2014	Δ % 2002–2008	Δ % 2008–2014
Regional Development Index (RDI)	0.359	0.444	0.424	23.59	−4.53
Economic variables	0.254	0.342	0.319	34.32	−6.61
Social variables	0.605	0.682	0.697	12.72	2.22
Demographic variables	0.323	0.410	0.360	27.07	−12.28

Source: author's calculations on Eurostat data; Madeira (2019).

4.3. Extremadura's Evolution after 2014

The evolution of Extremadura's GDP after 2014 was positive, with some convergence with the EU and Spain in the first years (see Table 4), but after 2017 it regressed slightly and stagnated until 2019 (year with the most recent data available). Spain as a whole had a similar trajectory, with some increase in the initial years and decrease after 2017, but without any convergence with EU values.

Table 4. Extremadura's evolution under RIS3 agenda.

Space/Time	2014	2015	2016	2017	2018	2019	Δ % 2014–2019
GDP PPS/inhab.							
EU-27	26,600	27,500	28,200	29,300	30,200	31,200	17.29
Spain	24,000	25,100	25,900	27,200	27,600	28,400	18.33
Extremadura	16,800	17,800	18,500	19,800	20,200	20,900	24.40
GDP PPS/inhab. in % of EU-27							
EU-27	100	100	100	100	100	100	0.00
Spain	91	91	92	93	91	91	0.00
Extremadura	63	65	66	68	67	67	6.35
Population (millions)							
EU-27	442.88	443.67	444.80	445.53	446.21	446.45	0.80
Spain	46.51	464.50	46.44	46.53	466.58	46.94	0.91
Extremadura	1.10	1.09	1.08	1.08	1.07	1.07	−2.83
Active population (millions)							
EU-27	210.57	210.94	211.98	212.98	213.53	214.36	1.80
Spain	22.95	22.92	22.82	22.74	22.81	23.03	0.32
Extremadura	0.504	0.503	0.501	0.495	0.496	0.498	−1.21
% of employed population							
EU-27	42.4	42.8	43.3	43.9	44.4	44.8	5.68
Spain	37.3	38.5	39.5	40.5	41.4	42.1	13.01
Extremadura	32.3	32.7	33.5	33.9	35.4	36.7	13.61
Unemployment rate (%)							
EU-27	10.9	10.0	9.1	8.1	7.3	6.7	−38.15
Spain	24.4	22.1	19.6	17.2	15.3	14.1	−42.29
Extremadura	29.8	29.1	27.5	26.2	23.6	21.5	−27.71
% of population aged 20–64 employed							
EU-27	67.3	68.2	69.3	70.5	71.4	72.2	7.31
Spain	59.4	61.5	63.4	65.1	66.8	68.0	14.52
Extremadura	52.3	53.0	54.2	54.9	57.4	59.6	13.88
Population aged 20–64							
EU-27	268.91	268.10	267.56	266.71	265.98	265.10	−1.41
Spain	28.86	28.66	28.53	28.48	28.46	28.57	−1.02
Extremadura	0.669	0.666	0.662	0.656	0.651	0.646	−3.38

Source: Eurostat data and authors' calculations.

The region experienced a continuous demographic shrinkage over this period, of almost three per cent, which contrasts with a slight increase of the population in Spain and the EU-27. This is a sign of problems linked to lack of dynamism and some inability to retain the local labour force. Moreover, there was also a decline in the active population, of 1.21 per cent, in contrast with a small increase in the country and an increase of almost two per cent in the EU.

The decrease in the active population was not as strong as that of the population as a whole and occurred simultaneously with a strong increase in the percentage of the employed population and a significant decline in the unemployment rate, which even so in 2019 remained above 20%. However, while the rise in the employed population occurred roughly in line with what happened in Spain and at a higher rate than in the EU, the 27.7% drop in the unemployment rate fell well short of what happened in the country and in the EU, where the decreases were around 40%.

One of the objectives of the Europe 2020 growth and jobs strategy (EC 2010a), which underpins the adoption of RIS3 in the 2014–2020 programming period of the cohesion policy, was that in that year 75% of the population aged between 20 and 64 should be employed, the target adopted for Spain being 74% (de Extremadura [2013] 2016, p. 17). The evolution of this variable in Extremadura was positive throughout the period considered, at a more intense pace than in the EU. Even so, in 2019 its value was still well below that of Spain and the Union.

It is worth noting that in the same period the population of this age group fell by more than three per cent in the region, which explains part of the percentage increase in its employment. Moreover, it should be considered that the demographic decline in the region has contributed to a positive evolution in employment and unemployment indicators, since the decrease in population generates less availability of workforce and, therefore, a simple stagnation in the number of employees is accompanied by an increase in their percentage weight in the population as a whole; in parallel, the unemployed population tends to have a greater propensity to emigrate.

In summary, for the period when RIS3 was in force for which data are already available, the region's performance can be said to have been poor. There has been some convergence, but not enough to compensate for the divergence in the previous period. Additionally, as of 2017 this process came to a halt. The demographic decline was continuous between 2014 and 2019. The main labour market indicators show an ambiguous track, with a percentage decrease in the unemployment rate in Extremadura lower than in the EU, while there was convergence in terms of percentage of the employed population.

This limited convergence, with stagnation at the end of the period, occurred during a cycle of economic expansion, which points to some shortcomings of the cohesion policy in place. Since in the previous period it had already been unable to prevent the divergence of the region (and regional divergence in the EU in general), it is important to take a critical look at its general logic and the main aspects of its operation.

5. The Role of the 2007–2013 Period Policies and of the RIS3 Logic

Cohesion policy for the period 2007–2013 was formulated very much in line with the EU's policy priorities arising from the Lisbon Agenda and was, therefore, directed primarily at promoting competitiveness and creating jobs (EC 2006a). It was decided that 60% of the expenditure under the Convergence Objective and 75% of the expenditure under the Competitiveness and Employment Objective would go to those priorities in all EU member states by 1 May 2004.

Member States were required to produce national reference documents on their development strategy (known as National Strategic Reference Frameworks), which would constitute the framing for regional programmes. This was the case in Spain and Extremadura, since its GDP PPS was below 75% of the EU-25 in the period 2000–2002, thus being eligible for funding under the Convergence Objective. The strategic guidelines for cohesion policy focused on (i) making Europe and its regions more attractive places to

invest and work, (ii) improving knowledge and innovation for growth and (iii) creating more and better jobs (EC 2006b). The second guideline was directed mainly at investment in innovation and technological development and information society issues.

In the Strategic Framework of Convergence of Extremadura (MECEX) 2007–2013, drafted by the regional authority, the objectives of increasing competitiveness and employment, together with growth, were assumed (de Extremadura 2006, p. 99). The document established two final objectives: to achieve a rate of economic growth that would make it possible to continue to bring Extremadura's levels of per capita product and employment closer to those of the most developed economies, boosting the region's process of real convergence; and to extend the benefits derived from socio-economic progress to the whole of Extremadura's territories and citizens, in order to achieve high levels of cohesion in the Autonomous Community.

The results of the cohesion policy in Extremadura in this period can be assessed through the indicators in Tables 2 and 3 and the 12 interviews carried out during fieldwork in the region. As seen above, Extremadura's level of development and well-being measured by GDP PPS/inhab. and RDI diverged from that of the EU as a whole. This means that the first final objective of Mecex was not accomplished. The fulfilment of the final objective concerning territorial and social cohesion was the subject of a controversial evaluation, tending to be negative. Five interviewees said it had not been achieved, four gave answers pointing to partial achievement of this objective and only three replied that it had been achieved.

Those interviewed who said they did not detect relevant advances in cohesion within Extremadura mentioned aspects such as the lack of homogeneity in the distribution of growth in recent years, which has been concentrated in the region's largest cities, with greater inequality at the beginning of 2017 than before the crisis and growing exclusion in profiles that include the long-term unemployed, foreigners, single-parent households and run-down neighbourhoods.

From the interviews it emerges that regional policy in this period was essentially implemented according to plan in terms of priorities, but less so in terms of actions. ESF actions relating to the labour force were often criticised for not having prevented the deterioration of the labour market, despite the fact that this fund played an important role in cushioning the effects of the crisis. EAFRD actions were in some cases criticised for not having achieved sufficient results in modernising the agricultural sector.

As for the financial execution (Table 5), it was significantly below the planned amounts, essentially due to the low execution of the funds available from the ERDF, judging by the values in the financial plans of the operational programmes of the various funds for this period and by the respective values of total expenditure presented by Ramajo et al. (2014).

Table 5. Amounts planned and received by Extremadura in the 2007–2013 Multiannual Framework.

Fund	Amounts Spent 2000–2006	Planned Amounts in OPs 2007–2013	Change from 2000–2006	Amounts Spent 2007–2013	Change from 2000–2006
ERDF	1837	1975.2	7.5	1319.4	−28.2
ESF	710.8	333.4	−53.1	550.4	−22.6
EAFRD	459.4	828.3	80.3	863.2	87.9
Cohesion F.	0	n.a.	n.a.	27.2	n.a.
Total	3007.2	3136.9	4.3	2760.1	−8.2

Sources: Operational Plans of the ERDF, ESF, FEAGA of Extremadura and Cohesion Fund of Spain; Ramajo et al. (2014, p. 119). Note: figures (in EUR million) refer to total expenditure, including EU funding and national co-financing; the territorial scope of the Cohesion Fund is Spain, and the respective OP does not provide forecasts for the amount to be applied in each region.

The fact that the actions of the various operational programmes seemed appropriate and, at least in part, were implemented as planned did not ensure that the final objectives were achieved. The first (convergence) even suffered a regression and the second (territorial and social cohesion) was not fulfilled, first of all because its basic assumption was not confirmed—the existence of socioeconomic progress in the period concerned. This in a

context in which the funds with the lowest financial execution were precisely those more directed to development—the ERDF and the Cohesion Fund.

The violence of the 2008 crisis and the socio-economic deterioration in the following years do not allow an assessment of the EU regional policy in the period under study from the point of view of its functioning if the assumptions on which it was designed had been maintained. However, it allows us to see that it failed to ensure the original objective of these policies—convergence—and that some of the problems that were pointed out by interviewed agents would remain in a context of evolution in continuity. This is the case of the tendency to devalue work and the lack of adequate development of many companies in face of what the policies assumed, what limited the level of evolution of the economic fabric in comparison with what was intended.

It should be noted that, throughout the interviews, the 2008 crisis is often referred to as a central aspect of the results of EU regional policy and its implementation in Spain and Extremadura. It is based on this that half of the interviewees did not consider that this policy had failed in the studied period. What was most frequently criticised was the impossibility of modifying operational programmes, even in situations of radical change in the assumptions of the macroeconomic scenarios, as happened in this case.

It is also relevant, in this context, that the directives that placed the objectives of increasing competitiveness and employment (originating in the Lisbon Strategy) at the centre of the cohesion policy and of regional development policy in the 2007–13 period have not guaranteed the maintenance of convergence nor ensured an improvement in the labour market—there was even a strong decline in total employment in the region. The deterioration of the labour market can also be seen as a failure, at least in a context of acute crisis, of the objectives and actions of the ESF, which were very much focused on employment and employability.

In the following programming period, cohesion policy and its structural funds were mobilized as key delivery mechanisms to achieve the EU priorities of smart, sustainable and inclusive growth in Member States and regions (EC 2010a, p. 21), known as the “Europe 2020 Strategy”, and also as the “Europe 2020 growth and jobs agenda”. This has mainly been pursued through the adoption of the research and innovation strategies for smart specialisation (RIS3), as explained in Section 2.

This agenda, maintaining the previous strategy’s objective of building a knowledge-based society, seeks to steer Europe towards “a smart, sustainable and inclusive economy with high levels of employment, productivity and social cohesion” (EC 2010a, p. 5). It adopted three priorities, which are intended to be “mutually reinforcing”:

- Smart growth: developing an economy based on knowledge and innovation.
- Sustainable growth: promoting a more resource efficient, greener and more competitive economy.
- Inclusive growth: fostering a high-employment economy delivering social and territorial cohesion.

The RIS3 approach was considered relevant for these priorities and consistent with the aims and tools of the EU cohesion policy, promoting growth and jobs across EU countries and regions (Foray 2012). It allows a strategy “for every national and regional economy, including both leader and less advanced territories” (Foray 2012, p. 9), assuming that “all regions have a role to play in the knowledge economy, provided that they can identify comparative advantages and potential and ambition for excellence in specific sectors or market niches”.

In the case of Extremadura, its RIS3 was designed as “an integrated agenda for the economic transformation of the region to ensure a more efficient use of public funds, stimulate private investment and help concentrate resources in a limited number of key sectors” (de Extremadura [2013] 2016, p. 9). It had the objective of promoting the scientific and technological leadership of the region in the sectors where a high growth potential has been identified, which are listed in Table 6.

Table 6. Extremadura’s RIS3 pattern of specialisation.

Priority Sectors	Main Activities to Be Developed	Trans-Sectorial Technological Domains
Agri-food	Agricultural technologies Veterinary Food technology	Agronomy, biology and ecology
Clean energy	Manageability, energetic efficiency and technologies of solar thermal and photovoltaic generation, hydropower, biogas and biomass	Electronics and automation
Tourism	Nature, cultural, gastronomic, health and experience tourism. This area includes cultural and creative industries, commerce and hospitality.	Ecodesign and new Materials
Health	Tele-medicine, tele-assistance, food-health, chronic patients monitoring, personalised medicine, regenerative medicine and reproduction.	Chemistry, biochemistry and biotechnology
Information and communication technologies	Data management Cloud computing Opensource software Mobile networks and systems Content Cybersecurity and digital trust Internet and social networks	Software engineering and computers

Source: elaborated based on the *Estrategia RIS3 de Extremadura 2014–2020*, p. 129.

In the same document, it is explained that the choice of these sectors and the strategy in general are the result of a consensual vision that aims to “position Extremadura as a space for innovation in the sustainable management of natural resources for the generation of energy and industrial uses, and in the application of technology to improve the quality of life of the population” (de Extremadura [2013] 2016, p. 11).

Agenda 2020 and RIS3 can be applied to all regions if we adopt as a methodology for identifying their comparative advantages the search for the sectors in which they are most specialised, as happened in the case of Extremadura (de Extremadura [2013] 2016, p. 90–129). However, as shown by the data in Table 4, this does not always ensure a convergent trajectory. In the first years of this programming period, there was some convergence. However, it peaked in 2017 and until 2019 there was relative stagnation in the context of the EU. Furthermore, the dynamics in the first years of the programming periods are to some extent related to what was in place in the previous years. This points to a limited role for Extremadura’s RIS3 in the region’s convergence after 2014.

It can be argued that, as discussed in Section 2, research and innovation strategies for smart specialisation (RIS3) were not designed to promote regional convergence. However, RIS3 has been adopted as central to cohesion policy in the 2014–2020 programming period, which aims to produce convergence in the regions covered by the policy objective with that same designation. They could therefore be expected to contribute to the convergence of these regions, within the framework of a policy that has other important components as well.

It is possible to admit that in the case of Extremadura there may be shortcomings in other components of the cohesion policy. However, during the fieldwork in 2017 it emerged that the region had good infrastructures, with exception of the railway. The problems most frequently pointed out in the interviews were related to the lack of economic dynamism and low technological capacity of part of the business fabric. Thus, it is particularly relevant

to try to understand some of the results of Extremadura's RIS3 in the sectors and activities that were chosen for its smart specialisation strategy.

The data available on Eurostat cover relevant aspects of the agricultural sector and of the most knowledge and technology intensive activities (Table 7). The variables for activities related to the valorisation of agricultural products (transformation of agricultural products and agriculture net value added at basic prices) show a much more intense evolution than occurred in Spain as a whole from 2014 to 2019. The same was true for agricultural employment, which rose at a much faster rate than in Spain, in a context of retrenchment in the EU. This shows that the focus on agri-food, associated with the development of agricultural and food technologies, has brought positive results.

Table 7. Trends in some sectors directly concerned by RIS3 in Extremadura.

Space/Time	2014	2018	2019	Δ % 2014–2018/19
Transformation of agricultural products (million euro)				
EU-27	n.a.	n.a.	n.a.	n.a.
Spain	145.91	170.14	n.a.	16.61
Extremadura	2.55	5.88	n.a.	130.59
Agriculture net value added at basic prices (million euro)				
EU-27	n.a.	n.a.	n.a.	n.a.
Spain	17,745.3	23,391.4	n.a.	31.82
Extremadura	700.1	1342.0	n.a.	91.69
Employment in agriculture, forestry and fishing (thousands)				
EU-27	8974	8057	7901	−11.96
Spain	724.90	797.90	781.60	7.82
Extremadura	38.20	50.80	47.30	23.82
Gross domestic expenditure on R&D (millions of euros)				
EU-27	248,550.4	294,919.3	n.a.	18.66
Spain	12,820.8	14,946.0	n.a.	16.58
Extremadura	116.0	122.0	n.a.	5.16
Employment in high-technology sectors (high-technology manufacturing and knowledge-intensive high-technology services) (thousands)				
EU-27	7119.4	7872.4	8192.6	15.07
Spain	629.1	699.0	732.2	16.39
Extremadura	5.2	5.4	5.8	11.54
Employment in high-technology sectors (high-technology manufacturing and knowledge-intensive high-technology services) (%)				
EU-27	3.8	4.0	4.1	7.89
Spain	3.6	3.6	3.7	2.78
Extremadura	1.5	1.4	1.5	0.00

Data source: Eurostat's Economic accounts for agriculture, Eurostat's Labour Force Survey, Eurostat's Research and Development Statistics (authors' calculations).

Although, when it comes to the more technical-scientific activities, the variables analysed show a disappointing performance. The value of gross expenditure on research and development in the region rose by just over five per cent from 2014 to 2019, while in Spain and the EU it grew by over 16 and 18 per cent, respectively. This was accompanied, in the same period, by a percentage growth in the number of jobs in high-tech sectors below that of Spain and the EU, without their percentage weight in the region's total employment having any relevant change.

In short, a relatively low-technology-intensive sector such as the agri-food industry has apparently experienced intelligent specialisation, with an increase in the processing of raw materials and, associated with this, an increase in added value and employment. However,

the evolution of indicators relating to R&D and employment in high-tech activities in Extremadura is disappointing. Even if in the other sectors covered by RIS3 there may have been positive developments, they have not ensured a consistent convergence of Extremadura nor have they implied a great intensification of investment and employment in technology-intensive activities.

This development is consistent with what we were told during the fieldwork in 2017 about the region's economic fabric, which did not have the capacity to take full advantage of the cohesion policy instruments in the 2007–2013 programming period, because they required a technological capacity not available in many of its small and medium-sized enterprises. This is, moreover, a limitation of the smart regional specialisation strategy applied to this period, which illustrates the idea, already mentioned, that more developed regions are better positioned than the others to benefit from a development strategy based on research and innovation.

The above makes clear the similarities between the two periods of cohesion policy analysed here based on the case of Extremadura. There are parallels between both the objectives of the Lisbon Agenda and those of the Europe 2020 Strategy, with the former focusing on the knowledge economy and competitiveness, and the latter on that of smart, sustainable and inclusive growth in Member States and regions. This has led to cohesion policy focusing in the first of these periods on competitiveness and employment objectives to be achieved based on investment in innovation and technological development; and, after 2014, on research and innovation strategies for smart specialisation (RIS3).

That is an additional reason why (based on the case of Extremadura) the assessment of the 2007–2013 period and of what is already known about the region's dynamics after 2014 makes it possible to draw some conclusions about the suitability of RIS3 for cohesion policy—especially from the perspective that it should ensure the convergence of the poorest regions.

6. Conclusions

The divergence of Extremadura after 2008 does not mean that cohesion policy has not made a positive contribution to its evolution. The data analysed and the interviews carried out show that it played a role as a social buffer from the effects of the deep crisis that the region went through. This is reflected in the fact that the evolution of the RDI in Extremadura has been less negative than in Spain, and the divergence from the EU is also lower in this indicator (which includes social variables) than when considering GDP alone.

However, the weakness of cohesion policy in this period and of its regional development instruments to achieve their objectives in a context of widespread crisis in the EU has become clear. Additionally, we know that crises are recurrent, even acute. We are indeed facing the consequences of a new recession of historic dimensions, due to the shutdown of large segments of economic activity in Europe following the pandemic of COVID-19.

One of the reasons for this mismatch has been revealed through what then was the quasi-impossibility of modifying Regional Operational Programmes even in situations of radical change in the assumptions underpinning their macroeconomic scenarios, as happened after 2008. This was one of the reasons why, during a severe crisis, the funds allocation of the cohesion policy for Extremadura was below what had been planned and below what had been spent in the previous period. This problem has been resolved, at least in part, in the Common Provisions Regulation for the period 2021–2027.

The limited capacity of part of the regional business fabric to absorb funding and innovate in technological areas and even to benefit from some information technology measures also contributed to the limited role of cohesion policy in the region after 2008. This brings us to the next period of cohesion policy and its logic based on RIS3.

What is already known of Extremadura's evolution in the ensuing cohesion policy programming period reveals results with limited scope. There was some convergence until 2017, which then stopped. The continued population shrinkage between 2014 and 2019 helped that there was a favourable evolution of the percentage of employed population

and of the unemployment rate (which nevertheless remained very high), but it configures a situation of repulsion that directly questions the cohesion policy in force and its results.

This is not to say that convergence is being poor because of, or as a result of, RIS3; just as in the previous period divergence did not happen because of, or as a result of, the regional policy then in place. What can be said with certainty is that the poor convergence in the period 2014 to 2019, like the divergence in the previous period, happened even though regional development policies whose objective is convergence were in place.

The information provided here is not sufficient to make a full assessment of the role of RIS3 as a core strategy for regional development and convergence of this region and for convergence in the EU in general. However, it gives us some lessons and allows us to draw some conclusions, even if they are preliminary. In a convergence objective region like Extremadura, its RIS3 has allowed it to evolve with smart specialisation in a low technological intensity sector, such as the agri-food industry. However, until near the end of its term, it has not led to convergence of the region with the EU in terms of investment and employment in high technology sectors, and there was even divergence in these indicators.

It was precisely when RIS3 for the 2014–2020 cohesion policy period should already be at full speed that Extremadura's convergence came to a halt, with the trend of population loss remaining in place. The employment indicators that have continued to evolve favourably in Extremadura, namely an increase in the employed population and a fall in the unemployment rate, have been carried out so much in line with the national trend in Spain, which also points to a limited role for the cohesion policy based on RIS3 in the region.

Thus, it is necessary to return to the above problem that *prima facie* smart specialisation appears to discriminate against backward regions and contradicts the very *raison d'être* of regional policy. It seems that it is more than *prima facie* so. Considering also that cohesion policy has additional elements to help regions of this type to deal with their weaknesses, the poor results obtained in Extremadura until near the end of the term of its RIS3 suggest a problem with adopting this logic as a major pillar of regional development in the EU, if the objectives concerning convergence and correction of regional imbalances in the EU treaties are to be taken seriously. This raises the problem of spatial justice at the regional scale (Madeira and Vale 2015), that relates with the geography of discontent.

Since the smart specialization argument relies on “employing appropriately designed local knowledge- and learning-enhancement tools in regional policy” (McCann and Ortega-Argilés 2015, p. 1295), RIS3 will naturally have more favourable contexts for their successful implementation in regions that are more advanced from this point of view, which are typically those of large metropolises and regions that lead in knowledge or with large industrial centres close to the technological frontier. However, these regions tend to be diversified enough already and are not main recipients of regional development policies. So, here the smart specialisation strategy is of little relevance.

In the case of poorer, lagging and/or isolated regions, the possibilities of smart specialisation are limited, as noted in Section 2. The already known trajectory of Extremadura after 2014 gives some empirical basis to this idea in the context of the 2014–2020 cohesion policy programming period. This also provides support for McCann and Ortega-Argilés's idea that this type of approach seems to be best suited for intermediate industrial regions, which is typically the case for problem regions in the richer EU countries. Additionally, it confirms to some extent what was clear from the theoretical perspective of the question—that the strategy for growth and jobs 2020 and its mobilisation of the structural funds lead to a regional policy which was not primarily designed to the convergence objective.

This limitation does not mean that RIS3 cannot produce important results in lagging regions, including Extremadura. It just means that they are unlikely to contribute strongly to converging regional dynamics. This is a topic where more research is needed, to fully understand the role of RIS3 in this period of cohesion policy and more specifically in lagging regions. On the one hand, it is not surprising that empirical work on the role of

RIS3 in regional convergence in the EU is scarce, as there is not yet complete information on the 2014–2020 period. However, on the other hand, given the existing doubt at the outset about the appropriateness of smart specialisation as a strategy to be applied to peripheral and lagging regions, it would not be surprising if more reflection on this issue had been produced, even if based on partial results.

Smart specialisation and RIS3 seem, however, to have virtues that make them suitable to be an important element of an economic policy for large, developed territories such as the EU. However, for the reasons stated, they are not necessarily suitable for a regional development policy aimed at convergence. Regarding the 2007–13 period, we know that the problem with cohesion policy was general, as there was divergence among the NUTS2 in the EU, and the situation worsened in several NUTS2 of the south covered by the convergence objective. For the RIS3 period, it is still necessary to find out whether the problems with cohesion policy are specific to Extremadura, whether they may have affected more NUTS2 covered by the Convergence Objective, or whether they occurred in most of these regions. Another question to be investigated relates to possible problems with poor or insufficient implementation of RIS3 in convergence objective regions, comparing their situation in this regard with that in other EU regions.

There are important elements of continuity between the priorities adopted for cohesion policy in these two periods, as the focus on research and development and on the information and knowledge society is a feature of the cohesion policy that comes from the previous programming period, where no convergence took place. As the literature already suggested that RIS3 were likely to have little potential to produce strong results in the most peripheral and lagging regions, the inadequacy of these cohesion policy priorities to deliver major convergence results emerges as a strong hypothesis. It is therefore necessary to question the strategic options for cohesion policy that have prevailed for more than a decade, and to draw some conclusions for the next programming period.

This article did not address the possible alternative priorities for the EU cohesion policy, since the research was not oriented in that direction. The results allow however to draw some conclusions for the next programming period. If the weak convergence of Extremadura is not an exceptional case among the poorest regions, this problem should be strongly addressed, considering the weaknesses of the regional productive fabric in the lagging regions and the need to climb the technological ladder.

This means that, for Convergence Objective regions, the programming period of cohesion policy that now starts should focus less on RIS3 logic and more on their need to move closer to the EU averages. In this regard, one of the aspects that has not been given attention and that should be considered is the role of indirect regional policies (Parr 2015). This refers to those policies that do not target specific territories—they are a-spatial—but have different relevant impacts in different territories or regions.

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References

- Barca, Fabrizio. 2009. *An Agenda for A Reformed Cohesion Policy: A Place-Based Approach to Meeting European Union Challenges and Expectations*. Independent Report Prepared at the Request of the European Commissioner for Regional Policy, Danuta Hübner. Brussels: European Commission.
- Barzotto, Mariachiara, Carlo Corradini, Felicia M. Fai, Sandrine Labory, and Philip R. Tomlinson. 2019. Enhancing innovative capabilities in lagging regions: An extra-regional collaborative approach to RIS3. *Cambridge Journal of Regions, Economy and Society* 12: 213–32. [CrossRef]
- de Extremadura, Junta. 2006. *Marco Estratégico de Convergencia de Extremadura 2007–2013*. Extremadura: Junta de Extremadura, Consejería de Hacienda y Presupuesto, Noviembre de. Available online: http://www.juntaex.es/filescms/ddgg002/uploaded_files/fondos_europeos/MECEX_DEFINITIVO.pdf (accessed on 16 July 2021).
- de Extremadura, Junta. 2016. *Estrategia de RIS3 de Extremadura 2014–2020–Estrategia de Investigación e Innovación para la Especialización Inteligente de Extremadura*. 3ª Versión, Julio 2016. Extremadura: Junta de Extremadura, Consejería de Economía e Infraestructuras. First published 2013. Available online: https://s3platform-legacy.jrc.ec.europa.eu/documents/20182/380920/Estrategia_RIS3_Extremadura_v3.pdf/def4af2a-bd3d-4694-bda7-115d030ebd3f (accessed on 16 July 2021).
- EC (European Commission). 2007. *Member States and Regions Delivering the Lisbon Strategy for Growth and Jobs through EU Cohesion Policy, 2007–2013*. 11.12.2007, COM (2007) 798 Final. Brussels: Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Available online: <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0798:FIN:EN:PDF> (accessed on 16 July 2021).
- EC (European Commission). 2010a. *Europe 2020: A Strategy for Smart, Sustainable and Inclusive Growth*. Communication from the Commission. Available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52010DC2020&from=EN> (accessed on 4 May 2021).
- EC (European Commission). 2010b. *Fifth Report on Economic, Social and Territorial Cohesion—Investing in Europe’s Future*. Luxembourg: Publications Office of the European Union. Available online: https://ec.europa.eu/regional_policy/sources/docoffic/official/reports/cohesion5/pdf/5cr_en.pdf (accessed on 16 July 2021).
- EC (European Commission). 2012. *Elements for a Common Strategic Framework 2014 to 2020 the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development and the European Maritime and Fisheries Fund*. Brussels: Commission Staff Working Document.
- EC (European Commission). 2017. *Seventh Report on Economic, Social and Territorial Cohesion—My Region, My Europe, Our Future*. Luxembourg: Publications Office of the European Union. Available online: https://ec.europa.eu/regional_policy/sources/docoffic/official/reports/cohesion7/short_7cr_en.pdf (accessed on 16 July 2021).
- EC (European Commission). 2020. *European Economic Forecast Autumn 2020*. In *European Economy Institutional Papers, n° 136, Directorate-General for Economic and Financial Affairs*. Luxembourg: Publications Office of the European Union. Available online: https://ec.europa.eu/info/sites/info/files/economy-finance/ip136_en_2.pdf (accessed on 16 July 2021).
- EC (European Council). 2006a. Council Regulation (EC) N° 1083/2006 of 11 July 2006 Laying Down General Provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund and repealing Regulation (EC) No 1260/1999. Official Journal of the European Union N° L 210, of 31/7/2006. Available online: <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32006R1083> (accessed on 16 May 2021).
- EC (European Council). 2006b. Council Decision of 6 October 2006 on Community Strategic Guidelines on Cohesion (2006/702/EC). Official Journal of the European Union N° L 291, of 21/10/2006. Available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32006D0702&qid=1621196852061&from=EN> (accessed on 16 May 2021).
- Farole, Thomas, Andrés Rodríguez-Pose, and Michael Storper. 2009. *Cohesion Policy in the European Union: Growth, Geography, Institutions*, Report Working Paper. Available online: https://ec.europa.eu/regional_policy/archive/policy/future/pdf/6_pose_final-formatted.pdf (accessed on 16 September 2021).
- Foray, Dominique, Paul A. David, and Bronwyn H. Hall. 2011. *Smart Specialization: From Academic Idea to Political Instrument, the Surprising Career of a Concept and the Difficulties Involved in Its Implementation*. MTEI Working Paper, École Polytechnique Fédérale de Lausanne. Available online: <https://www.semanticscholar.org/paper/Smart-specialisation-From-academic-idea-to-the-of-a-Foray-David/29ad6773ef30f362d7d3937c483003d974bc91c5> (accessed on 16 July 2021).

- Foray, Dominique. 2012. *John Goddard, Xabier Goenaga Beldarrain, Mikel Landabaso, Philip McCann, Kevin Morgan, Claire Nauwelaers; Raquel Ortega-Argilés*. Guide to Research and Innovation Strategies for Smart Specialisations (RIS 3). Regional Policy, May 2012. Available online: https://ec.europa.eu/regional_policy/sources/docgener/presenta/smart_specialisation/smart_ris3_2012.pdf (accessed on 12 April 2021).
- Gordon, Ian R. 2018. In what sense left behind by globalisation? Looking for a less reductionist geography of the populist surge in Europe. *Cambridge Journal of Regions, Economy and Society* 11: 95–113. [CrossRef]
- Guilluy, Christophe. 2014. *La France Périphérique—Comment on a Sacrifié les Classes Populaires*. Paris: Champs Actuel, Flammarion.
- Hadjimichalis, Costis, and Ray Hudson. 2014. Contemporary Crisis Across Europe and the Crisis of Regional Development Theories. *Regional Studies* 48: 208–18. [CrossRef]
- Hadjimichalis, Costis. 2018. *Crisis Spaces—Structures, Struggles and Solidarity in Southern Europe*. London and New York: Routledge.
- Madeira, Paulo-Miguel, and Mário Vale. 2015. Desigualdade e espaço no capitalismo contemporâneo: Uma questão de (in)justiça territorial? [Inequality and space in contemporary capitalism: A question of territorial (in)justice?]. *Geosp-Espaço e Tempo (Online)* 19: 196–211. Available online: <http://www.revistas.usp.br/geosp/article/view/102771> (accessed on 16 July 2021).
- Madeira, Paulo-Miguel, Katielle Silva, and Jorge Malheiros. 2021. The geography of the nationalist right in Portugal: Outlines of an emerging process. *Cadernos Metrópole* 23: 469–98. [CrossRef]
- Madeira, Paulo-Miguel. 2019. Dinâmicas Regionais e Políticas de Desenvolvimento Territorial—Um Olhar Cruzado entre a UE e o Brasil [Regional Dynamics and Territorial Development Policies—A Crossed Glance between the EU and Brazil]. Doctoral thesis, Instituto de Geografia e Ordenamento do Território da Universidade de Lisboa, Lisboa, Portugal. Available online: <http://hdl.handle.net/10451/42268> (accessed on 16 July 2021).
- McCann, Philip, and Raquel Ortega-Argilés. 2012. Redesigning and reforming European regional policy: The reasons, the logic and the outcomes. *International Regional Science Review* 36: 424–45. [CrossRef]
- McCann, Philip, and Raquel Ortega-Argilés. 2015. Smart Specialization, Regional Growth and Applications to European Union Cohesion Policy. *Regional Studies* 49: 1291–302. [CrossRef]
- Morgan, Kevin. 2013. The regional state in the era of Smart Specialisation. *Ekonomiaz* 83: 102–25. Available online: <https://www.euskadi.eus/web01-a2reveko/es/k86aEkonomiazWar/ekonomiaz/abrirArticulo?idpubl=79®istro=1267> (accessed on 25 August 2021).
- Moruno, Francisco M.P., and e José F.R. Preciado. 2014. La economía extremeña en perspectiva histórica: Crecimiento, convergencia y cambio estructural. In *Treinta años de Economía y Sociedad Extremeña—1983–2013*. Edited by Luis Macorra y Cano. Badajoz: Diputación de Badajoz, pp. 13–32.
- O'Brien, Karen L., and Robin M. Leichenko. 2003. Winners and Losers in the Context of Global Change. *Annals of the Association of American Geographers* 93: 89–103. [CrossRef]
- Ortega-Argilés, Raquel. 2012. The transatlantic productivity gap: A survey of the main causes. *Journal of Economic Surveys* 26: 395–419. [CrossRef]
- Parr, John B. 2015. Neglected Aspects of Regional Policy: A Retrospective View. *Environment and Planning C: Government and Policy* 33: 376–392. [CrossRef]
- Ramajo, Julián, Miguel Márquez, and Francisco De Miguel. 2014. Economic impact of the European Funds in Extremadura during the period 2007–13. *Investigaciones Regionales* 29: 113–28.
- Reis, José. 2011. Foi Bonita a festa ou adeus tristeza? In *25 Anos da União Europeia: 125 Reflexões*. Edited by Eduardo Paz Ferreira. Coimbra: Instituto Europeu da Faculdade de Direito de Lisboa/Almedina, pp. 327–31.
- Rodríguez-Pose, Andrés, and Riccardo Crescenzi. 2008. Mountains in a flat world: Why proximity still matters for the location of economic activity. *Cambridge Journal of Regions, Economy and Society* 1: 371–88. [CrossRef]
- Rodríguez-Pose, Andrés. 2018. The revenge of the places that don't matter (and what to do about it). *Cambridge Journal of Regions Economy and Society* 11: 189–209. [CrossRef]
- Rotaru, Igor. 2015. Smart specialisation in the less advanced regions. What are the key challenges? *Eurint* 2: 319–27. Available online: https://cse.uaic.ro/eurint/proceedings/index_htm_files/EURINT2015_ROT.pdf (accessed on 26 August 2021).
- Serbanica, Cristina. 2021. Smart specialisation, peripheries and EU Cohesion Policy. In *EU Cohesion Policy and Spatial Governance*. Edited by Daniel Rauhut, Franziska Sileker and Alois Humer. Cheltenham and Northampton: Edward Elgar Publishing. [CrossRef]
- Tsipouri, Lena J. 2017. Innovation Policy in Southern Europe: Smart Specialization versus Path Dependence. In *Advances in the Theory and Practice of Smart Specialization*. Edited by Slavo Radošević, Adrian Curaj, Radu Gheorghiu, Liviu Andreescu and Imogen Wade. Cambridge, London, Oxford and San Diego: Elsevier, pp. 125–55.
- UNDP. 2016. Human Development Report Technical Notes 2016. Available online: http://hdr.undp.org/sites/default/files/hdr2016_technical_notes.pdf (accessed on 25 August 2021).
- Valdmaa, Kaija, Rhiannon Pugh, and Jaanus Müür. 2021. Challenges with strategic placed-based innovation policy: Implementation of smart specialization in Estonia and Wales. *European Planning Studies* 29: 681–98. [CrossRef]
- Vale, Mário. 2012. *Conhecimento, Inovação e Território*. Lisboa: Edições Colibri.
- Vale, Mário. 2014. Economic crisis and the Southern European regions: Towards alternative territorial development policies. In *Identity and Territorial Character—Re-Interpreting Local Spatial Development*. Edited by Julia Salom Carrasco and Joaquín Farinós Dasí. València: Universitat de València, Colección Desarrollo Territorial 13, pp. 37–48.