

# Smart specialisation policy strategy for interregional cooperation: pushing less-developed regions

Mirko KRUSE\*, Jan WEDEMEIER\*\*

## Abstract

*The concept of Smart Specialisation Strategies (S3) is one of the key policy instruments for Europe's regional development. The strategy considers the regional sectoral diversity to build a competitive advantage and increase the position in the knowledge economy. Particularly less-developed regions can benefit in this context when Smart Specialisation is promoted as the primary instrument of European Cohesion Policy. One strategy to develop the competitive advantage of moderate innovator regions is to develop a common, collaborative strategy to overcome regional disparities by leveraging regional growth potential. A methodology is presented by the authors, which is suggested to be accompanied for the identification of Smart Specialisation Strategies in an interregional context. The objective of this is to supply a novel method for interregional Smart Specialisation development and to improve its outward-looking orientation*

*Keywords:* smart specialisation, S3, regional disparities, policy, innovation policy

## Introduction

Smart Specialisation, as defined by the Joint Research Centre of the European Commission, means an “innovative policy approach that aims to boost jobs and growth by enabling the identification and development of competitive advantages” (Gómez Prieto *et al.*, 2019, 8). Its characteristics include a place-based dimension, a bottom-up character nurtured by a partnership between policy, business, academia, and public (i.e., “quadruple helix”), the identification of investment priorities based on local assets and resources as a result of an Entrepreneurial Discovery Process (EDP) as well as the flexibility of the mechanism. The approach allows the identification and development of likely competitive advantages by focusing efforts and resources on the discovery of

---

\* Mirko KRUSE is associated member of Hamburg Institute of International Economics (HWWI), Bremen, Germany; e-mail: m-kruse@hwwi.org. ORCID: 0000-0002-0766-2926

\*\* Jan WEDEMEIER is senior researcher at Hamburg Institute of International Economics (HWWI), Bremen, Germany; e-mail: wedemeier@hwwi.org. ORCID: 0000-0003-0659-9926 (Corresponding author)

innovation niches and then on regional policies to promote innovation in particularly these fields (Gómez Prieto *et al.*, 2019; McCann and Ortega-Argilés, 2015). By now, Smart Specialisation Strategies (S3) have become a major pillar for economic development and growth policy-thinking, at least in Europe (McCann and Ortega-Argilés 2015; McCann and Soete 2020). The official strategy for Europe 2020 and beyond (EU2020) is defined by its conceptualisation of Smart Specialisation (Lopes *et al.*, 2018). The main objective of the EU2020 strategy is to focus on smart, sustainable, and inclusive growth. But also, in the current period of Cohesion Policy, Smart Specialisation plays an important role in the initiative “Stairway to Excellence”. The EU Cohesion Policy will therefore further aim to reduce the gap of productivity, research, and development (R&D), and innovation between EU-member states in the coming period 2021-2027.

Despite the recent success of the S3 concept in the EU and beyond, a cross-border or interregional perspective to the Research and Innovation Strategies for Smart Specialisation (RIS3) is still in its infancy (Larrea *et al.*, 2019). This holds both for practical implementation and academic research despite the fact that the outward-looking aspect and idea of cooperation in Smart Specialisation were highlighted from the very beginning of the concept. An exception in academia are papers by Uyarra *et al.* (2014) providing a conceptualisation of interregional collaboration within the framework of RIS3 and Pagliacci *et al.* (2019), developing a component analysis concept to compare different regions. Blažek and Csank (2015) summarise that particularly less-developed regions can benefit from Smart Specialisation within an interregional framework. These benefits result from catching-up processes as well as improved regional strengths in accordance with interregional value chains.

Therefore, a strategy for interregional cooperation is demanded and, here, developed. The paper at hand describes a new methodology of the analytical part of said policy-oriented strategy focusing particularly on how to identify potential common priorities and domains for interregional cooperation. The objective of the paper at hand is to present a novel method for interregional Smart Specialisation comparison and to introduce a method to identify common similarities between regions as potential starting points for cooperation in innovation policy. The methodology presented in this article allows to deliver a strategy of Smart Specialisation for different regional economic levels (i.e., moderate innovator regions and innovator regions).

Particularly the potential for lagging regions to participate in interregional and international cooperation remains underexploited (Balland and Boschma, 2021; Ferreira *et al.*, 2021; Woolford *et al.*, 2020). The method of interregional Smart Specialization Strategies (S3) presented here identifies an approach to catch up: the strategy draws the six steps of a RIS3 processes in an interregional context. The main issue with this approach is that almost in all regions of Europe a RIS3 strategy exists.

Setting this background, it has been regarded as important to build on already existing frameworks instead of starting from the beginning.

The paper is structured as follows: following the introduction at hand (Section 1), the authors move to an overview of regional disparities and the challenge of Cohesion Policy in Europe (Section 2). This analysis is followed by a literature review setting out the topic at Smart Specialisation Strategy (S3) and the concept of Research and Innovation Strategies for Smart Specialisation (RIS3) (Section 3). Fourthly, the methodologies for general S3 and interregional S3 are introduced (Section 4). The final section concludes and discusses some limitations of the article (Section 5).

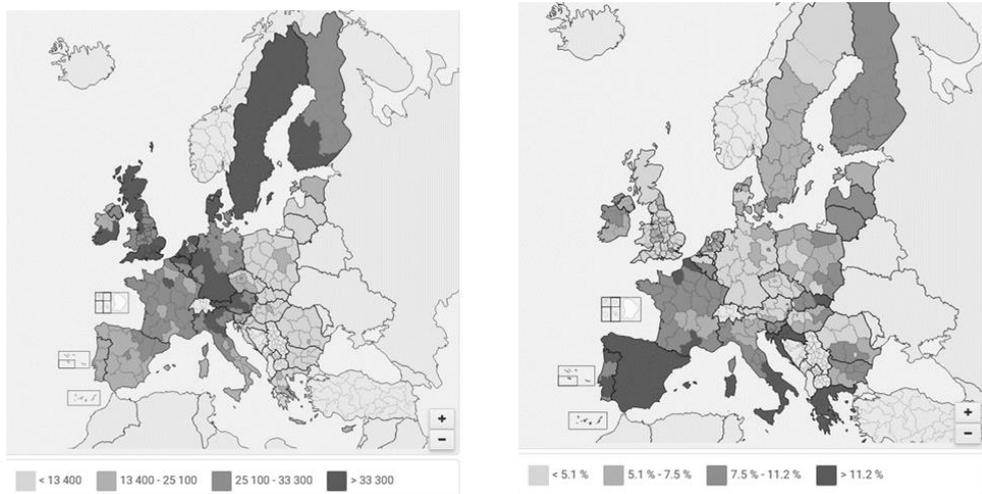
## 1. Regional disparities in Europe

The European Union strives to be an ever-closer Union and not only emphasises the economic aspect of a common market but also the social aspect of convergency between its members. Still, the EU is characterised by a high level of regional disparities. From a geographical point of view, one can observe a differentiation between regions in Western and Eastern Europe (and to a smaller degree between North and South) in terms of economic strength, income, or wealth. Looking at economic indicators such as GDP per capita or unemployment rates highlights that, although a certain progress is observable, a division through the EU remains (see Figure 1). A set of extraordinarily successful regions such as Amsterdam, Milano, Copenhagen, or Stuttgart already show certain specialisation characteristics and benefit from agglomeration advantages. On the other hand, a lot of peripheral-rural and urban regions, particularly in Eastern Europe, are still on the bottom of the process to develop crucial competitive advantages in the system of international value chains (Amendola *et al.*, 2006; Boettcher *et al.*, 2014; Kruse and Wedemeier, 2019a; McCann and Ortega-Argilés, 2016).

In this context, the concept of Smart Specialisation becomes relevant. The concept shall contribute to different policies such as industrial policy, R&D-driven innovation policy, European value chains and networking initiatives or cohesion policy. Particularly the latter plays a focus role since the European Commission has framed RIS3 strategies as an approach to not only boost regional innovation capacity but also to initiate catch-up processes to the benefit of less-developed regions and contribute to regional convergency this way (Foray *et al.*, 2018). Different from established instruments of EU Cohesion Policy, such as the Structure and Investment Fund, the Cohesion Fund, or the Social Fund, Smart Specialisation focuses more on activating potential for endogenous growth rather than financial transfers. This approach appears even more promising as research shows an increasing tendency of agglomeration of high-income economic activities (Geppert *et al.*, 2004) so that an enabling policy approach for less-developed regions is of substantial importance (Iammarino *et al.*, 2018). Although Smart Specialisation can only by one instrument to overcome regional disparities, the potential is significant and will be elaborated

further in this article (Barzotto *et al.*, 2019; Kruse and Wedemeier, 2019; McCann and Ortega-Argilés, 2013).

**Figure 1. Regional disparity in Europe**



Note: GDP per capita (left) and unemployment rates (right).

Source: S3 Platform (2019)

## 2. Conceptualising smart specialisation: a literature review

On the level of the European Union (EU), Smart Specialisation is a policy issue which has come up dominantly over the last 10 years. It emerged in the literature analysing the productivity gap between Europe and the United States which had become evident since 1995. It is attributed to that origin because S3s at the beginning were mainly based on traditional forms of innovation or to the sector of information and communication technologies (ICT) (Asheim, 2019; McCann and Ortega-Argilés 2015). But in the meantime, Smart Specialisation has become much more: the concept underlines the relevance of knowledge, technology, innovation, and regional specialisation. All of these share the uniqueness that these aspects are regarded as the main drivers for economic development and growth (Fagerberg, 2005; Lopes *et al.*, 2018; Schumpeter, 1950). Innovation is mainly related to peculiar places such as urban areas. In contrast, rural areas theoretically appear to have a lower ability for innovation, because of the lack of high-skilled personnel in R&D, size of markets, or the concentration of talent and creative people (Asheim, 2019).

However, by now, over 120 S3s have been developed and adopted by EU regions and member states with different thematic emphasis underlining the relevance and acknowledgement of S3. Almost 200 regions and 26 countries are active in the Smart Specialisation Platform (Gómez Prieto *et al.*, 2019) which

provides advice to EU countries and regions for the design and implementation of their regional S3. The strategy for EU 2020 and beyond defines and measures its framework according to S3, making it a key factor for the development of the EU. Smart Specialisation is likely to become even more important for the post-2020 period since it was created to enable catch-up processes for less-developed regions in innovation and economics (European Commission, 2020a)

At the beginning of its development, the S3 concept has been based entirely on a sectoral basis but has progressively been adapted in regional contexts. Smart Specialization Strategies 3 now largely reflect the logic of regional innovation systems, i.e., a Research and Innovation Strategy for Smart Specialisation (RIS3) (Foray *et al.*, 2012; McCann and Ortega-Argilés, 2015). The terms S3 and RIS3 differ slightly when it comes to their specific focus but are widely used as synonyms. The process to this systematical approach was mainly evolutionary, whereas authors consider this process to be more programmatically abrupt (Foray, 2014; Kroll, 2015; Lopes *et al.*, 2018). The idea of the general S3 approach is that regional authorities can make use of the concept by assessing their region's knowledge assets, capabilities and competences as well as the key players between whom knowledge is transferred to use this analysis as an orientation for economic specialisation (McCann and Ortega-Argilés, 2015).

Apart from theoretical considerations, a field of particular S3 research would be how S3 are received and implemented in the regions (see i.a. Cooke, 2016). Various authors show how heterogeneous the S3 design and implementation are between regions (see i.a. D'Adda *et al.*, 2017; D'Adda *et al.*, 2019). Evidence on the gap between planned and actual outcome is presented by Gianelle *et al.*, (2019) and potential problems with Smart Specialisation in regions are highlighted by Pugh (2017) using the example of Wales. While a theoretically sound methodology is a crucial basis for defining a regional S3, the implementation is no less important to realise the anticipated outcome.

However, the methodology described further below focuses on providing a scheme for analysis at the one hand and a basis for selection on the other hand. Addressing the issue of specialisation in the R&D/invention and its link to sector activities is crucial for the regions which are not an innovation (technology) leader. For the respective regions it is more relevant to focus on what is the potential of GPT by the aspect of co-invention of applications (see i.a. European Commission, 2020a). The relevance of R&D for Smart Specialisation is highlighted, for instance by Capello and Lenzi (2013), although the empirical analysis shows that different forms of regional innovating should be considered (i.e., social innovation, incremental innovation, basis innovation). Moreover, papers have been presented examining the limitations of related variety, particularly in regions characterised by low technology regimes (see i.a. Cortinovis and von Oort, 2015; Hartog *et al.*, 2012).

S3 can play an important role for the sectoral modernisation of industrial sectors since it helps to transform a traditional sector into an innovative one (Foray,

2018). Smart Specialisation is considered a key strategy for the achievement of smart and sustainable growth (Kogut-Jaworska and Ociepa-Kicinska, 2020). Its characteristics of combining top-down directionalities with bottom-up enterprise engagement can make Smart Specialisation a strategy for sustainable transition (McCann and Soete, 2020; Nakicenovic *et al.*, 2021). Transition needs to recognise place-based factors and should build upon regional specialisations (Montresor and Quatraro, 2018). S3s are about enabling regions to turn their needs, strengths and competitive advantages into marketable goods and services. It is indicated that S3s can also benefit regional (and national) economic structures by i) more interactions between businesses, business to research, research to research, research to community and business to community, ii) increased investments and new “leading businesses” that get attracted to regions and iii) high level support professionals moving to designated innovation hubs (OECD, 2013).

Experiences of S3s show that the concept is not only applied at the European Union’s level but also in many other non-European countries. The concept has inspired regions of the European neighbourhood and S3 has become an instrument of the European Enlargement Policy. Further examples come from regions in Latin America, e. g. Brazil, Chile, Colombia, Mexico, and Peru. Currently, several regions of Latin America conduct pilot activities to test the Smart Specialisation concept according to their regional characteristics (Belen *et al.*, 2017; Gómez Prieto *et al.*, 2019). Moreover, the concept is implemented as well in regions of the United States of America, Canada, Australia, and Africa. The most recent experience of Smart Specialisation confirmed that this concept has an influence at a global scale. The common aspect of these developments is that RIS3 serves to strengthen the regional innovation processes. It is expected that S3s could help to transform economies as a part of an industrial modernisation process. The global achievement is expected to improve the impact of the Smart Specialisation concept (Gómez Prieto *et al.*, 2019).

### **3. Smart Specialisation in cross-border cooperation: the missing gap**

Emerging from its basic idea of a sectoral focus, Smart Specialisation is generally a place-based concept. There have been approaches to initiate a scale up process to a regional context (see i.a. Camagni *et al.*, 2014) but S3 approaches with an interregional reach are hardly to be found in the literature. The Joint Research Centre of the EU has recently recognised this gap by publishing a methodological manual for developing thematic interregional partnerships for S3 (Rakhmatullin *et al.*, 2020). Since fragmentation of regions along national borders can prevent the full exploitation of different kinds of economies of scale and scope, particularly in the field of innovation, proposals to overcome regional fragmentation are rising. It is recognised that cross-border and interregional collaboration strategies should be developed to raise the potential of research and innovation activities (Navarro, 2018). While other papers list the development of a joint RIS3 Strategy across several regions as a

possibility and focus on the coordination of innovation policies, the process of the strategy development itself is not covered (Muller *et al.*, 2017). To do so, it becomes important to develop mechanisms to measure the proximity between regions. While factors such as geographical proximity between regions are obvious and intangible, dimensions of relational proximity such as shared norms can be assessed qualitatively, a coherent set of analytical tools to determine economic proximity is not present, as claimed by Balland *et al.* (2018) (Ulyarra *et al.*, 2014; Pagliacci *et al.*, 2019).

Linked to the strategy development, the logic of the theoretical foundation is to have i) an embeddedness, i.e. strong regional connections to certain sector and sub-sectors, ii) relatedness, i.e. knowledge spillovers, and iii) connectivity, i.e. connected in terms of networks, human-capital and face-to-face contact (McCann and Ortega-Argilés, 2015). Considering the last aspect iii) it is relevant to develop interregional projects within the S3 framework but also the strategy itself should contain a strategically interregional approach.

Thereby, interregional S3 can constitute a pillar for the European Cohesion Policy fostering processes to bridge the gap between more and less-developed regions among the European Union (European Commission, 2020a; McCann and Ortega-Argilés, 2015). The disparities are not only limited to economic structures but also include population and demographic characteristics, level of development, extent of urbanisation, environmental features, or the institutional and governance system (McCann and Ortega-Argilés, 2016). The cohesion aspect of S3 arises from the possibility to establish economic linkages between regions to facilitate a catch-up process through trade, knowledge transfer, policy-learning, and system-building efforts in less-developed regions (i.a. Trippel *et al.*, 2019). Particularly less-developed regions therefore have a high chance to benefit from Smart Specialisation and interregional cooperation although there are specific challenges to be resolved (Blažek and Csank, 2015). These benefits can date from catching-up processes as well as improved regional strengths in accordance with interregional value chains.

Interregional collaboration based on calculations of economic similarities or complementarities are considered a fruitful approach. Still, many EU regions and countries do not fully consider interregional collaboration as an effective way for the support of innovation and growth. This is because the relatively new concept of interregional S3 lacks a governance system which could be adapted and applied (Girejko *et al.*, 2019). Moreover, this lack of collaboration in the framework of Research and Innovation Strategies for Smart Specialisation (RIS3) is a general phenomenon, not only between regions of two countries, but also within countries. Examples come from the German federal states where less cooperation between the single RIS3 strategies can be observed (Bornemann *et al.*, 2017). Reasons for this are to be found in budget constraints to territorial boundaries. Another reason is that difficulties generally emerge in the implementation of RIS3 when the S3 frameworks have been inconsistent and lead to confusion by the regional authorities (Capello, 2014; Kroll, 2015). Also, Hassink and Gong (2019) argue that Smart Specialisation

remains to be a confusing concept which made it difficult to implement and which was rather a continuation of regional cluster policies. In this context, interregionality is much more difficult to introduce into policy action.

Accordingly, the methodology explained in this paper can only be a step forward for the establishment of interregional aspects to S3 contributing to a discussion which is just developing. In the following, while the specific component of the identification of interregional S3 priority areas is represented prominently, other relevant factors such as the Entrepreneurial Discovery Process (EDP) and management are not further addressed in this paper. The authors consider the developed methodology and its arguments to be a basis for further discussion and development.

#### **4. A new strategy for smart specialisation policy in interregional context**

The development of a RIS3 follows mainly a procedure of six steps (Foray, 2014): (i) analysis of the regional context and potential for innovation, (ii) set-up of a sound and inclusive governance structure, (iii) production of a shared vision about the future of the region, (iv) selection of a limited number of priorities for regional development, (v) establishment of suitable policy mixes, and, finally, (vi) integration of monitoring and evaluation mechanism. The process of developing an interregional methodology for S3 revealed a variety of challenges compared to a standardised S3: (i) the geographical context being “disconnected” (due to the large distance both physically and in terms of development, different economic structures, and innovation levels among the respective regions); (ii) temporary and relatively weak governance structures (project based, probably not universal); (iii) agreement on shared vision is difficult due to “disconnectedness” and weak governance; (iv) policy mixes are generally not compatible at interregional level, funding is largely differentiated, except for EU horizontal programs; and (v) monitoring and evaluation set in the project context are not easily transferable to permanent interregional structures.

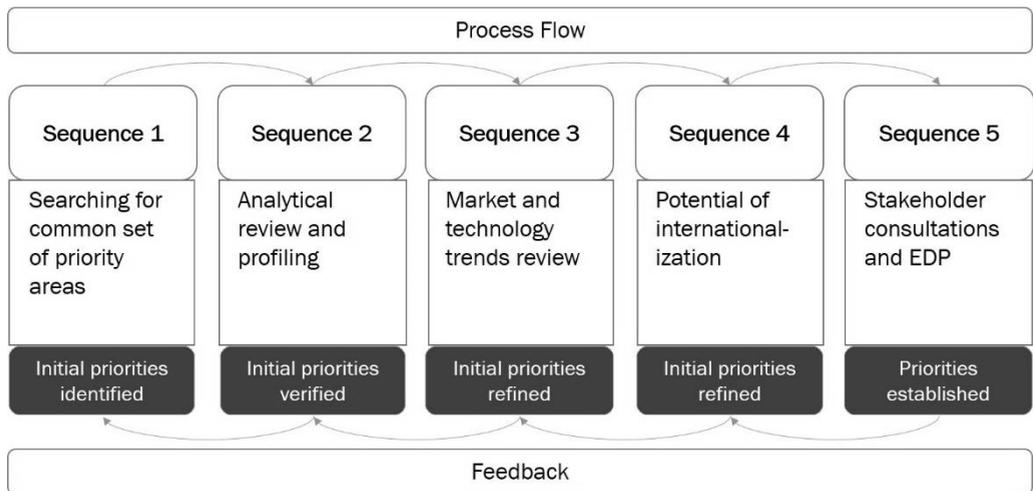
Taking into account the above mentioned six steps model by Foray *et al.* (2012) for a standardised policy process to set up a S3, the methodology presented here focuses mostly on the steps (i) analysis of the regional context and potential for innovation, and (iv) the selection of a limited number of priorities for regional development in order to set the basis of interregional specialisation.

It is suggested to introduce the following methodology if each of the regions to be analysed possesses its own Research and Innovation Strategy for Smart Specialisation. These regional RIS3 are considered as a starting point for the initial identification of the interregional S3 priorities. Finding common Smart Specialisation priorities and their underlying economic domains becomes an exercise of selecting common sets and refining this selection through appropriate further analyses with the participation of various stakeholders. The application of the full six standard steps (Foray *et al.*, 2012) would be required in the case that the regions do not possess a regional S3. Still, the application of the standard six steps

is difficult in the interregional context. Particularly in terms of establishing an appropriate governance system and setting up a common policy mix (Girejko *et al.*, 2019; Hassink and Gong, 2019).

The methodology developed breaks down the process of identifying priorities for interregional S3 into five sequences (see Figure 2).

**Figure 2. Interregional S3 identification**



Source: Authors' representation

Sequence 1 is to search for a common set of Research and Innovation Strategies of Smart Specialization (RIS3) domains in two or more regions. The initial sequence is to look for similarities between regions implemented in already existing S3 frameworks. The information on regional S3 can be obtained from regional S3 strategy documents (mainly at NUTS2 regional level). By analysing S3, it is relatively basic to list all Smart Specialization priority areas for the observed regions. It becomes apparent that there are priority areas which are common for the majority of regions such as general areas like logistics or certain services (European Commission, 2020b).

At this point, a study of further S3 documents in more detail is still needed and shall include: (i) listing all smart knowledge sectors / sub-sectors, and technologies at regional level; (ii) consolidating the regional Smart Specialisation domains from the various S3 levels. These consolidated regional domains are the basis for interregional consolidation: (iii) consolidating the interregional domains by identifying the common ones and allocating them to the appropriate Smart Specialisation priority areas that have been defined previously. The specific domains which clearly do not match the selected general priority areas should be deleted. As a result of the above analysis and combination of selection methods, the Smart

Specialisation priority areas and their underlying knowledge / technology domains (for e. g. NACE classification by sectors and sub-sectors) are defined.

The second sequence consists of a statistical review. The main reasons for sequence 2 are (i) to reset the reference points for priority areas and domains from the ones applied in the regional S3s; (ii) cross-checking that the identified Smart Specialisation priority areas (and their underlying domains) are statistically important currently; (iii) verifying that the conditions and trends at regional level have not significantly changed between the time when their individual S3s had been adopted and the current situation; (iv) introducing evidence into the process as some regional S3 could have some degree of normative policy-making (cf. also Gianelle *et al.*, 2019; Hassink and Gong, 2019).

When it comes to elaborating the interregional S3, each reference region can be compared in terms of measuring its regional specialisation (e. g. by location quotient, input-output analysis or other indices such as the Krugman-Index) (Farhauer and Kröll, 2009).

While some regional S3 might be still generally valid, not all of them have been regularly reviewed and updated while the economic developments, challenges, and technologies change. It appears to be plausible to suggest that each initially identified Smart Specialisation priority area and each domain should undergo a statistical review. Also, new priorities and domains should be considered to the extent that statistical data supports their relevance and importance.

Through the analytical review and profiling of the regions, the initially identified interregional S3 can be verified, meaning that some Smart Specialisation priority areas and their underlying domains should be added or deleted, based on the verifying statistics.

The third sequence is about market and technology trends. While analyses of previous data and the status quo are the objective of sequence 2, sequence 3 is outward- and future-oriented. Relevant market and technological trends affects the regional development. The market, industry and technology trends should be collected and analysed by researching publications (Association of German Engineers, 2015; European Commission, 2015).

The derivation of global trends and the specific fields of application follow a deductive approach: at first, a variety of global trends is identified. Thereunder fields such as health and provision of food, ecological issues such as climate change and energy, as well as major trends such as globalisation, demographic change, or urbanisation. Based on these trends, potential challenges are presented, showing connection to the major trends. To close the circle in favour of regional priority areas, the corresponding domains (e.g. by NACE classifications) connected to each trend and challenge are listed in order to underline which trends might be relevant for the (previous selected) domains. Also, less-developed regions generally show sectoral starting points for promising economic trends that can be addressed by Smart Specialisation.

The fourth sequence deals with the internationalisation potential of economic sectors. Because the interregional S3 aspect is at the core of the methodology at hand, it is relevant to assess the potential of the previously identified and revised smart priorities and domains (of the sequences 1-3). The internationalisation potential will depend on several factors, such as attractiveness of market niches served to/to be served, export data, proximity of the involved regions, existence of comparative advantages, or cultural linkages. The internationalisation potential is assessed with the help of regional experts in a quantitative framework that can be linked to the previously identified possible sectors for interregional cooperation.

The final sequence consists of stakeholder consultations whereby the outputs of all the previous sequences 1 to 4 constitute the input. This sequence is characterised by stakeholder involvement, consultations and running an Entrepreneurial Discovery Process, which (i) encourages and ensures an inclusive and interactive bottom-up involvement of university-industry, university-government, government-industry relations as well as public (i.e. “quadruple-helix” framework) through which the proposed smart priorities and domains can be assessed and new potential ones identified, mostly based on market and/or technological opportunities identified in the process; (ii) provides a vehicle for integrating entrepreneurial knowledge by strengthening connections and partnerships. The EDP process gives the interregional S3 framework the policy legitimisation (Foray, 2014).

Different tools can be used for the EDP such as communication platforms, including interregional ones, information provision on emerging market and technological opportunities, associations, clustering, or workshops. The sequence of consultations with an integrated EDP is the final sequence before finalising the framework of an interregional S3.

## **Conclusion and future development**

In the paper at hand, the authors suggest a methodology for an advanced process to develop a basis for interregional Smart Specialisation Strategies (S3) for regional development. The most promising approach is to build on the Smart Specialization Strategies (S3s) of the regions and not reinvent the wheel: nothing succeeds like success.

The S3 concept is one of the key instruments for Europe’s regional development. S3s provide a new building block for collaboration in the context of the European Union Cohesion policy. Considering the green transition in Europe, Smart Specialisation is an instrument of European innovation policy and leads to investments in certain technologies, raising sectors capacities, and to exploring new niches of structural diversification (Gianelle *et al.*, 2020). Smart Specialisation combines the required factors for an implementation of the Green Deal. Moreover, Smart Specialisation Strategies for Sustainability (S4), as currently discussed on

political level, introduce a green dimension in Smart Specialisation to complement economic and environmental aspects (McCann and Soete, 2020; Nakicenovic *et al.*, 2021). S4 could mobilise resources and financial investment, building upon place-based approaches and combining top-down directionality with bottom-up entrepreneurial activity. The already established concept of Smart Specialisation considers regional diversity to build upon competitive advantages and increase the position of a region in the knowledge economy. One strategy to develop the competitive advantage of moderate innovators regions is to develop a strategy to overcome regional disparities by leveraging regional growth potential. An interregional S3 is therefore required, which considers interregional knowledge and learning. But the heterogeneity makes it challenging to develop and implement such a common strategy. The paper at hand presents different steps, or sequences, which are elaborated to accompany the identification of smart priority areas for interregional S3. These sequences include analytical, market technology trends, internationalisation potential, and stakeholder aspects in the S3 development and can act as a basis for Smart Specialisation and regional catch-up processes.

Following the five sequences of the suggested methodology for interregional S3s leads to establishing certain priorities in a coherent, logical, and integrative manner which reflects the main underlying concepts of the S3. In this context, it is important that the whole process is iterative to a high degree, meaning that verifications and validations are carried out throughout all steps.

The methodology still faces limitations that need to be tackled in future practice. A central aspect is that the methodology in its current form is highly based on the availability of S3 frameworks, and, moreover, by statistics. This is partly challenging. The methodology requires regional S3 frameworks as a basis (for sequence 1), it is not yet working for regions that are at the beginning of the S3 development. A further challenge is that the existing regional S3 frameworks are mostly developed with different methods and professionalism making them hard to compare. Moreover, the paper does not represent a statistical-econometric paper and does not test the developed methodology either. Reference here is made to the paper by Kruse and Wedemeier (2021) which practically applies the methodology in less-developed regions, using the Tunisian regions of Sfax and Medenine as an example. Whereby Kruse and Wedemeier (2021) apply the five sequences there, including the qualitative and quantitative evaluation, a trend analysis and an analysis of the sectoral internationalisation potential.

A more critical aspect is of that kind that some Smart Specialization Strategies (S3) depend on traditional forms of innovation, i.e., technological innovations which might be linked to peculiar places as urban areas (leading and less-developed regions in terms of economic development and innovation). Especially for peripheral regions this is a critical aspect. Since smart development strategies are based on principles – embeddedness, relatedness, connectedness – as well as other locational factors like critical mass, it might be challenging to implement a regional S3 in peripheral and

less-developed regions. However, this is an issue for the aspect of an interregional S3, because of the lack of scale (i.e., low density, lack of diversification). On the contrary, an interregional S3 approach could support the development of less-developed regions by the co-invention aspect of innovation and application. The interregional S3 approach builds on the principles, it “borrows size” from the leading regions and gives extra-regional knowledge to less-developed regions. Therefore, particularly less-developed regions have a high chance to benefit from Smart Specialisation and interregional cooperation which is why the EU sees S3 as a building block to overcome regional disparities. These benefits can date from catching-up processes as well as improved regional strengths in accordance with interregional value chains.

**Acknowledgements:** The authors would like to thank Wieslaw Urban and Robert Girejko for their contribution. We would also like to thank two anonymous reviewers for valuable information, which helped to sharpen the paper’s content. The publication is an outcome of project results from the EU co-funded project GoSmart BSR (EU-Baltic Sea Region Programme, Grant-No. #R041) and GoSmart & Excel BSR (EU-Baltic Sea Region Programme, Grant-No. #X012).

## References

- Amendola A. Caroleo F. and Coppola G. (2006), Regional Disparities in Europe, in: Caroleo F. and Destefanis S. (eds.), *The European Labour Market, AIEL Series in Labour Economics*, Physica-Verlag HD. [https://doi.org/10.1007/3-7908-1680-9\\_2](https://doi.org/10.1007/3-7908-1680-9_2)
- Asheim, A. (2019), Smart Specialisation, Innovation Policy and Regional Innovation Systems: What about New Path Development in Less Innovative Regions?, *Innovation: The European Journal of Social Science Research*, 32(1), pp.8-25. <https://doi.org/10.1080/13511610.2018.1491001>
- Balland, P. Boschma, R. Crespo, J. and Rigby, D. (2018), Smart Specialization Policy in the European Union: Relatedness, Knowledge Complexity and Regional Diversification, *Regional Studies*, 53(9), pp.1252-1268. <https://doi.org/10.1080/00343404.2018.1437900>
- Balland, P. and Boschma, R. (2021), Complementary interregional linkages and Smart Specialisation: an empirical study on European regions, *Regional Studies*, 52(6), pp.1059-1070, <https://doi.org/10.1080/00343404.2020.1861240>
- Barzotto, M. Corradini, C. Fai, F. Labory, S. and Tomlinson, P. (eds.) (2019), *Revitalising Lagging Regions - Smart Specialisation and Industry 4.0*, Regional Studies Policy Impact Books, 1st ed, Taylor & Francis, Oxford.
- Belen, B. Gómez Prieto, J. Paton, J. Palazuelos, M. and Cabrera Giraldez, M. (2017), Innovation and Regional Specialisation in Latin America, *Joint Research Center (JRC) Technical Report, S3 Working Paper Series*. <https://doi.org/10.2760/114716>

- Blažek, J. and Csank, P. (2015), Can Emerging Regional Innovation Strategies in Less Developed European Regions Bridge the Main Gaps in the Innovation Process?, *Environment and Planning C: Government and Policy*, 34(6), pp.1095-1114. <https://doi.org/10.1177/0263774X15601680>
- Boettcher, F. Niebuhr, A. Schlitte, F. and Revilla Diez, J. (2014), The determinants of regional disparities in skill segregation evidence from German regions, in: Kourtit, K. Nijkamp, P. and Stimson, R. (eds.), *Applied regional growth and innovation models*, Berlin: Springer: pp.173-196.
- Bornemann, H. Kramer, J. Nellen, J. and Schrapers, M. (2017), *Status-quo der Regionalen Innovationsstrategien zur „intelligenten Spezialisierung“ (RIS3) der Bundesländer: Mit besonderer Betrachtung der Zusammenhänge zur Förderung über den EFRE 2014-2020*, Berlin, DE/Brussels, BE: prognos.
- Camagni, R. Capello, R. and Lenzi, C. (2014), A Territorial Taxonomy of Innovative Regions and the European Regional Policy Reform: Smart Innovative Policies, *Scienze Regionali*, 13(1), pp.69-105. <https://doi.org/10.3280/SCRE2014-001005>
- Capello, R. (2014), Smart Specialization Strategy and the New EU Cohesion Policy Reform: Introductory Remarks, *Scienze Regionali*, 13(1), pp.5-15. <https://doi.org/10.3280/SCRE2014-001001>
- Capello, R. and Lenzi, C. (2013), Territorial Patterns of Innovation and Economic Growth in European Regions, *Growth and Change*, 44(2), pp.195-227. <https://doi.org/10.1111/grow.12009>
- Cooke, P. (2016), Four minutes to four years: the advantage of recombinant over specialized innovation – RIS3 versus ‘smartspec’, *European Planning Studies*, 24(8), pp.1494-1510. <https://doi.org/10.1080/09654313.2016.1151482>
- Cortinovis, N. and Oort, F. (2015), Variety, Economic Growth and Knowledge Intensity of European Regions: A Spatial Panel Analysis, *The Annals of Regional Science*, 55(1), pp.7-32. <https://doi.org/10.1007/s00168-015-0680-2>
- D’Adda, D. Iacobucci, D. and Palloni, R. (2019), Relatedness in the Implementation of Smart Specialisation Strategy: A First Empirical Assessment, *Papers in Regional Science*, 99(3), pp.1-21. <https://doi.org/10.1111/pirs.12492>
- D’Adda, D. Guzzini, E. Iacobucci, D. and Palloni, R. (2017), Is Smart Specialisation Strategy coherent with regional innovative capabilities?, *Regional Studies*, 53(7), pp.1004-1016. <https://doi.org/10.1080/00343404.2018.1523542>
- European Commission (2015), *New Horizons: Future Scenarios for Research & Innovation Policies in Europe: A report from Project BOHEMIA*, Luxembourg, LU: Publications Office of the European Union.
- European Commission (2020a), *Cohesion Policy beyond 2020: Commission Helps Europe’s Regions Become More Innovative*, European Commission, (retrieved from: [https://ec.europa.eu/commission/presscorner/detail/en/IP\\_18\\_4184](https://ec.europa.eu/commission/presscorner/detail/en/IP_18_4184)).
- European Commission (2020b) *Benchmarking Regional Structure Rev. 2013 Finding reference regions based on structural similarities*, European Commission Smart Specialisation Platform, (retrieved from: <https://s3platform.jrc.ec.europa.eu/regional-benchmarking>).

- Eurostat (2018) *NUTS - Nomenclature of territorial units for statistics. GISCO: Geographical Information and Maps*, European Statistical Office, Accessed March 27 2018, (retrieved from: <https://ec.europa.eu/eurostat/>).
- Fagerberg, J. (2005), *The Oxford Handbook of Innovation*, Oxford, UK: Oxford University Press.
- Farhauer, O. and Kröll, A. (2009), Verfahren zur Messung räumlicher Konzentration und regionaler Spezialisierung in der Regionalökonomik, *Passauer Diskussionspapiere – Volkswirtschaftliche Reihe V-58-09*.
- Ferreira, J. Farinha, L. Rutten, R. and Asheim, B. (2021), Smart Specialisation and learning regions as a competitive strategy for less developed regions, *Regional Studies*, 55 (3), pp.373-376, <https://doi.org/10.1080/00343404.2021.1891216>
- Foray D. (2014), *Smart Specialisation: Opportunities and Challenges for Regional Innovation Policy*, London, UK: Routledge.
- Foray, D. (2018), Smart Specialisation Strategies and Industrial Modernisation in European Regions – Theory and Practice, *Cambridge Journal of Economics*, 42(6), pp.1505-1520. <https://doi.org/10.1093/cje/bey022>
- Foray, D. Goddard, J. Beldarrain, X. Landabaso, M. McCann, P. Morgan, K. Nauwelaers, C. and Ortega-Argilés, R. (2012), *Guide to Research and Innovation Strategies for Smart Specialisation (RIS3)*, Luxemburg, LU: Publications Office of the European Union.
- Foray, D. Morgan, K. and Radosevic, S. (2018), The Role of Smart Specialisation in the EU Research and Innovation Policy Landscape, *European Commission Publications*, Accessed May 03 2020, (retrieved from: <https://ec.europa.eu/>).
- Geppert, K. Happich, M. and Stephan, A. (2004), Regional Disparities in the European Union: Convergence and Agglomeration, *Papers in Regional Science*, 87(2). <https://doi.org/10.1111/j.1435-5957.2007.00161.x>
- Gianelle, C. Guzzo, F. and Mieszkowski, K. (2019), Smart Specialisation: What Gets Lost in Translation from Concept to Practice?, *Regional Studies*, 54(10), pp.1377-1388. <https://doi.org/10.1080/00343404.2019.1607970>
- Gianelle, C. Kyriakou, D. McCann, P. and Morgan, K. (2020), Smart Specialisation on the move: reflections on six years of implementation and prospects for the future, *Regional Studies*, 54(10), pp.1323-1327, <https://doi.org/10.1080/00343404.2020.1817364>
- Girejko, R. Kruse, M. Urban, W. and Wedemeier, J. (2019), Methodology for Transnational Smart Specialisation Strategy, *GoSmart BSR Policy Paper*, Interreg Baltic Sea Region. Cēsis, LV: Vidzeme Planning Region.
- Gómez Prieto, J. Demblans, A. and Palazuelos Martínez, M. (2019), *Smart Specialisation in the World, an EU Policy Approach Helping to Discover Innovation Globally*, Joint Research Center (JRC) Science for Policy Report, Luxemburg, LU: Publications Office of the European Union.
- Hartog, M. Boschma, R. and Sotarauta, M. (2012), The Impact of Related Variety in Regional Employment Growth in Finland 1992-2006: High-Tech versus Medium/Low-Tech,

- Industry and Innovation*, 19(6), pp.459-476. <https://doi.org/10.1080/13662716.2012.718874>
- Hassink, R. and Gong, H. (2019), Six Critical Questions about Smart Specialization, *European Planning Studies*, 27(10), pp.2049-2065. <https://doi.org/10.1080/09654313.2019.1650898>
- Iammarino, S., Rodriguez-Pose, A. and Storper, M. (2018), Regional Inequality in Europe: Evidence, Theory and Policy Implications, *Journal of Economic Geography*, 19(2), pp.273-298. <https://doi.org/10.1093/jeg/lby021>
- Kogut-Jaworska, M. and Ociepa-Kicinska, E. (2020), Smart Specialisation as a Strategy for Implementing the Regional Innovation Development Policy – Poland Case Study, *Sustainability*, 12, 7986.
- Kroll, H. (2015), *Weaknesses and Opportunities of RIS3-Type Policies: Seven Theses*, Karlsruhe, DE: Fraunhofer ISI.
- Kruse, M. and Wedemeier, J. (2019a), *Mehr Konvergenz durch regionale Spezialisierung?*, Makronom, February 24 (retrieved from: <https://makronom.de>).
- Kruse, M. and Wedemeier, J. (2019b), Grenzen intelligenter Spezialisierungsstrategien, *Wirtschaftsdienst*, 99 (11), pp.795-797. <https://doi.org/10.1007/s10273-019-2531-8>
- Kruse, M. and Wedemeier, J. (2021), Smart Specialisation strategies in North Africa: a catching-up strategy for less-developed countries – the case of Tunisia, *The Journal of North African Studies*. <https://doi.org/10.1080/13629387.2021.1958680>
- Larrea, M. Estensoro, M. and Pertoldi, M. (2019), *Multilevel Governance for Smart Specialisation: Basic Pillars for Its Construction*, Joint Research Center (JRC) Technical Report, Luxemburg, LU: Publications Office of the European Union.
- Lopes, J. Ferreira, J. and Farinha, L. (2018), Innovation Strategies for Smart Specialization (RIS3): Past, Present and Future Research. *Growth and Change*, 50(1), pp.38-68. <https://doi.org/10.1111/grow.12268>
- McCann, P. and Ortega-Argilés, R. (2013), Transforming European Regional Policy: Smart Specialisation and a Results-Driven Agenda, *Oxford Review of Economic Policy*, 29(2), pp.405-431. <https://doi.org/10.1093/oxrep/grt021>
- McCann, P. and Ortega-Argilés, R. (2015), Smart Specialisation, Regional Growth and Applications to European Cohesion Policy, *Regional Studies*, 49(8), pp.1291-1302. <https://doi.org/10.1080/00343404.2013.799769>
- McCann, P. and Ortega-Argilés, R. (2016), Smart Specialisation: Insights from the EU Experience and Implications for Other Economies, *Investigaciones Regionales – Journal of Regional Research*, 36, pp.279-293.
- McCann, P. and Soete, L. (2020), Place-based innovation for sustainability, *Joint Research Center (JRC) Technical Report*, Luxemburg, LU: Publications Office of the European Union.
- Montesor, S. and Quatraro, F. (2018), Green technologies and smart specialisation strategies: a European patent-based analysis of the intertwining of technological relatedness and Key-Enabling-Technologies, *LEI&BRICK Working Paper*, 04/2018.

- Muller, E. Zenker, A. Hufnagl, M. Héraud, J. Schnabl, E. Makkonen, T. and Kroll, H. (2017), Smart Specialisation Strategies and Cross-Border Integration of Regional Innovation Systems: Policy Dynamics and Challenges for the Upper Rhine, *Environment and Planning C: Politics and Space*, 35(4), pp. 684-702. <https://doi.org/10.1177/0263774X16688472>
- Nakicenovic, N. Zimm, C. Matusiak, M. and Ciampi Stancova, K. (2021), *Smart Specialisation, Sustainable Development Goals and environmental commons – Conceptual framework in the context of EU policy*, *Science for Policy Report*, Luxemburg, LU: Publications Office of the European Union. <https://doi.org/10.2760/766406>
- Navarro, M. (2018), Regional Cross-Border Cooperation and RIS3, *RIS3 Vivo Policy Brief 1*, Orkestra – Basque Institute of Competitiveness and Deusto Business School.
- Organisation for Economic Co-Operation and Development (OECD) (2013), *Innovation-driven Growth in Regions: The Role of Smart Specialisation*, *Organisation for Economic Co-Operation and Development* (retrieved from <https://www.oecd.org>).
- Pagliacci, F. Pavone, P. Russo, M. Giorgi, A. (2019), Regional Structural Heterogeneity: Evidence and Policy Implications for ris3 in Macro-Regional Strategies, *Regional Studies*, 54(6), pp.765-775. <https://doi.org/10.1080/00343404.2019.1635689>
- Pugh, R. (2017), Questioning the Implementation of Smart Specialisation: Regional Innovation Policy and Semi-Autonomous Regions., *Environment and Planning C: Politics and Space*, 36(3), pp.530-547. <https://doi.org/10.1177/2399654417717069>
- Rakhmatullin, R. Hegyi, F. Ciampi, S. Gomez, J. and Mieskowski, K. (2020), *Methodological Manual – Developing Thematic Interregional Partnerships for Smart Specialisation*, Joint Research Center (JRC) Science for Policy Report, Luxemburg, LU: Publications Office of the European Union.
- S3 Platform (2019), *R&I Regional Viewer*, (retrieved from <https://s3platform.jrc.ec.europa.eu/synergies-tool>).
- Schumpeter, J. (1950), *Capitalism, socialism, and democracy*, 3rd ed., New York: Harper.
- Trippel, M. Zukauskaitė, E. and Healy, A. (2019), Shaping Smart Specialization: The Role of Place-Specific Factors in Advanced, Intermediate and Less-Developed European Regions, *Regional Studies*, 54(10), pp.1328-1340. <https://doi.org/10.1080/00343404.2019.1582763>
- Ulyarra, E. Sörvik, J. and Midtkandal, I. (2014), Inter-regional Collaboration in Research and Innovation Strategies for Smart Specialisation (RIS3), *Joint Research Center (JRC) Technical Report, S3 Working Paper Series*, 6, Luxemburg, LU: Publications Office of the European Union. <https://doi.org/10.2791/13682>
- Woolford, J. Amanatidou, E. Gerussi, E. and Mark, B. (2020), Interregional Cooperation and Smart Specialisation: a Lagging Regions Perspective, *Joint Research Center (JRC) Technical Report*, Luxemburg, LU: Publications Office of the European Union. <https://doi.org/10.2760/379859>