Review
05

EN

Smart specialisation strategies in the EU

EUROPEAN
COURT
OF AUDITORS

2025

Contents

Annexes

Abbreviations

ECA team

Executive summary

I Smart specialisation is an EU regional innovation policy approach, and ´smart specialisation strategy´ (also termed an S3) in the EU context comprises a national or regional innovation strategy, which sets priorities for research and innovation spending to build the competitive advantage of the region by developing and matching its strengths to business needs. The related research and innovation funding, which smart specialisation guides, represents more than €70 billion over the two programming periods (2014-2020 and 2021-2027).

II The objective of this review is to provide useful information on what smart specialisation consists of, and how it is implemented in the EU. Smart specialisation is important as it is a pioneering place-based tool and is intended to bring an important shift from scattered investments across EU funds to a more strategic approach. This review provides description and analysis mainly based on publicly available information. It is not an audit.

III In addition, we carried out a survey of national and regional authorities and collected information through on-the-spot visits and interviews with regional authorities. We reviewed the evolution of the concept, and how it is implemented, monitored and evaluated.

IV For the 2014-2020 period, European Regional Development Fund (ERDF) -funded innovation projects were generally aligned with the strategies' priorities, supporting the investment of EU resources in the targeted sectors. This alignment was reinforced for the 2021-2027 period. However, there is no EU-level oversight to maximise the added value of the smart specialisation process beyond mere compliance. Neither are there any direct means to ensure regional priorities take account of the innovation priorities of the EU's industrial policy (such as microchips and hydrogen).

V The entrepreneurial discovery process (hereinafter referred to as 'process') is an important part of the development of such a strategy, and is designed to involve as many relevant stakeholders as possible in establishing investment priorities. It became a mandatory step for the 2021-2027 programming period, but some respondents to our survey find the process hard to apply and would benefit from clearer up to date guidance.

VI Interregional collaboration is key for ensuring smart specialisation is a success. In this regard, for example, the Commission's smart specialisation community of practice serves as a guidance, networking and support hub. The platform is designed to enhance interregional cooperation, but many regions still do not use the information available.

VII Monitoring of smart specialisation at national and regional levels has evolved throughout the years, but the approaches taken, such as the indicators used, differ significantly. Monitoring smart specialisation has proved to be challenging for the regions since the creation of the strategy concept, especially for those that are less innovative. Evaluations at regional level focus on the impact of the underlying innovation investments, rather than on the smart specialisation process itself. At EU level, the Commission has not carried out an evaluation since the smart specialisation concept was introduced in 2014 although an ongoing external study or an upcoming wider Commission's evaluation on ERDF might address this at least to some extent. However, most of the respondents to our survey indicated that they find smart specialisation concept useful.

VIII We highlight three future challenges for the Commission:

- To make smart specialisation strategies useful, they should identify meaningful priorities that optimise EU spending and are well-defined, allowing regions to set priorities with the right level of detail. There is an opportunity for the Commission to promote coherence between smart specialisation priorities and the EU's industrial policy research and innovation priorities. The S3 CoP Observatory could be better used to identify priority gaps and overlaps.

- To assess the value of smart specialisation as a process and evaluate its implementation in the EU. This evaluation should take into consideration whether the smart specialisation concept works equally well for regions of differing characteristics , or whether it needs more flexibility to meet different needs. It remains unclear whether the concept can be evaluated independently from the ERDF innovation spending that it guides. The Commission can provide support to member states on simplifying monitoring and evaluation, as highlighted by our survey results.

- To maximise the value of interregional cooperation. The Commission has the opportunity to further promote this cooperation, including by identifying and facilitating suitable areas for such cooperations, supporting less innovative regions in developing their administrative capacity, and ensuring that the suitable incentives to cooperate are in place.

Introduction

Smart specialisation

01 Smart specialisation is an innovation policy approach within the EU's regional development. It aims to help regions identify the most promising areas for their future development, and use this information to improve the allocation of cohesion policy funds[1]. Simply put, smart specialisation helps regions focus their innovation spending on their potential and actual strengths, to promote economic growth – specialising smartly. A smart specialisation strategy (hereinafter referred to as a strategy) is a plan produced by each region that outlines the priorities on which they will be investing their efforts (see ***Annex I*** for examples).

Box 1

Definition of smart specialisation strategy

"… 'smart specialisation strategy' means the national or regional innovation strategies which set priorities in order to build competitive advantage by developing and matching research and innovation own strengths to business needs in order to address emerging opportunities and market developments in a coherent manner, while avoiding duplication and fragmentation of efforts…"

Source: 2014-2020 Common Provisions Regulation (CPR).

02 The smart specialisation concept is intended to help bridge the innovation divide in the EU, defined as "*the persistence of significant variations in innovation performance among member states and regions*" and stems from structural factors. EU regions are classified into four innovation performance groups by the Commission's Regional Innovation Scoreboard. As of 2023, there were 36 innovation leaders, 70 strong innovators, 69 moderate innovators, and 64 emerging innovators.

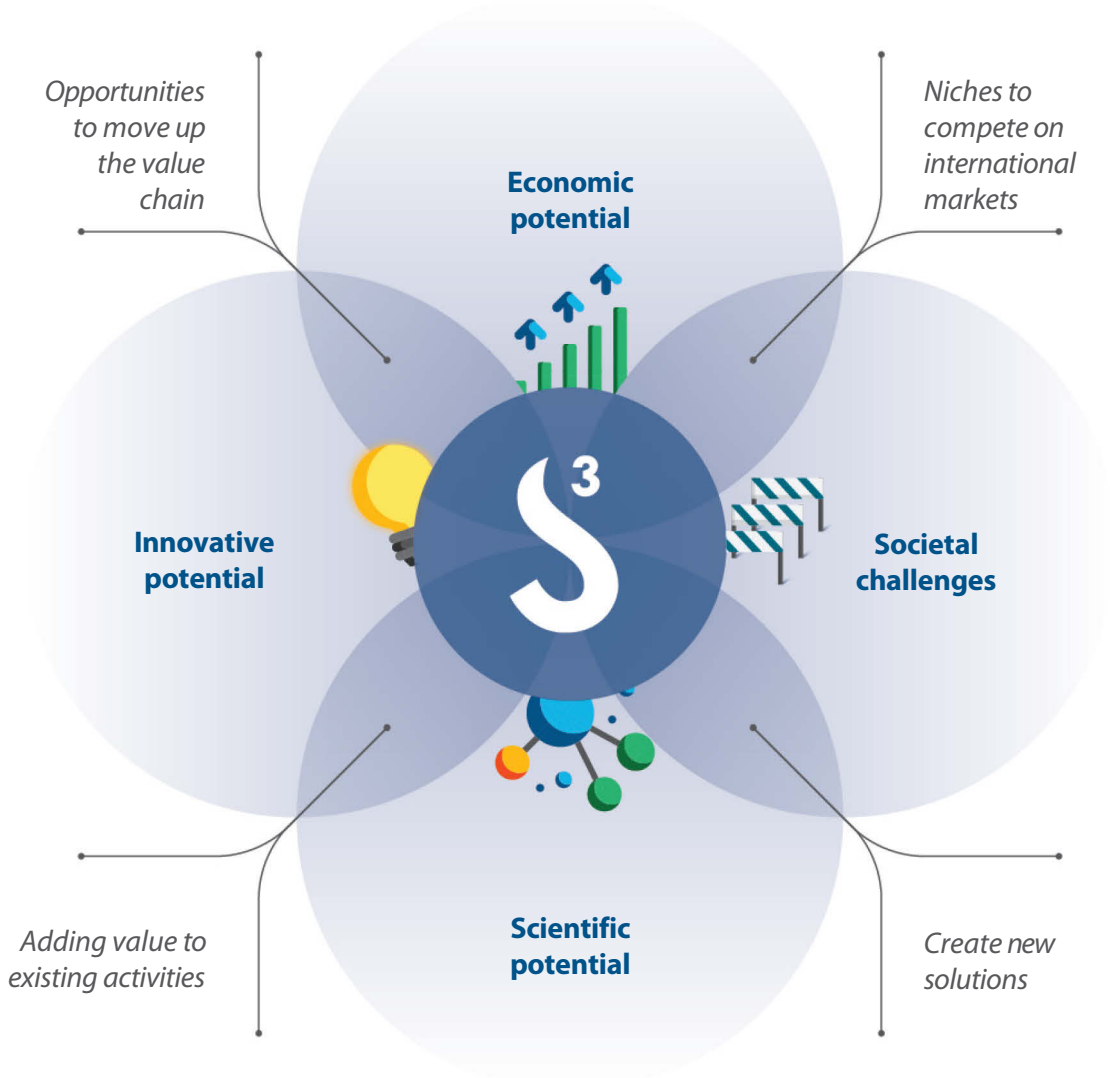
03 The European Commission introduced the smart specialisation concept in 2010 for the European Regional Development Fund's research and innovation (R&I) objectives for the 2014-2020 programming period. National and regional governments

[1] *Guide to Research and Innovation Strategies for smart specialisation (RIS 3)*, European Commission 2012.

were required to develop strategies, and in doing so identify their respective competitive advantage(s).

04 Producing a strategy was initially made a condition[2] to be able to access ERDF R&I funding for the 2014-2020 period, and was then extended to the 2021-2027 period (see ***Annex II*** for the evolution of the smart specialisation timeline). As set out in the first Commission smart specialisation strategy guide in 2012, smart specialisation is about generating unique assets and capabilities based on each region's distinctive industry structures and knowledge (***Figure 1***).

Figure 1 – Illustration of smart specialisation



Source: European Commission, the Joint Research Centre, Gómez Prieto J. et al. (2019).

[2] Regulation (EU) No 1303/2013, recital 21 and Article 19.

Roles and responsibilities

05 Responsibility for producing smart specialisation strategies lies mainly with the regional or national authorities (when a country is defined as being one region for these purposes, or complements its regional strategy with a national one). These authorities are responsible for:

- deciding on the geographical scope of these strategies;
- identifying those industrial or other commercial areas in which specialisation exists or is targeted, and deciding on the related research and innovation priorities;
- selecting suitable projects to align with the priorities;
- disbursing the funding;
- monitoring and evaluating project implementation, as well as for the strategy more generally.

06 Member state authorities and the Commission both check that regions' smart specialisation strategies comply with the CPR requirements. However, this does not include assessing and judging the suitability of the areas in which they decide to specialise, nor the priorities they select. They also have the responsibility to evaluate ERDF programmes. In addition, the Commission provides support and co-ordination. The Commission and its Joint Research Centre (JRC) together supported the regions in preparing and implementing their initial smart specialisation strategies. In 2011, the JRC established a smart specialisation platform – an online community for those involved in the preparation and implementation of these strategies. In 2023 the Commission's Directorate-General for Regional and Urban Policy (DG REGIO) replaced the platform with a smart specialisation community of practice "*a central node for guidance, networking, support and peer-learning on S3, covering its design and its implementation of the S3*". The community of practise hosts practice guides and tools, and is used to plan and organise related events.

Scope and approach

07 Smart specialisation is important as it is a pioneering place-based tool and is intended to bring an important shift from scattered investments across EU funds to a more strategic approach. Our review is intended to describe and analyse the origins, design, implementation, monitoring and evaluation of smart specialisation strategies in the EU context, including the entrepreneurial discovery process.

08 We mainly focus on the interaction of smart specialisation with the ERDF, as this represents the most material financing stream linked to the strategies. European Social Fund funding can also be linked to smart specialisation strategies through the specific objective of "skills for S3". This focuses on developing the workforce needed, but having a strategy is not a condition for receiving these funds.

09 This review is based mainly on publicly available information, in addition to material that was specifically collected for this purpose. In contrast to an audit, a review provides a descriptive and informative analysis.

10 Our reviewee is the Commission, specifically DG REGIO. We also held information meetings with representatives of several relevant organisations, academic experts and representatives of four leading innovation regions or member states: Baden-Württemberg (Germany), Denmark, Helsinki-Uusimaa (Finland) and Stockholm (Sweden). We made on-the-spot visits to innovation leader Bavaria (Germany), during which we received input from neighbouring region Oberösterreich (Austria), and to emerging innovator Extremadura (Spain), and received input from neighbouring regions Alentejo and Centro (Portugal). Across these visits we reviewed six smart specialisation projects (***Annex III***).In December 2024, we participated in the annual smart specialisation strategies conference to engage with regional representatives.

11 We have also carried out a survey of the 178 national or regional authorities participating in smart specialisation to obtain their views on various elements related to the policy and the process. The response rate was 58 % (***Annex IV***).

Development of the smart specialisation concept

The origin and principles of smart specialisation

12 While smart specialisation emerged as a concept under that name in the mid-2000s, the main principles were already common in both academic circles and regional policy debates[3]. For example, authorities in Baden-Württemberg, one of the EU innovation leaders, explained to us that they were practising priority-based regional innovation planning as far back as the early 1990s. In the context of the 2000 Lisbon Strategy – with the aim of making the EU the most competitive and dynamic knowledge-based economy in the world – the Directorate-General for Research and Innovation (DG RTD) brought together a group of growth and innovation economists to form the Knowledge for Growth group. This group devised ideas for achieving sustainable growth and tackling the innovation gap between Europe and United States[4].

13 Although the initial focus was on research competitiveness[5], the concept was devised at a time when regional innovation – which had already been part of cohesion policy since 1993 – was considered a priority by DG REGIO. By the 2000s, most regions were supporting innovation with ERDF funding[6]. The Commission identified persistent problems, such as the lack of sound analysis of regional strengths in this area[7]. Smart specialisation was therefore seen as a way to address the issue, and was discussed as a potential way forward in the 2009 Barca Report on reforming cohesion. The Commission announced that it would be incorporating the concept into cohesion policy in a 2010 Communication.

---

3 Foray D., *Smart Specialisation: Opportunities and Challenges for Regional Innovation Policy* 2015, p. 10.

4 *Knowledge for Growth: Prospects for science, technology and innovation*, Directorate-General for Research and Innovation, 2009, p. 5.

5 Foray D., *Smart Specialisation: Opportunities and Challenges for Regional Innovation Policy*, 2015, p. 16.

6 *Ibid.*

7 *Guide to Research and Innovation Strategies for smart specialisation (RIS 3)*, European Commission, 2012.

14 Smart specialisation rapidly evolved from a concept developed by a DG RTD working group to becoming an integral part of cohesion policy. The concept was included in the Common Provision Regulation[8] (CPR) in 2013, which governs the five EU funds implemented under shared management.

15 The 2014-2020 CPR established smart specialisation prerequisite (or as an *ex ante* conditionality[9]) to access funding for thematic objective 1: "strengthening research, technological development and innovation". The co-legislators regarded this as a way to help ensure the effective and efficient use of the EU structural and investment funds involved.

16 The European Parliament Research Service[10] noted that smart specialisation had been developed and implemented without being tested and without much implementation experience in EU regions. In addition, research on its introduction has found that at the point of implementation, the theory underpinning the concept was still weak, and it lacked an adequate evidence base, sufficient transparency, and verifiability[11].

17 As the 2014-2020 CPR preceded the 2018 Better Regulation agenda, an *ex ante* smart specialisation evaluation was neither mandatory nor performed. The regulation included three fulfilment criteria to help ensure that national or regional smart specialisation strategies were effective (***Table 2***). Guidance in the form of a general orientation document was issued in May 2012. It laid down certain general, non-binding principles ("the four Cs") and defined a six-step approach to preparing smart specialisation strategies (***Table 1***).

---

[8] Regulation (EU) No 1303/2013.

[9] Ibid, Article 2(3).

[10] EPRS, *Smart specialisation: The concept and its application to EU cohesion policy*, 2016.

[11] Foray D., *Smart Specialisation: Opportunities and Challenges for Regional Innovation Policy*, (2015), p. 16.

Table 1 – The four general principles of smart specialisation strategies and the six steps to design them

Four general principles (the "four C's")	Six design steps
o (Tough) Choices and critical mass (have few priorities in the international value chain, avoid duplication and fragmentation) o Competitive advantage (match R&I potential with business using the entrepreneurial discovery process) o Connectivity and clusters (match what you have with what the rest of the world has) o Collaborative leadership	o Analyse the regional context and the potential for innovation o Set up a sound and inclusive governance structure o Produce a shared vision of the region's future o Select a limited number of priorities for regional development o Establish suitable policy mixes o Integrate monitoring and evaluation mechanisms

Source: ECA, based on the 2012 S3 guidance.

18 In 2014, a European Parliament resolution stated that smart specialisation is a dynamic, long-term process. It acknowledged that developing a smart specialisation strategy could offer regions significant advantages in terms of the effectiveness of their research and innovation actions, while also pointing out risks related to the implementation of the concept. More specifically, in 2013, a European Parliament committee[12] identified several risks that could hinder its implementation:

- it may become merely a formal requirement (i.e. a box-ticking exercise);
- regions may concentrate on R&I alone, rather than using a broader idea of innovation that could better benefit less-advanced regions (i.e. embracing lower-tech innovation);
- in some regions there may be insufficient local administrative capacity to meaningfully implement the entrepreneurial discovery process;
- priorities may be set too broadly, meaning the resulting funding will not be sufficiently focused;

[12] Committee on Regional Development, *Working Document on smart specialisation: networking centres of excellence for an effective cohesion policy*, 2013.

- interregional cooperation might be both a time-consuming and costly process, while support provided by the Commission (through the established guidelines and the S3 platform) may not be sufficient for every region;

- possible difficulties in obtaining synergies between different funding sources, e.g. EU Structural and Investment Funds and Horizon 2020 funds.

19 In the 2021-2027 CPR, smart specialisation became a thematic enabling condition – "good governance of a national or regional smart specialisation strategy" – for spending under two specific objectives of policy objective 1 "A more competitive and smarter Europe". One of these specific objectives is about developing and enhancing research and innovation capacities and the uptake of advanced technologies, and the other specific objective aims at developing skills for smart specialisation, industrial transition and entrepreneurship. In practice, this means that a smart specialisation strategy was mandatory to access ERDF funds programmed under those specific objectives. Other specific objectives (for example, on strategic technologies for Europe platform (STEP)) can also be relevant for smart specialisation, even if enabling conditions do not apply.

20 The 2021 CPR applicable to the 2021-2027 programming period introduced seven fulfilment criteria for smart specialisation strategies, to improve the implementation of the concept and to address some of the challenges previously encountered (***Table 2***). The updated approach made smart specialisation an enabling condition and provided that compliance would be assessed throughout the funding period, with the strategy being updated as necessary. This meant it would no longer just be a one-off exercise completed at the start of the funding cycle.

Table 2 – Criteria for smart specialisation strategies presented in the Common Provision Regulation 2014-2020 and 2021-2027

Thematic objective 1: Strengthening research, technological development and innovation 2014-2020	Policy objective 1: A more competitive and smarter Europe 2021-2027
The strategy is based on a SWOT or similar analysis to concentrate resources on a limited set of research and innovation priorities	Up-to-date analysis of challenges related to innovation diffusion and digitalisation
The strategy outlines measures to stimulate private research and technology development investment	Existence of competent regional or national institution or body, responsible for managing the smart specialisation strategy
The strategy contains a monitoring mechanism	Monitoring and evaluation tools to measure performance towards fulfilling the strategy's objectives
	Functioning of stakeholder cooperation ("entrepreneurial discovery process")
	Actions necessary to improve national or regional research and innovation systems, where relevant
	Actions to support the industrial transition, where relevant
	Measures to enhance cooperation with partners outside a given member state in priority areas supported by the smart specialisation strategy

Source: ECA, based on CPRs 2014-2020 and 2021-2027.

21 While the 2014-2020 CPR preceded the better regulation agenda, the 2021-2027 CPR came after it. As highlighted in ECA opinion No 2/2020, the 2021-2027 CPR, including its provisions on smart specialisation, were not subject to an impact assessment.

22 On the other hand, impact assessments were carried out for the fund-specific regulations in a 2018 staff working document accompanying proposals for the 2021-2027 ERDF[13]. They did not, however, cover the expected impact or value of smart specialisation, nor did the document refer to any relevant evaluation findings. According to a survey conducted for the document, the highest levels of satisfaction with smart specialisation were reported in innovation leader member states, in particular Sweden, Denmark and Finland, where 80 % consider the benefits to outweigh the costs involved. This finding is to some extent at odds with the outcomes of smart specialisation envisaged by the developers of the concept, who posited that smart specialisation should not be "reserved for the best" (i.e. the most innovative regions), and that its main purpose is its transformative potential in less-advanced regions[14].

23 Interregional collaboration has the potential to lead to more successful regional innovation ecosystems[15]. Facilitating access to resources, skills and knowledge from outside the region can yield substantial benefits. Collaboration can take place on many different levels, from policy development to opening up programmes to outside partners or joint projects, and, ultimately, policy integration through joint strategies[16].

24 Research[17] suggests that smart specialisation strategies should not only identify priorities, but also actively help regions to benefit from complementary strengths and new knowledge, and to integrate into global value chains. In general, interregional connections can help regions diversify and boost resilience.

---

13 SWD/2018/282.

14 Foray D., *Smart Specialisation: Opportunities and Challenges for Regional Innovation Policy*, (2015), p. 12.

15 Bachtrögler-Unger, J., Balland, P.-A., Boschma, R., & Schwab, T., *Technological capabilities and the twin transition in Europe: Opportunities for regional collaboration and economic cohesion*, Bertelsmann Stiftung, Berlin, 2023.

16 Morisson, A. & Pattinson M., *Interregional Complementarities in innovation*, Interreg Europe Policy Learning Platform, Lille, 2024.

17 De Noni, I., & Ganzaroli, A., *Enhancing the inventive capacity of European regions through interregional collaboration*, Regional Studies, 2023; Balland, P. A., & Boschma, R., *Complementary interregional linkages and Smart Specialisation: An empirical study on European regions*, Regional Studies, 2021.

Smart specialisation and the innovation priorities of the EU's industrial policy

25 Smart specialisation, the strategic framework underpinning investments funded by the ERDF, is only one of the initiatives that supports research and innovation. The EU's Horizon programmes (Horizon 2020, with a budget of around €79 billion, and Horizon Europe, with a budget of around €97 billion) are the EU's flagship programmes for supporting research and innovation. Recent years have also seen a strengthening and a development of EU industrial policy, which also plays a role in the EU's research and innovation landscape.

26 Smart specialisation is based on a bottom-up approach, which means that choices are made by regional authorities, and involve local businesses, researchers and communities to identify the region's strengths and opportunities. Every region is covered, creating a large variety of economic and innovation profiles. In some of them, innovation does not necessarily require high tech solutions. In contrast, the Horizon programmes are mostly based on top-down approaches where the EU centrally sets its specific research and innovation priorities and allocates funding to them accordingly. The Horizon programmes are aimed at cutting-edge research and achieving scientific excellence, and the spending is highly concentrated in the more developed regions. In recent years, the Commission has also established several industrial priorities through specific strategies and targets, such as those for microchips, batteries, and hydrogen.

27 In the context of smart specialisation strategies, the Commission's role is to check their compliance with the legal requirements. It is not, however, responsible for assessing or influencing the choices made by the regions in terms of the priorities they choose (paragraph ***06***). This means that the two processes, the bottom-up definition of regional priorities and the top-down setting of EU targets and priorities, each have their own legitimacy and logic. They largely function independently, with no formal mechanism to reconcile or align priorities.

28 The R&I element of EU industrial policies (such as those on batteries, hydrogen and semiconductors) is also driven by EU priorities, and is mostly financed through the Horizon programmes. Close links between Horizon 2020 and smart specialisation were envisaged in the 2014-2020 period, with the CPR Regulation stating that the strategies should include actions to prepare actors to participate in Horizon 2020 ("stairways to excellence") and pathways to exploit Horizon results on the market.

29 The Commission emphasised the importance of synergies in a 2022 Commission notice. It also illustrated potential synergies between smart specialisation and Horizon. Among other options, this included the possibility for managing authorities to transfer ERDF funds to Horizon, to enable projects to participate therein that would not otherwise have been selected. Projects meeting smart specialisation priorities were deemed to be especially suitable for this.

30 A 2021 Commission study analysing key parameters of smart specialisation strategies found a high degree of thematic coherence between the strategies and Horizon 2020 projects. Overall, 64 % of the analysed Horizon 2020 projects could be connected to priority areas of the respective strategy. However, as noted in the 9th cohesion report in 2024, there are legal and practical difficulties in building synergies between Horizon 2020 and the ERDF. While the report does not elaborate on these challenges our special report 23/2022 on synergies between Horizon and cohesion funds identified specific difficulties, including those related to state aid rules, eligible costs and selection procedures.

Involving stakeholders: the entrepreneurial discovery process

31 Smart specialisation is fundamentally about regions establishing priorities for investment. The priorities should be selected by a process that "*draws on the collective intelligence of businesses, universities, government bodies and other key territorial actors*"[18]. This has been termed the entrepreneurial discovery process.

The principles of entrepreneurial discovery

32 Since the early 2012 Commission S3 guide, regions have been instructed to identify investment priorities through the entrepreneurial discovery process. This process is intended to be evidence-based, and to bring together key stakeholders to reflect on a region's research and innovation strengths. The aim of the process is to synthesise knowledge from science, technology and engineering, and relate it to the market needs and realities, such as growth potential, business competition and new activities[19].

33 The related knowledge is spread widely across different stakeholders. The process is intended to allow policymakers to improve their understanding of their own region. It should be where representatives from government, industry, academia and the community interact (***Figure 2***). In smart specialisation planning this is referred to as a "quadruple helix"[20]. Regional governments have a key role to play in governing this dialogue, analysing the outcomes and reflecting the impact of these outcomes on their strategies. In addition, intermediary organisations (e.g. innovation agencies, clusters[21],

---

[18] Joint Research Centre, *Assessing Smart Specialisation: The Entrepreneurial Discovery Process*, 2021.

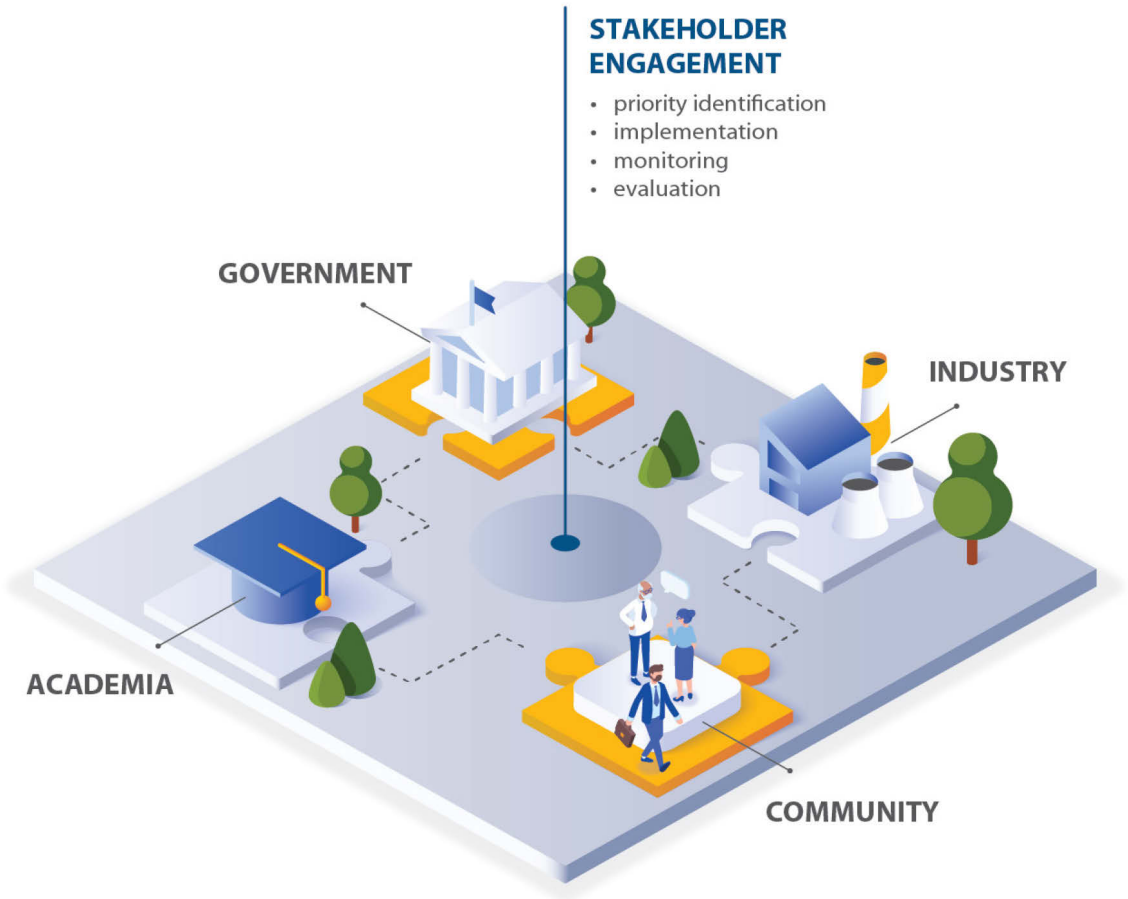
[19] Foray, D., David, P. A., & Hall, B. H. (2011), *Smart Specialisation: From academic idea to political instrument, the surprising career of a concept and the difficulties involved in its implementation*, MTEI Working Paper No. 2011-001, École Polytechnique Fédérale de Lausanne.

[20] *Guide to Research and Innovation Strategies for smart specialisation (RIS 3)*, European Commission, 2012.

[21] European Commission: Directorate-General for Research and Innovation, Cassingena Harper, J., Lubicka, B., Lindqvist, G., Ketels, C. et al., *The role of clusters in smart specialisation strategies*, Publications Office of the European Union, 2013.

business networks and business support centres) act as a bridge between different stakeholders, such as businesses, researchers and policymakers.

Figure 2 – Stakeholder engagement in the entrepreneurial discovery process



Source: ECA, based on Joint Research Centre *Assessing Smart Specialisation: The Entrepreneurial Discovery Process*, 2021.

34 Since its creation, the entrepreneurial discovery process has been subject to considerable academic research. The Commission S3 Guide (2012) and the implementation guide (2016) provide conceptual principles and guidelines on the subject. However there is still ambiguity[22] in both theory and practice in terms of how the process should adapt to regions with different economic and innovation profiles (see paragraph ***02***), how to maintain stakeholder engagement over time, mechanisms and instruments (e.g. the usefulness of thematic groups in facilitating detailed

[22] Joint Research Centre, *Assessing Smart Specialisation: The Entrepreneurial Discovery Process*, 2021.

discussions) and adequate capabilities (e.g. how to overcome stakeholders' lack of skills).

The entrepreneurial discovery process in practice

35 There is no common approach to the entrepreneurial discovery process, meaning that it is applied differently across regions and member states. Nevertheless, two JRC surveys of regional authorities responsible for smart specialisation strategies (in 2017 and 2021), revealed some common characteristics:

- in practice, it is often conducted as a "triple helix" rather than a "quadruple helix", with the "community" element (such as civil society) being left out. A Committee of the Regions study (2023) also concluded that civil society participation in these processes is extremely rare;
- in most cases, higher education institutions and research and technology organisations were highly involved in their region's process.

36 Research shows that, at least for the 2014-2020 period, the process often stops once the strategy has been designed, rather than continuing as a potentially useful forum[23]. The example below (***Box 2***) shows the challenge of maintaining stakeholder dialogue and participation throughout the lifetime of the strategy.

[23] Ibid.

Box 2

Evolution of the entrepreneurial discovery process in an emerging innovation region

During the design of the first smart specialisation strategy in 2014 in Extremadura in Spain, there was a very proactive approach to the entrepreneurial discovery process. A significant number of participants (600) were mobilised. Stakeholders were motivated to contribute by the expectation that smart specialisation could lead to a radical increase in research and innovation funding in the region.

During the implementation of this first strategy (2017 onwards), stakeholder participation declined. To manage the process, the regional authorities created a thematic working group for each of the region's five priority areas. However, the working groups ended up operating in isolation, and did not systematically join forces to identify and create synergies.

To improve the process' governance and address these issues, the region introduced collaborative open platforms for use during the 2021-2027 programming period.

Source: ECA, based on review visit Extremadura.

37 JRC research has found that intermediary institutions acting as clusters can have a positive effect on stakeholder participation levels during the implementation of smart specialisation[24]. Our visit to Bavaria (Germany) provided an example of this. Bayern Innovativ GmbH, a government-funded agency, has led cluster activities for the region since 2006. For example, the energy cluster (matching one of the region's priority areas – ***Figure 4***) connects approximately 7 000 businesses and has supported around 2 300 projects.

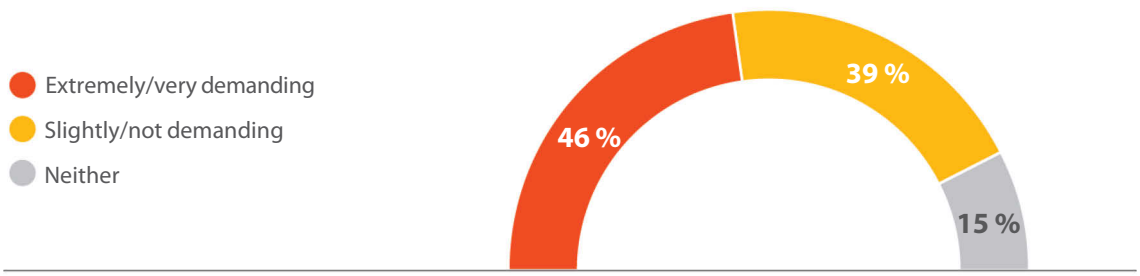
38 The entrepreneurial discovery process was widely applied in the 2014-2020 programming period, with 77 % of the total of 185 strategies using it[25]. In the subsequent programming period, the co-legislators made it a mandatory part of the smart specialisation, by introducing a corresponding fulfilment criterion (***Table 2***).

[24] Joint Research Centre, *Assessing Smart Specialisation: The Entrepreneurial Discovery Process*, 2021.

[25] *Study on prioritisation in Smart Specialisation Strategies in the EU*, Final report, European Commission, Directorate-General for Regional and Urban Policy, 2021.

39 Despite its widespread application over many years, implementation is still found to be a challenge. Our survey found that 46 % of respondents found the process "very" or "extremely" demanding (***Figure 3***). Of those, more than two thirds were regions with lower innovation capabilities, i.e. with moderate or emerging innovation profiles. Some respondents in less-populated regions indicated that they feel they are too small to develop and implement such a process effectively. They consider that they do not have sufficient administrative capacity to analyse and implement the process, and that their links with academia are often weak. A few of the respondents stated that the low number of enterprises, an absence of knowledge-intensive companies, and a lack of resources, make it a challenge to run it in a meaningful way.

Figure 3 – Around half of the respondents find the entrepreneurial discovery process "very" or "extremely" demanding



Source: ECA survey.

40 Nevertheless, even though regions find entrepreneurial discovery process a demanding criterion to fulfil, they consider it beneficial. A 2017 JRC technical report finds that almost all respondents (97 %) confirmed that it was a positive experience for them and a large majority of participants (93 %) found it to have had a positive impact when identifying priorities for investments. A 2023 Committee of the Regions study concluded[26] that the process was one of the most decisive factors for smart specialisation success. It also states that compared to the 2014-2020 programming period, the regions now are more aware of the need to involve stakeholders such as industry, institutions, researchers and civil society.

[26] *The Future of Regional Smart Specialisation Strategies: Sustainable, Inclusive and Resilient*, European Committee of the Regions; Commission for Social Policy, Education, Employment, Research and Culture, 2023, p. 94.

Implementation of smart specialisation guiding cohesion research and innovation spending

41 Having a smart specialisation strategy is a condition for receiving research and innovation funding from the ERDF. This funding is substantial as it represents more than €70 billion over the two programming periods [27]. According to the Commission, the ERDF funding guided by smart specialisation for two programming periods 2014-2027 is in total €73.8 billion:

- 2014-2020 period: Thematic objective 1: Strengthening research, technological development and innovation: €37.3 billion;
- 2021-2027 period: Policy objective 1: A more competitive and smarter Europe by promoting innovative and smart economic transformation and regional ICT connectivity: €36.5 billion.

42 Our 2022 special report on synergies between Horizon 2020 and the European Structural and Investment funds highlighted the different degrees to which member states are reliant on ERDF funding for research and innovation. For example, in Latvia, ERDF funding accounted almost for 50 % of national R&I expenditure, whereas in Germany, the share was well below 1 %. The 9th cohesion report states that around 85 % of the overall financial allocation for 2014-2020 was concentrated in less-developed and transition regions, where it is often the main source of innovation support. However, even where ERDF funds are small in the regional context, regional authorities found them useful (***Box 3***).

[27] Open Data Portal for the European Structural and Investment Funds - European Commission | Cohesion Open Data.

Box 3

Use of European Regional Development Fund in high-innovation regions for experimental projects

Despite the relatively small size of the ERDF budget compared to general innovation funding flows in these regions, authorities in both Denmark (where the ERDF's share of R&I funding represented about 0.15 % of total R&I spending annually in 2014-2020) and Baden-Württemberg (0.09 %) found S3 related funds useful as they could be used in pilot projects which were not covered by the usual funding streams in the region. In our meetings with the authorities in Baden-Württemberg, they explained that the EU funding was valuable, as they could direct it to more niche or experimental projects, which are not covered by the usual funding streams in the region.

For example in Baden-Württemberg, a flagship project "Hydrogen Valley South Baden" (an ERDF project for 2021-2027), implemented with partners from Alsace (France) and north-western Switzerland, focuses on the practical applications of future hydrogen technology for small and medium-sized enterprises.

43 One of the characteristics of the EU is that its regions vary considerably in terms of size of population or area. During the 2014-2020 programming period, 185 smart specialisation strategies were prepared across the EU[28]. In the current programming period (2021-2027), more than 170 strategies are included in the S3 Observatory (***Box 4***).

Box 4

Smart specialisation strategies cover regions which vary significantly in size

Cohesion policy makes use of the "nomenclature of territorial units for statistics" (NUTS) system, to provide a breakdown of Europe into regional units of a generally consistent size. ERDF funding is provided based on a region's economic status at the NUTS2 level, wherein regions generally contain a population of between 800 000 and 3 million. As of January 2024, there are 244 NUTS2 regions in the EU.

[28] *Study on prioritisation in Smart Specialisation Strategies in the EU*, Final report, European Commission, Directorate-General for Regional and Urban Policy, 2021.

However, this standard is not always applied when establishing the regions for which a strategy should be produced. In fact, there are no guidelines concerning the appropriate regional size for these purposes. The strategies are typically linked to the territorial coverage of the related ERDF programmes supporting investments under specific objectives 1.1 and 1.4 Strategies are applied to territories which vary significantly in size. Several strategies are made at national level, including for the Czechia, with a population of over 10 million. Other strategies are sometimes decided at the level of very small regions, such as Gotland[29] (Sweden), with a population of just over 60 000. In some cases, member states have strategies at both national and regional level (e.g. Greece, Poland, Portugal and Romania).

While some regions maintained their initial approach, others changed their design level between programming periods. For example, the Danish authorities told us that they had moved responsibility for smart specialisation from the regions to a national body (*Erhvervsfremmebestyrelse*). The reason being that the regions largely chose to specialise in the same priorities, leading to duplication. In contrast, other Nordic countries (Finland (18 strategies) and Sweden (21 strategies) have continued to maintain a regionally-driven approach.

Source: ECA, based on interviews and the information provided by the European Commission.

44 The 2014-2020 CPR stated that smart specialisation strategies aim to "*concentrate resources on a limited set of research and innovation priorities*". Consequently, the competent authorities were to define the priority areas for specialisation in their corresponding strategies. Managing authorities and implementing bodies should then have ensured that R&I funding focused on these priorities.

45 The number of priorities and the level of detail involved varies between regions. For the 2014-2020 period, regions chose between 2 and 15 priorities, and the median is five[30]. However, regions can develop sub-priorities which means that the number of areas covered can be far higher. This is illustrated by the regional innovation strategy of Bavaria, Germany, in which five priorities are divided into 25 second-level areas (***Figure 4***). Some of the sub-areas under the same priority (e.g. aerospace technology and infrastructure for future mobility) cover very different fields, that are significant enough to be treated as separate priorities.

[29] Strategi för smart specialisering i Gotlands län 2021-2027, 2021.

[30] *Study on prioritisation in Smart Specialisation Strategies in the EU*, Final report, European Commission, Directorate-General for Regional and Urban Policy, 2021.

Figure 4 – Five specialisation priority fields for Bavaria (Germany) 2021-2027 with numerous related topics and applications

© Innovationsland.Bayern – Bayerische Innovationsstrategie 2021-2027, Bavarian Ministry of Economic Affairs, Regional Development and Energy.

46 The risk of overly broad priorities, leading to scattered funding with a lack of clear objectives[31], was flagged as far back as 2013 (paragraph ***18***). Broad priority areas, such as 'energy', risk producing dispersed, disconnected projects with limited synergies, spillovers, or critical mass. In contrast, a more narrowly defined priority area, such as 'energy storage systems', may improve the focus and effectiveness of the funding.

[31] Gianelle, C., Guzzo, F. & Mieszkowski, K.; *Smart Specialisation: what gets lost in translation from concept to practice?*, Regional Studies, 2020.

47 However, as research has identified[32], overly narrow priorities also bring with them drawbacks, such as reducing the potential number of participants (i.e. a region decides only to focus on a small number of already successful companies). In both scenarios (i.e. too broad or too narrow priorities), the outcome is that using a region's economic advantages to best effect becomes difficult to achieve.

48 The Commission integrated smart specialisation into cohesion policy in order to align more effectively funding and projects with regional economic structures and their potential strengths. Alignment between calls for proposals and the priority areas is therefore crucial to ensure that projects support regional innovation objectives[33].

49 A 2021 study contracted by the Commission on smart specialisation prioritisation found that for the 2014-2020 programming period, 84 % of ERDFs thematic objective 1 "strengthening R&I" calls for proposals in member states or regions included criteria for alignment with smart specialisation priorities[34]. This means that in 16 % of the collected calls, no such specific criteria were found. This shows that smart specialisation was not always reflected in the preparation and implementation of calls. The study also found links to smart specialisation priorities in 57 % of ERDF-funded projects, with a significant variation across member states and regions. Of the over 86 000 projects, 57 % appear to be aligned with corresponding priorities based on a key word search. In terms of R&I budget, the three biggest sectors, agrifood and bioeconomy, health and life science, and ICT and industry account around for 50 % of the €19 billion of funding (***Figure 5***).

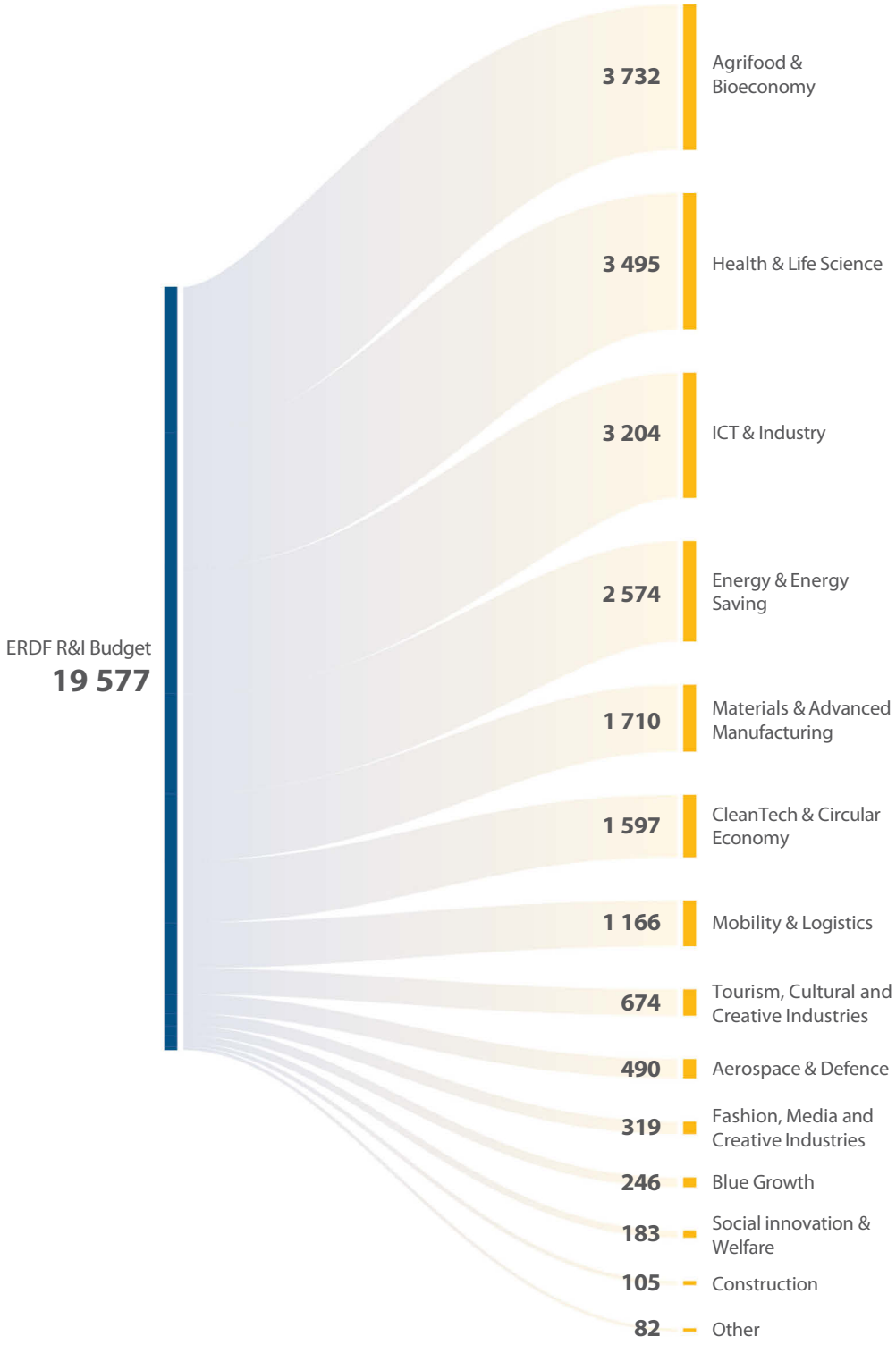
---

[32] Foray, D., *In response to 'Six critical questions about smart spezialisation'*, European Planning Studies, 27(10), 2066-2078, 2019.

[33] *Study on prioritisation in smart specialisation strategies in the EU, Final report*, European Commission, Directorate-General for Regional and Urban Policy, 2021.

[34] Ibid.

Figure 5 – Overarching thematic domains and budget spent on ERDF projects for 2014-2020, EUR million



Note: These figures are not final as the study was carried out in 2021 while the regions were still implementing projects.

50 We reviewed four ERDF-funded projects (***Annex III***) from the 2014-2020 programming period under thematic objective 1 in Bavaria (Germany) and Extremadura (Spain). Our review shows that these regional calls for proposals aligned with their smart specialisation priorities. In Bavaria, reviewed projects focused on efficient production technologies as well as innovative, technology-based services, while in Extremadura, the emphasis was on the agrifood priority area.

51 For the 2021-2027 programming period, an enabling condition strengthened the need to comply with priorities. Managing authorities were required to ensure that projects were "*consistent with the corresponding strategies and planning documents established for the fulfilment of that enabling condition*[35]". As at May 2025, there have been no studies analysing whether there is greater alignment between projects and priorities in the 2021-2027 period.

Interregional collaboration in the context of smart specialisation

52 Established by the Commission, the smart specialisation community of practice (S3 CoP) serves as a hub for guidance, networking, support, and peer-learning about smart specialisation, focusing on both its development and its implementation. The community offers strategic services tailored to practitioners' needs. As part of this community, the S3 CoP Observatory is a new platform designed to enhance interregional cooperation. It acts as a central repository for smart specialisation-related information across the EU, enabling users to compare specialisation areas, access key contacts, and explore strategic links with other regions.

53 In our survey, two thirds of respondents reported using the S3 CoP Observatory platform, while one third indicated they do not. It is viewed positively among users, with 80 % agreeing that it provides valuable information on smart specialisation priorities and practices in other EU regions and member states, and offers possibilities for potential collaboration.

54 Since 2015, the European Commission has launched four thematic smart specialisation platforms: agrifood, energy, industrial modernisation, and sustainable blue economy (i.e. sustainable use of ocean resources for economic growth while preserving the health of ocean ecosystem). These platforms contain partnerships,

[35] Article 73(2)(b) of Regulation (EU) 2021/1060.

which are networks of regions established to facilitate interregional collaboration in a particular area. For example, the platform for industrial modernisation includes partnerships for space and medical technologies. However, platforms or partnerships do not cover every possible priority, even those frequently chosen by regions (***Box 5***) e.g. in health and life science.

Box 5

No thematic platform or partnership for the health and life science priority

While the thematic platforms cover the main smart specialisation domains, the second biggest one, health and life science (***Figure 5***) does not have a specific platform. The authorities in Stockholm stated they had difficulties finding relevant interregional partners despite having a sizeable industry in this sector. For example, the region has number of pharmaceutical companies and Karolinska University Hospital is the highest ranked European healthcare institution.

Source: ECA, based on an interview.

55 The Commission also launched specific initiatives to strengthen interregional cooperation:

- Under the ERDF, the Interregional Innovation Investments Instrument supports interregional innovation projects in their scaling up and commercialisation phases. It helps overcome regulatory and market barriers, bringing projects to investment level. It has a budget of €570 million in funding for 2021-2027.

- The primary objective of the Regional Innovation Valleys is to boost innovation and foster excellence by connecting regions with varying levels of innovation together. To date, 148 regions have been selected for the regional innovation valleys label, benefiting from €122 million in funding under Horizon Europe and the ERDF through the interregional innovation investments instrument.

56 Within the ERDF, Interreg, a series of EU funding programmes that support cooperation between regions, is closely linked to smart specialisation. Although the thematic enabling condition on "*good governance of national or regional smart specialisation strategy*" does not apply to Interreg funding, smart specialisation is an important element in maximising the effectiveness of cross-border and interregional cooperation. We examined one Interreg project in each region we visited, and they both demonstrated alignment with the respective strategies. On the other hand, some Interreg projects are dedicated to helping regions with strategy design and

implementation, as well as providing funding for this cooperation through thematic platforms.

57 Interregional collaboration can be further improved through regional (or national) programmes, and facilitated by explicitly allowing[36] ERDF funds to be partially allocated outside designated programme areas. However, regions do not usually take advantage of this option in their regional programmes[37]. The two regions we visited did not use this flexibility in either programming period.

58 During the 2014-2020 programming period, interregional collaboration was peripheral to smart specialisation, with cooperation initiatives not being a structured policy requirement. A study found that European regions were underusing their potential for effective interregional collaboration, leaving significant untapped opportunities[38].

59 The 2021-2027 period has elevated interregional collaboration to a strategic priority. As one of the fulfilment criteria (***Table 2***), strategies are now required to include measures for enhancing interregional collaboration in designated priority areas[39].

60 Our survey included questions about the perceived difficulty in meeting this fulfilment criterion. Results revealed that almost half of respondents find it challenging (***Figure 6***).

---

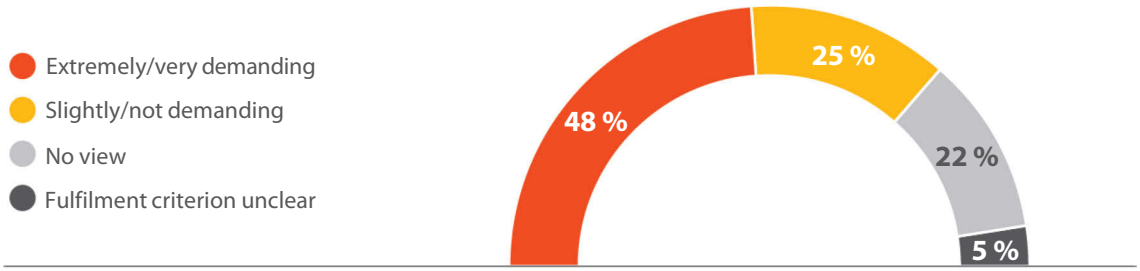
[36] Articles 70(2) of the 2014-2020 CPR and 63(4) of the 2021-2027 CPR.

[37] Woolford, J., Amanatidou, E., Gerussi, E. and Boden, J.M., *Interregional Cooperation and Smart Specialisation: a Lagging Regions Perspective*, Publications Office of the European Union, Luxembourg, 2021.

[38] Bachtrögler-Unger, J., Balland, P.-A., Boschma, R., & Schwab, T., *Technological capabilities and the twin transition in Europe: Opportunities for regional collaboration and economic cohesion*, Bertelsmann Stiftung, Berlin, 2023.

[39] Annex IV to Regulation (EU) 2021/1060.

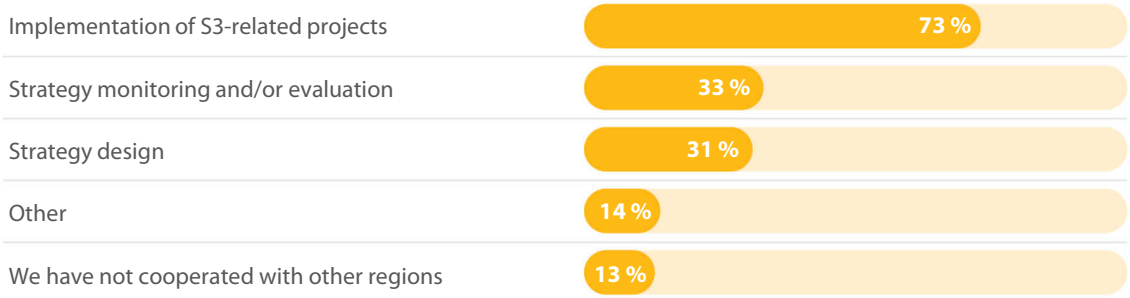
Figure 6 – Enhancing interregional collaboration is seen as demanding



Source: ECA survey.

61 A total of 87 % of respondents to our survey reported that they engage in some sort of interregional collaboration (***Figure 7***), with the implementation of smart specialisation-related projects being the most dominant area. During our visit to Bavaria, we came across an example of this practice (***Box 6***). Other areas of cooperation, albeit to a lesser extent, were monitoring and evaluation, and strategy design.

Figure 7 – Implementation of projects is the most common form of interregional collaboration



Respondents could select more than one reply.

Source: ECA survey.

Box 6

An example of cooperation in implementation: a project in Bavaria and the Austrian border regions

Co-funded by the 2014-2020 INTERREG V-A Austria-Germany/Bavaria Programme, the CompStor project enabled two universities to combine their complementary expertise in energy storage and high-voltage/high-current systems. Both benefited from the acquisition of additional infrastructure and now serve students, researchers and SMEs.

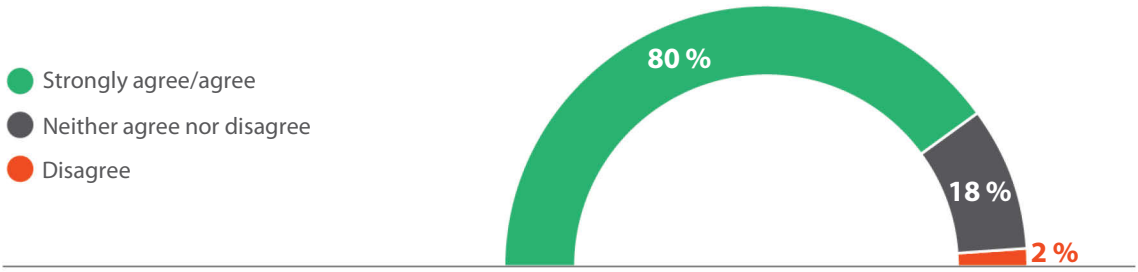
A direct project output was the development of a 10 000 V storage battery prototype. Ongoing research is investigating the effects of strong electromagnetic fields on high-voltage battery cells.

In teaching, the two universities jointly develop and deliver seminars on battery technology, grid integration and the protection of storage systems, and manufacturing quality assurance. According to estimates, approximately 30 former CompStor project employees (including those from subsequent projects) and several students have found employment in relevant companies within the border region.

Source: ECA, based on project visit.

62 A substantial majority of respondents to our survey agree that interregional links contributed to the success of their strategies (***Figure 8***). Our survey analysis shows that when broken down by the regions' innovation performance, the perceived benefits of interregional collaboration are more pronounced among less-innovative regions than their more innovative counterparts.

Figure 8 – Interregional linkages are viewed as contributing to the success of a smart specialisation strategy



Source: ECA survey.

Monitoring, evaluation and impact

63 With any policy, monitoring and evaluation are key to understanding the (results and) impact and improving the effectiveness and efficiency of the programme. At EU level, DG REGIO has overall responsibility for the mid-term and *ex post* evaluation of ERDF spending, while member states or managing authorities carry out evaluations at national or regional level. Monitoring has been a smart specialisation fulfilment criterion for the regions in both programming periods, while the requirement for evaluation was introduced for the 2021-2027 period. In practice, monitoring committees set-up by member states and representing relevant parties are responsible for it[40].

Monitoring approach to regional smart specialisation strategies

64 Already in the 2014-2020 period, monitoring was one of the three fulfilment criteria ("*S3 contains a monitoring mechanism*") for smart specialisation, and the Commission provided guidance on how to implement it (***Box 7***). In 2017, the Commission noted that in some regions the lack of a monitoring mechanism was one of the main reasons for their difficulties in fulfilling the *ex ante* conditionality[41].

[40] Article 38-40 and recital 35 of Regulation (EU) 2021/1060.

[41] SWD(2017) 264, pp. 16 and 32.

Box 7

The evolution of smart specialisation monitoring guidance for the 2014-2020 period

The first guidance document in 2012 proposed a monitoring system based around three types of indicator: context, result and output. They were to be "parsimonious yet comprehensive".

In 2014 the Commission published a Guidance Document on Monitoring and Evaluation for the Programming Period 2014-2020. It emphasised "a clearer articulation of the policy objectives", to focus on implementing a results-oriented policy (without an excessive focus on fund absorption), and to differentiate between monitoring and evaluation. It promoted a case-by-case approach, and stated that there is no "best" method for every situation.

In 2016 the Commission published a smart specialisation implementation handbook. The monitoring chapter includes four regional examples of how monitoring was carried out.

Source: ECA.

65 For the 2021-2027 period, monitoring remained a fulfilment criterion, but with additional requirements which established that monitoring and evaluation tools were to measure performance towards reaching the strategy's objectives. However, the Commission did not issue any new guidance related to these the new arrangements.

66 In 2021 the JRC published Assessing Smart Specialisation: Monitoring and Evaluation Systems, which stated that "*the effectiveness of monitoring activities needs to strengthen in many cases*", and presented criteria for achieving an effective monitoring and evaluation system. However, the document did not provide any Commission guidance on the matter.

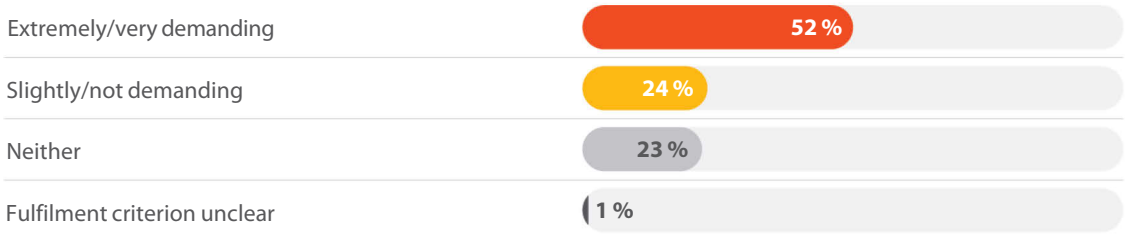
67 Our survey responses suggest that users would welcome improved Commission guidance. Respondents mentioned the following challenges:

- the complexity of existing monitoring and evaluation systems; with calls for clearer guidelines and standardised frameworks;
- the difficulty in selecting appropriate indicators and measuring long-term socio-economic effects.

Monitoring and evaluation in practice

68 Of the seven fulfilment criteria (***Figure 9*** and ***Table 2***), respondents indicated that complying with the monitoring and evaluation criterion is the most difficult. Around half of the respondents (52 %) found it either extremely or very demanding (***Figure 9***). As with the entrepreneurial discovery process, less-innovative regions find monitoring and evaluation more demanding than those with stronger innovation profiles.

Figure 9 – Monitoring and evaluation requirements are seen as demanding



Source: ECA survey.

69 The regions' monitoring and evaluation systems vary significantly in terms of sophistication. Some regions that first established complex monitoring and evaluation systems, subsequently simplified them (***Box 8***).

Box 8

Differences in monitoring and evaluation systems in Emilia-Romagna (Italy) and Czechia

For the 2014-2020 period, Emilia-Romagna had a comprehensive monitoring and evaluation system with 81 indicators. For the 2021-2027 period they changed their approach, from measuring overall performance, to tracking and mapping research and innovation projects, and reduced the number of indicators to 8. Their platform database included more than 6 900 research and innovation projects funded in 2021-2027 (and 11 000 overall).

In contrast, Czechia, which counts as one single region for smart specialisation purposes, has retained an extensive monitoring and evaluation system with over 100 indicators.

70 If a region requests it, DG REGIO and the S3 community of practice secretariat can provide targeted advice and support to help the region to improve its monitoring and evaluation system (***Box 9***). As of May 2025, there had been around 30 requests recorded.

Box 9

The Commission provides targeted support for monitoring and evaluation systems

Päijät-Häme (Finland)

Although the Päijät-Häme region is rated as a strong innovator, it did not have a well-developed monitoring system. The region used smart specialisation monitoring indicators that were not directly linked to the underlying objectives, and struggled with data accessibility, out-of-date data sources, and other data collection issues.

After cooperation with the Commission, two changes were planned in September 2024: firstly, to streamline monitoring by clearly defining process owners; and secondly, to use clearly defined indicators. While there has been progress in streamlining processes by establishing specific priority focus groups, as of May 2025 the indicators are yet to be finalised.

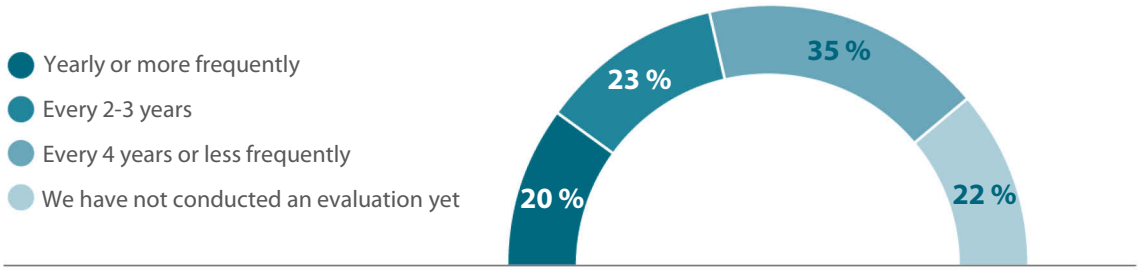
Hungary

Following targeted support in Hungary, there was a suggestion to improve the indicator system by better reflecting the interregional dimension, and better aligning it with the indicator system from the relevant funding sources. In addition, a recommendation was made to develop a digital tool to improve the accessibility and timeliness of data.

Evaluation at regional level

71 Our survey highlighted differences with regard to evaluation at regional level. The majority (78 %) of respondents indicated that they have conducted an impact evaluation of their strategies, albeit with differing regularity (***Figure 10***). More than 90 % of the leading innovation regions have carried out impact evaluations, while only around 70 % of the emerging innovation regions have done so.

Figure 10 – One out of five respondents evaluate smart specialisation at least yearly



Source: ECA survey.

72 The interpretation of these results should take into account the difficulties respondents experience in meeting monitoring and evaluation requirements (***Figure 9***). For example, some regions indicated that they do not monitor implementation, but claimed that they did perform an evaluation.

73 The World Bank, as part of the agreement with the Commission, has developed two smart specialisation regional evaluations in terms of economic performance, namely for the Pomorskie region (Poland) and the Basque Country (Spain). However, the scope of these studies is broader and the direct effect of smart specialisation cannot be fully isolated: they analyse the effects of EU research and innovation grant funding, i.e. that linked to smart specialisation, on the regions' economies. Keeping in mind this limitation, the two pilot studies found that smart specialisation can foster sectoral growth but also found it difficult to assert that the strategies has contributed significantly to sectoral efficiency.

No evaluation to date on smart specialisation at EU level

74 Since the launch of the concept in 2014, neither an overall performance evaluation of the effectiveness of R&I investment under the ERDF, nor an evaluation of the results or impact of smart specialisation has been conducted by the Commission at EU level. It should be noted, however, that in general, regions see the benefit of having a strategy to prioritise innovation spending. Based on our survey, 80 % of the respondents would still prepare a strategy, or a very similar kind of document, even if it was not a requirement for receiving EU funding.

75 In a 2017 document about Strengthening Innovation in Europe's Regions, the Commission states that smart specialisation *ex ante* conditionality has helped address institutional weaknesses in innovation systems. The document states that support for research, innovation and entrepreneurship is expected to help 15 000 enterprises to introduce new products to market, support 140 000 start-ups and create 350 000 new jobs by the end of 2020. As in the case of regional evaluations (paragraph ***73***), they all refer to effects of the innovation funding guided by smart specialisation. Smart specialisation strategies themselves are not funding instruments, and their effects on innovation investments remains to be seen.

76 A JRC technical report in 2021 highlighted the difficulty of measuring the impact of smart specialisation, and identifying what can be directly attributed to it compared with other factors. However, a Committee of the Regions study (2023), states that at regional and local levels, there is a conviction that the future of Europe lies in regional specialisation. In addition, in March 2025, the Council published its conclusions on cohesion and cohesion policy post-2027, where it stressed "*the importance of smart specialisation strategies, building cooperation networks, including knowledge transfer, research and innovation, to help regions develop competitive capacities, strengthen regional value chains and integrate into global value chains*".

77 In 2024, the Commission contracted an external study to assess the success of the smart specialisation framework in enhancing research and innovation capacities and driving innovation and smart economic transformation in EU regions. The results of the study are expected in the second half of 2025.

78 The 9th cohesion report noted that the place-based approach to regional policy is now well established and widespread. It also noted that the EU smart specialisation approach has helped to disseminate and make this approach mainstream among regional authorities in the EU. The report, however, does not provide information as to how effective smart specialisation has proved to be in contributing to achieving cohesion policy objectives.

79 The 2024 report from the High-Level Group on the Future of Cohesion Policy concluded that it was too early to fully assess whether smart specialisation, and the associated array of accompanying administrative capacity-building measures, resulted in significant improvements in institutional quality for the most vulnerable EU regions. DG REGIO is mandated to carry out an evaluation of the 2014-2020 ERDF and cohesion funds by the end of 2024[42], but this has not yet been published. Its evaluation will include a section on the ERDF investments strengthening research, technological development and innovation. However, it is unclear to what extent DG REGIO will assess smart specialisation.

[42] Article 57 of the 2014-2020 CPR.

Closing remarks

80 While the smart specialisation emerged in the mid-2000s, it was incorporated into the 2014-2020 programming period without being tested and without much implementation experience in EU regions (paragraphs *12*-*16*). For the 2021-2027 programming period, the common provision regulation reinforced the smart specialisation concept and implementation requirements, but did so without undertaking an underlying impact assessment (paragraphs *20*-*21*).

81 The Commission checks the fulfilment of strategies' enabling conditions and provides regions with guidance and technical support on smart specialisation (paragraph *06*). It also fosters interregional cooperation (paragraphs *23*-*24*) and knowledge exchange through the establishment of the community of practice observatory and thematic platforms in some priority areas (paragraph *52*-*54*). It does not, however, use its unique position, experience and oversight to guide regions in their choices, or to bring regions together that could potentially mutually benefit from this. There is no oversight at EU level to maximise the added value of the smart specialisation process or to ensure that regional priorities take sufficient account of the EU industrial policy research and innovation priorities (paragraphs *25*-*30*).

82 The entrepreneurial discovery process is recognised as an important part of drawing up a strategy, designed to make sure as many relevant stakeholders as possible participate in identifying the priorities (paragraphs *31*-*38*). The co-legislators made it mandatory to identify the priorities in order to access EU funding for the 2021-2027 programming period (*Table 2*). However, the Commission has not updated its guidance on the process since 2012 and there is significant room for differing interpretations and implementation of the concept. Some respondents to our survey found the process difficult to apply, especially those regions that are less innovative (paragraph *39*).

83 To ensure that resources are invested in the targeted sectors, general alignment between EU-funded innovation projects and smart specialisation priorities was introduced for the 2014-2020 period, and was reinforced for 2021-2027 period (paragraphs *44*-*51*). The extent to which these strategies guide the funding depends on the particular scope of the defined priorities. Smart specialisation represents a distinctive bottom-up approach to cohesion policy innovation spending, resulting in regional priorities. Other EU innovation policies, such as the Horizon programmes and EU industrial policy strategies on batteries, microchips or hydrogen, use a more top-down approach that focuses on addressing EU industrial innovation priorities and goals

(paragraph *28*). Both approaches have their own legitimacy and logic, but are largely implemented independently. At the time of this review there are no direct means of ensuring regional priorities take into account the research and innovation priorities of the EU's industrial policy.

Future challenge 1

To ensure that the process of designing smart specialisation strategies is useful, leading to the identification of meaningful priorities.

This should result in regions defining their priorities at an appropriate level of detail. There is an opportunity for the Commission to promote coherence between the priorities emerging from S3 and the research and innovation priorities of the EU industrial policy. The S3 CoP Observatory could be better used to identify priority gaps and overlaps.

84 Monitoring smart specialisation has proved to be challenging for the regions since the creation of the concept, especially for the less innovative ones. No new guidance was issued by the Commission for the 2021-2027 period despite the requirements increasing (paragraphs *65*-*67*).

85 When the smart specialisation concept was being introduced, it was seen as a dynamic, long-term process with potential benefits from focusing research and innovation activities at the regional level. However, a number of risks were identified that could affect its implementation, notably that it may become a mere formal requirement (paragraph *18*). Since then, the impact at the EU level of smart specialisation has not so far been assessed (paragraph *74*). There is no clear conclusion on the value brought by the process, both overall and by type of regions although the ongoing study (paragraph *77*) and *ex post* evaluation of the ERDF and cohesion funds (paragraph *79*) might address this at least to some extent. Evaluations at regional level, while seen as demanding by our survey respondents, focus on evaluating the underlying innovation investments rather than on the impact of the concept itself. However, based on our survey, most of our respondent regions indicated that they find smart specialisation concept useful (paragraphs *68*-*75*).

Future challenge 2

To assess the value of smart specialisation as a process.

To meet this challenge, it is important for the Commission to evaluate the implementation of smart specialisation in the EU. This evaluation should take into consideration whether the smart specialisation concept works equally well for regions of differing innovation profiles and levels of administrative capacity, or whether it needs to be adapted to their specific needs. It is, however, not clear to what extent the concept can be evaluated independently from the ERDF innovation spending that it guides. There is also an opportunity for the Commission to provide appropriate support to member states on how to ensure effective monitoring and evaluation in a simplified way, the need for which was highlighted by our survey results.

86 Interregional collaboration is key when searching for complementarities in smart specialisation areas but seen as demanding, especially in light of overall strains on administrative capacity. This type of collaboration was made one of the fulfilment criteria for the strategies in the 2021-2027 programming period (paragraphs ***59-62***). Interregional linkages serve as a valuable tool to maximise the effectiveness of smart specialisation spending, such as identifying beneficial complementary capabilities in other regions (paragraphs ***52-58***).

Future challenge 3

To maximise the value of interregional cooperation. To help unlock untapped regional potential, there is an opportunity for the Commission to further promote cooperation among regions, including by identifying and facilitating suitable areas for such cooperation, supporting less innovative regions in developing their administrative capacity, and ensuring that the suitable incentives to cooperate are in place.

This review was adopted by Chamber II, headed by Ms Annemie Turtelboom, Member of the Court of Auditors, in Luxembourg at its meeting of 16 July 2025.

For the Court of Auditors

Tony Murphy
President

Annexes

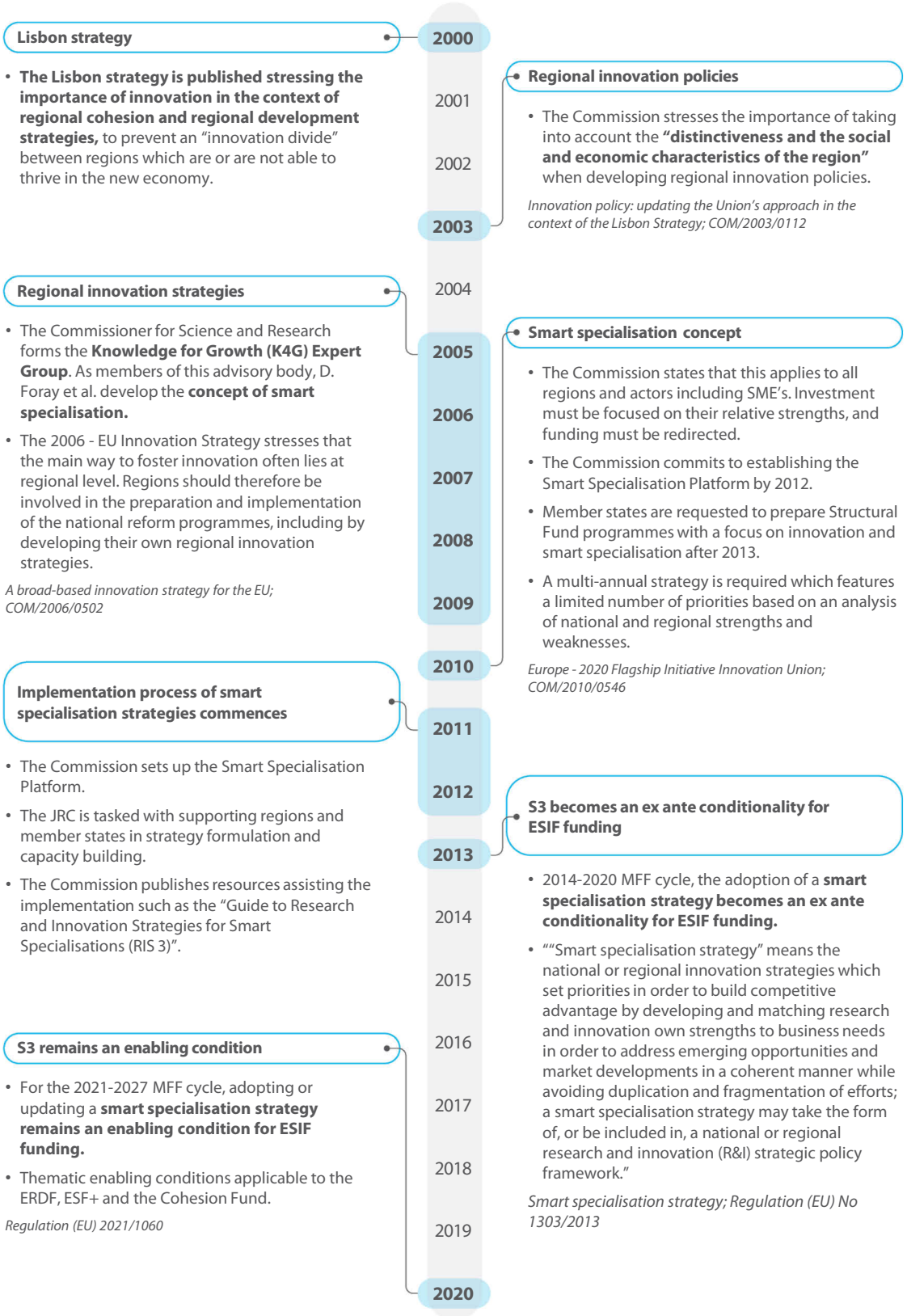
Annex I – Examples of smart specialisation strategies

Region	Baden-Württemberg	Helsinki-Uusimaa	Stockholm
Title of strategy and competent authority	Innovation strategy – Baden-Württemberg: 2020 update by Baden-Württemberg Ministry of Economy, Labour and Tourism	Smart specialisation strategy for Helsinki-Uusimaa Region: Resource wise Helsinki-Uusimaa Region by Helsinki-Uusimaa regional council	Business and growth strategy for the Stockholm Region by Stockholm Region
Region size	NUTS1	NUTS2	NUTS2/3
Responsible body	Ministerium für Wirtschaft, Arbeit und Wohnungsbau	Helsinki-Uusimaa Regional Council	Region Stockholm
Number of priorities	5	3	4
Priorities	Digitalisation, artificial intelligence and industry 4.0 Sustainable mobility (with alternative drivetrains, new vehicle concepts, networked, digitalised and autonomous covering all modes of transport) Health science Resource efficiency, energy transition, and sustainable bio-economy	Climate neutrality Citizens' city Industrial modernisation	Life science, care and health ICT, tech and digitalisation Industrial transition through sustainable production Climate and environment investments for sustainable city development

Region	Baden-Württemberg	Helsinki-Uusimaa	Stockholm
Publication	February 2020	May 2020	June 2021
“Pure” S3 (document solely about smart specialisation)	Yes	Yes	No, an overall regional development plan with a section dedicated to smart specialisation

Source: ECA, based on regional documents.

Annex II – Timeline of the development of the smart specialisation concept



Source: ECA based on literature review.

Annex III – List of reviewed smart specialisation strategy projects

Region/ projects	Short description of the project	Priority area	Total cost (in thousand euros)	EU co-funding (%, in thousand euros)	Start and end of implementation	Results
Bavaria 1	The "Efficient Production Technology Network" (EffPro) project aimed at strengthening technology transfer between the university and SMEs in mechanical and manufacturing engineering. The focus was on cost reductions through energy savings.	Efficient production technologies	4 751	2 375 (50 %)	6.2017-12.2021	24 activities and research projects e.g. on 3D optical measurement, industrial marking of components (CastCode), machine learning for process controls (EMMAPro), 11 publications.
Bavaria 2	The project "Service Innovation for Trade – DIGIONAL" aimed to support SMEs in the brick-and-mortar trade to face the challenges of increasing competition from urban agglomerations and growing e-commerce.	Innovative, technology-based services	1 892	946 (50 %)	2.2018-7.2022	Project deliverables achieved: e.g. 1 300 surveyed, 23 cooperation projects, 60 guides for digitalisation published. Sustainability difficult to measure but cooperation partners maintained or expanded their activities.

Region/ projects	Short description of the project	Priority area	Total cost (in thousand euros)	EU co-funding (%, in thousand euros)	Start and end of implementation	Results
Bavaria 3	Battery storage project pooling competences in energy storage between two universities.	N/A	6 429	5 465 (85 %)	10.2015-3.2019	See ***Box 6***.
Extremadura 1	Project on the potential use of Near Infrared Spectroscopy (NIR) technology to assess quality parameters in olive oils such as: maturity index, physical aspects, integrity, health status, uniqueness and food safety.	Agrifood and digital transformation	333	162 (50 %)	12.2020-11.2022	Fully achieved and likely to remain sustainable. The project has allowed the beneficiary to improve the quality of the olive oil produced to the point that 90 % of the olive oil produced is currently extra-virgin olive oil. The project also ensures a transparent way of paying farmers for their product.
Extremadura 2	Project to explore the use of hyperspectral technology to assess quality parameters in pigmeat to identify the presence of bacteria.	Agrifood and health relating to food safety	184	110 (60 %)	12.2020-9.2022	Project deliverables achieved (e.g. algorithm) and patent created. Sustainability uncertain as project did not reach the level of having commercial benefits (main shopping chain is not yet using this food safety technology).

Region/ projects	Short description of the project	Priority area	Total cost (in thousand euros)	EU co-funding (%, in thousand euros)	Start and end of implementation	Results
Interreg: Extremadura (Spain) and regions Alentejo and Centro (Portugal)	INNOACE is a project with 16 entities (four universities, six science parks and six technological centres) aimed at creating synergies among enterprises and R&I centres, carrying out transfer actions and early validation of products and services through open innovation processes.	Agrifood and technological transformation		Funded by Interreg V-A Spain-Portugal (POCTEP) 2014-2020. 4 556 (70 % from Spain, 30 % from Portugal) split between 16 beneficiaries	1.2017-12.2020	Innovations clustered in 14 areas www.innoace.eu.

Source: ECA, based on reviewed projects documents.

Annex IV – ECA survey methodology

Purpose

01 The aim of our survey was to gain a broader and more comprehensive understanding of the design and implementation of smart specialisation within the EU. The questionnaire comprised six sections: background, design and implementation of smart specialisation strategies, support for design and implementation, interregional cooperation, monitoring and evaluation, and final reflections.

Survey Implementation

02 An in-house expert in survey methodology conducted independent online pre-tests of the draft survey with a small group of final respondents before its publication. Feedback from these pre-tests, with input from DG REGIO, was incorporated by the audit team as deemed necessary.

03 The online survey was sent to all competent regional or national institutions, or bodies responsible for managing smart specialisation. It was conducted using EUSurvey, an online survey tool.

Response rate

04 We received valid responses from 104 authorities in 22 member states, representing an overall response rate of approximately 58 %. However, strict firewall settings may have prevented some recipients from receiving the survey invitation email.

Abbreviations

CPR: Common Prevision Regulation

DG REGIO: Directorate-General for Regional and Urban Policy

DG RTD: Directorate-General for Research and Innovation

ERDF: European Regional Development Fund

JRC: Joint Research Centre

R&I: Research & Innovation

S3: Smart specialisation strategy or strategies

S3 CoP: Smart specialisation Community of Practice

ECA team

This report was adopted by Chamber II – Investment for cohesion, growth and inclusion, headed by ECA Member Annemie Turtelboom. The task was led by ECA Member Annemie Turtelboom, supported by Eric Braucourt, Head of Private Office and Guido Fara, Private Office Attaché; Gediminas Mačys, Principal Manager; Jussi Bright, Head of Task; Jan Hendricks, Rene Reiterer and Juan Antonio Vazquez Rivera, Auditors; Austin Maloney and Ines Gonzalez Echanove, audit support; Jacob Haas and Gabriele Ramonaite, Trainees. Laura McMillan provided linguistic support, Britta Middelberg provided survey support and Dunja Weibel provided graphical support.

From left to right: Britta Middelberg, Eric Braucourt, Jussi Bright, Austin Maloney, Annemie Turtelboom, Guido Fara, Gediminas Mačys, Rene Reiterer.

COPYRIGHT

PDF	ISBN 978-92-849-5571-8	ISSN 2811-8197	doi:10.2865/3208836	QJ-01-25-045-EN-N

HOW TO CITE

European Court of Auditors, review 05/2025: "Smart specialisation strategies in the UE", Publications Office of the European Union, 2025.

Smart specialisation is an EU policy approach, fully implemented from the 2014-2020 programming period onwards, wherein regions identify investment priorities and focus their EU regional innovation spending on them. The goal is to maximise competitive advantage and to build on the regions' own economic strengths. This review aims to inform the reader on what smart specialisation is and how it is implemented in the EU. We observed that while most regions find smart specialisation useful, gaps remain when it comes to ensuring priorities are meaningful for the regions themselves, and for the EU's wider strategic goals. Regions would benefit from more support, there is potential to improve monitoring and evaluation, and more could be done to stimulate the value of interregional co-operation.

EUROPEAN COURT OF AUDITORS
12, rue Alcide De Gasperi
1615 Luxembourg
LUXEMBOURG

Tel. +352 4398-1

Enquiries: eca.europa.eu/en/contact
Website: eca.europa.eu
Social media: @EUAuditors

CURIA RATIONUM

EUROPEAN
COURT
OF AUDITORS