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Analysis of key parameters of Smart Specialisation Strategies (S3)

Smart Growth Matrix meeting

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Agenda

Background & scope of the study

Specific assessment of the potential of S3 for interregional cooperation

Assessment of opportunities related to the green & digital transition

Assessment of links to Horizon 2020 & Horizon Europe

Analysis of related vs. unrelated diversification

The S3 Scoreboard 2022

Scope of the study and its objectives: 5 core questions

Interregional cooperation potential: What is the potential for interregional cooperation regarding the S3 strategies and priorities chosen by Member States and regions and in which areas?

Green and digital transition:

- How do S3 strategies contribute to key Commission priorities, in particular the Twin Transition?
- What are the opportunities of S3 to contribute to the Green Deal in rural, less developed, and peripheral regions?

Links to EC research funding:

- What is the link between S3 priorities and Horizon 2020 projects?
- What are possible complementarities with the key Horizon Europe instruments?

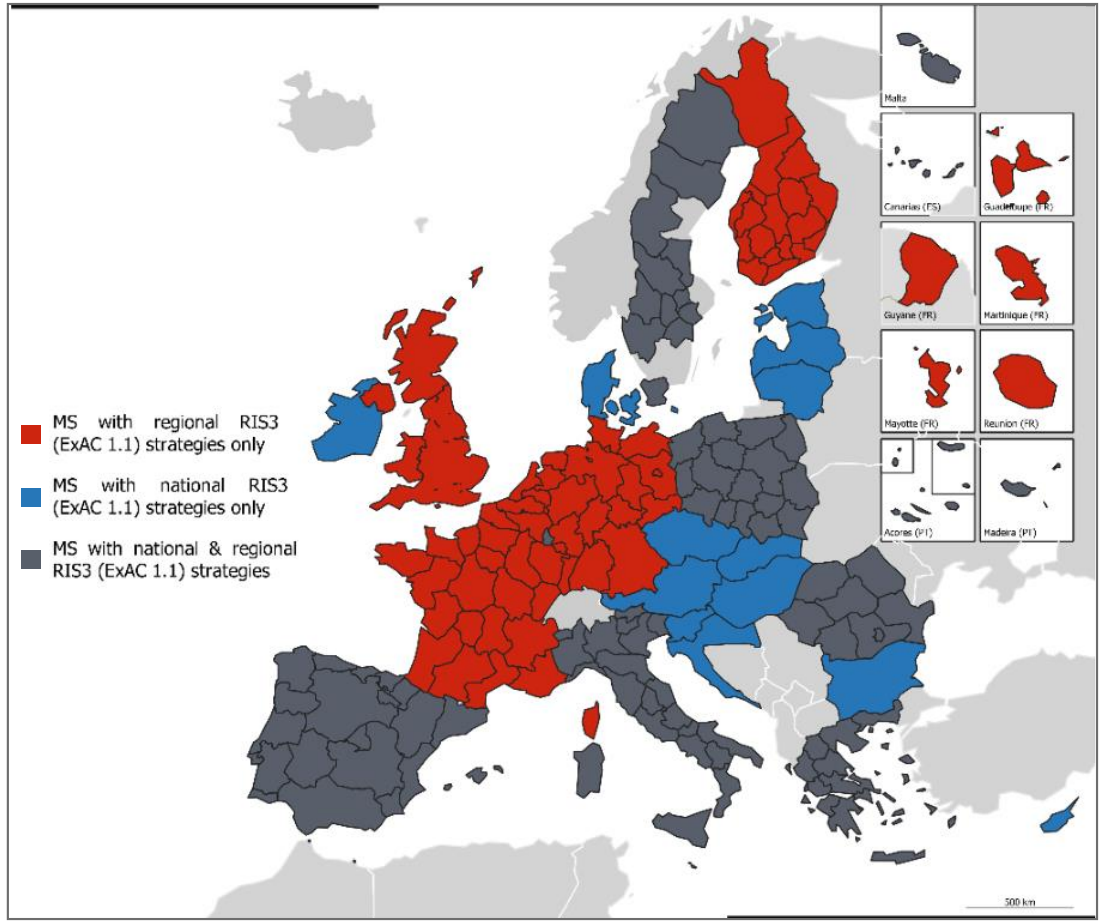
Related vs. unrelated diversification:

- What determines an 'optimal bandwidth' of S3 strategies
- Under which conditions is a strategy of related or unrelated diversification a "good" option for a MS/region?

S3 Scoreboard:

What is needed for an integrated methodology leading towards a single comparative map of the S3 Scoreboard?

Empirical basis from predecessor study as starting point for in-depth analyses



Collection of S3 strategies

- **185 S3 strategies** and accompanying documents collected / 181 interviews conducted
- **Creation of an online questionnaire** that was filled in for all 185 S3-strategies

Analysis of correspondence

- **Datasets were created** (for economic, scientific, techn. profiles and relatedness and complexity)
- **Correspondence and cluster analysis**
- **Ten case studies** conducted

Assessment of priorities

- **Prioritisation database** was developed (1,014 priorities)
- 88 NACE 2-digit level sectors, 22 FOR 2-digit level dimensions, 35 Technology fields

Assessment of implementation

- **186 ERDF project/beneficiary lists** collected and connected to the JRC dataset
- **2,876 ERDF calls collected** (2,328 T01 calls)

Source: Prognos / CSIL (2021): Study on prioritisation in smart specialisation strategies in the EU

Specific assessment as regards interregional cooperation potential

01

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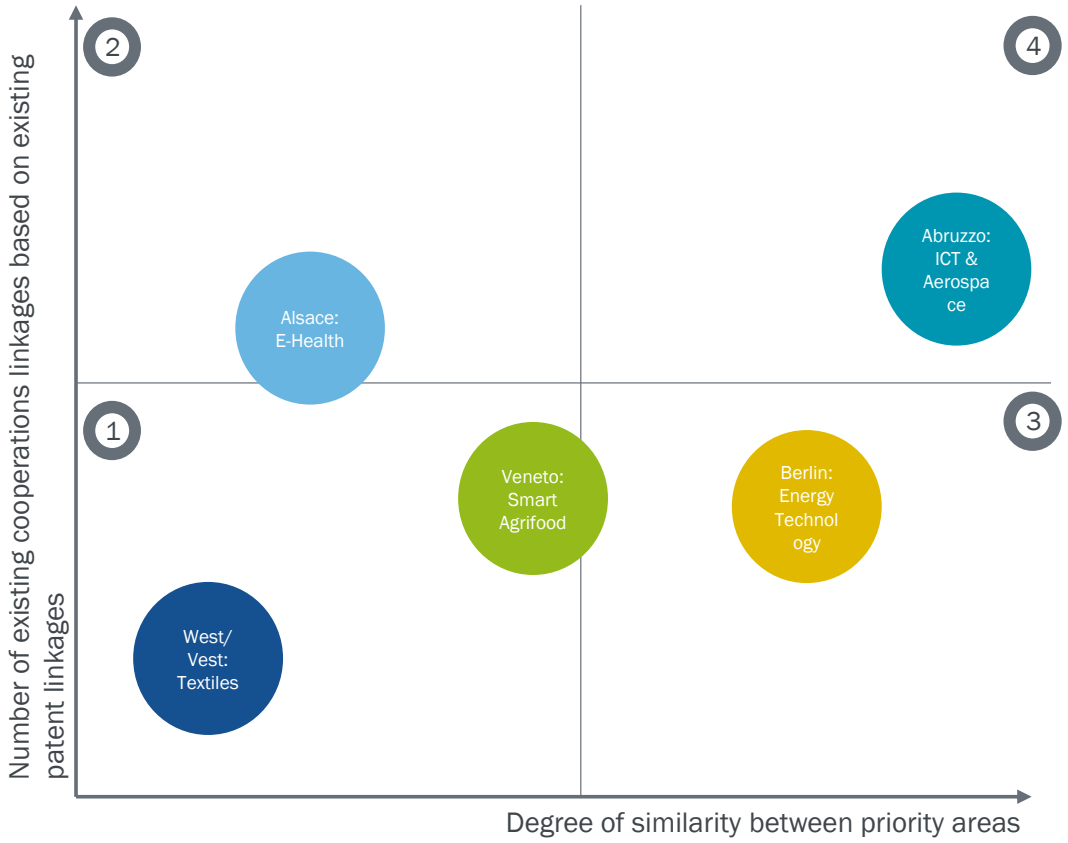
Detecting interregional cooperation potential based on patents & similarity between S3 priority areas

Cooperation-Similarity Matrix



Based on these assessments, **matrices** can be developed to draw recommendations regarding cooperation potential. The 4 quadrants are:

1. **Low similarity & low existing number of cooperation linkages**: Low potential for interregional cooperation
2. **Low similarity & high existing number of cooperation linkages**: Due to low similarity between given priority areas there is low potential for interregional cooperation
3. **High similarity & low existing number of cooperation linkages**: Degree of similarity between priority areas offers promising opportunity for collaboration. Cooperation should further be developed
4. **High similarity and high existing number of cooperation linkages**: The collaboration between the regions should be maintained & further strengthened

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Several S3 priorities showcase cross-industry collaboration potential

Cooperation potential by overarching topics of S3 priority areas

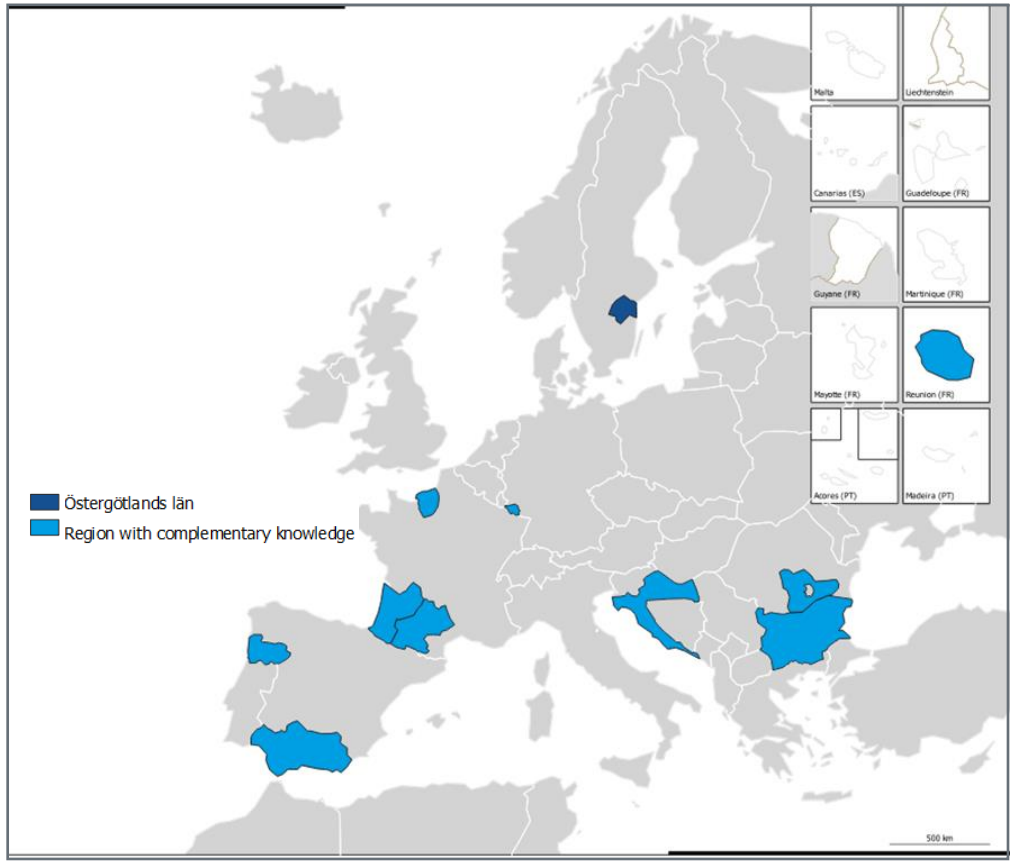
Overarching Topics	Aerospace & Defense	Agrofood & Bioeconomy	Blue Growth	CleanTech & Circular Economy	Construction	Energy & Energy Storage	Fashion, Media & Creative Industries	Health & Life Sciences	ICT & Industry 4.0	Materials & Advanced Manufacturing	Mobility & Logistics	Other	Social Innovation & Welfare	Tourism, Cultural & Creative Industries
Aerospace & Defense	3%	1%	1%	1%	1%	1%	1%	0%	2%	1%	2%	1%	1%	1%
Agrofood & Bioeconomy	14%	25%	19%	21%	18%	20%	12%	15%	12%	19%	16%	19%	21%	19%
Blue Growth	4%	4%	6%	4%	4%	4%	3%	3%	3%	4%	4%	3%	4%	4%
CleanTech & Circular Economy	7%	7%	7%	8%	8%	8%	5%	4%	5%	7%	6%	6%	6%	6%
Construction	3%	2%	2%	3%	3%	3%	1%	1%	2%	2%	2%	2%	1%	1%
Energy & Energy Storage	12%	10%	11%	12%	13%	15%	4%	3%	8%	9%	10%	9%	6%	6%
Fashion, Media & Creative Industries	1%	1%	1%	1%	1%	1%	4%	2%	3%	2%	2%	2%	2%	2%
Health & Life Sciences	4%	11%	10%	9%	5%	5%	17%	34%	14%	11%	8%	13%	18%	17%
ICT & Industry 4.0	17%	9%	13%	11%	13%	12%	25%	14%	25%	11%	15%	13%	13%	15%
Materials & Advanced Manufacturing	15%	15%	13%	15%	17%	15%	12%	12%	10%	19%	16%	15%	13%	13%
Mobility & Logistics	16%	8%	11%	10%	11%	11%	9%	6%	11%	10%	14%	10%	9%	10%
Other	2%	2%	1%	2%	2%	2%	1%	1%	2%	2%	2%	1%	2%	1%
Social Innovation & Welfare	1%	1%	1%	1%	0%	0%	1%	1%	1%	1%	1%	1%	0%	1%
Tourism, Cultural & Creative Industries	2%	3%	3%	3%	3%	3%	5%	4%	3%	3%	3%	3%	4%	4%
Total number of links	**1,736**	**29,698**	**5,918**	**10,192**	**3,452**	**16,375**	**2,569**	**20,062**	**21,957**	**23,072**	**15,628**	**2,401**	**1,112**	**5,216**

Source: Prognos/CSIL (2022). Note: overarching topics addressed by the S3 priority areas have been established in the predecessor study. The shares show the number of potential linkages for cooperation from a given overarching topic to a respective overarching topic divided by all the potential linkages to that respective overarching topic.

Analysis of complimentary knowledge in S3 priorities underlines vast cooperation potential in the EU

- S3 show **profound potential for interregional cooperation:** a total of around **159,000 possible linkages** between S3 strategies & their respective priority areas has been detected.
- Our database shows for each priority area potential linkages with priority areas of different regions with complimentary knowledge in their priority areas.
- **However:** varying quality of priority area descriptions. More potential for cooperation sometimes based on more extensive priority descriptions.

Example: Interregional cooperation potential for Östergötlandslän, priority area "Smart, secure & robust connected products and systems"

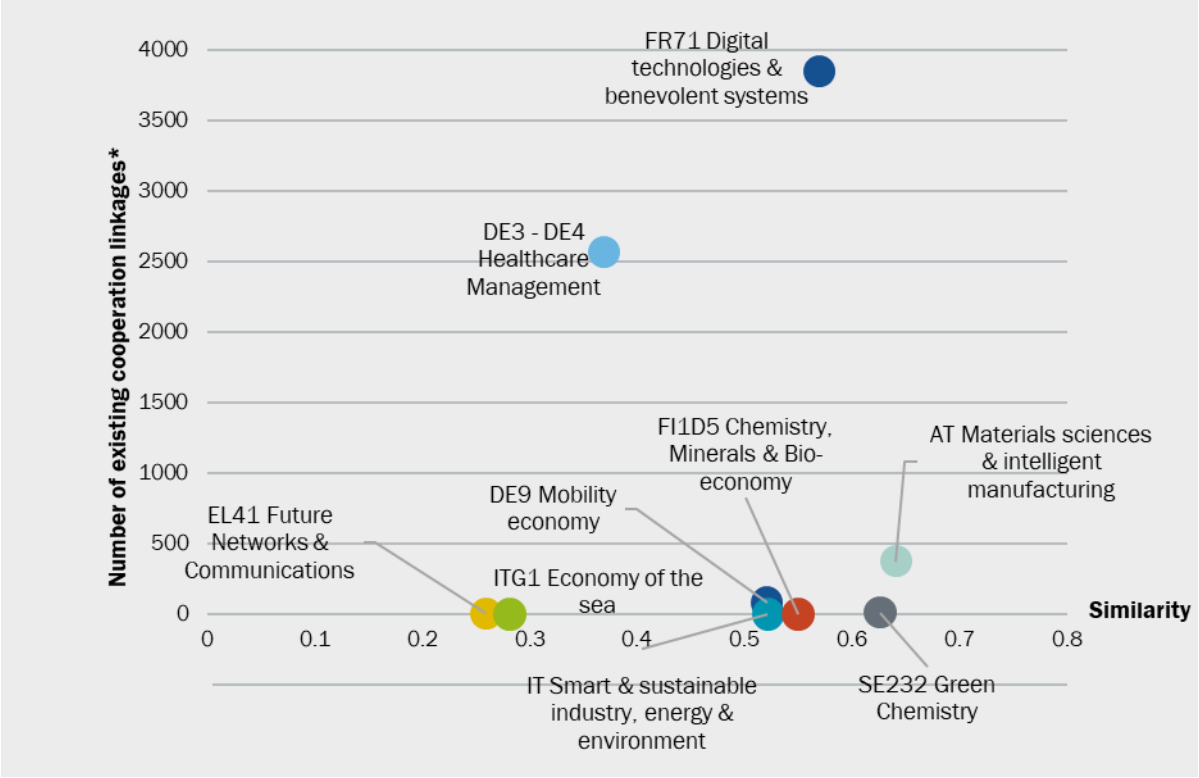


Source: Prognos/CSIL (2022). n = 11 regions.

Considerable gap between potential & existing cooperations

Gap analysis between potential & existing cooperation

Regions with interregional cooperation potential with NRW and its priority area "Green Economy" (by similarity & number of existing cooperation linkages*)



- For majority of identified potential cooperation linkages the number of existing cooperations is low or non-existing
- Database allows to **derive recommendations** for interregional cooperation for each region, e.g. NRW:
  - Collaboration with Rhône-Alpes/FR (Digital technologies & benevolent systems) should be maintained & further strengthened
  - Västra Götaland län/SE (Green Chemistry), Central Ostrobothnia/FI (e.g., Chemistry, Minerals & Bioeconomy) & national Italian strategy (Smart sustainable industry, energy & environment) as promising opportunity for collaboration

Source: Prognos/CSIL (2022). * based on patents. Note: Degree of similarity is shown on the abscissa & the number of cooperation linkages on the ordinate. AT: Austria; DE3–DE4: Berlin/Brandenburg; DE9: Lower Saxony; EL41: North Aegean; FI1D5: Central Ostrobothnia; FR71: Rhône-Alpes; IT: Italy (national strategy); ITG1: Sicily; SE232: Västra Götalands län.

Assessment of opportunities related to the green and digital transition

02

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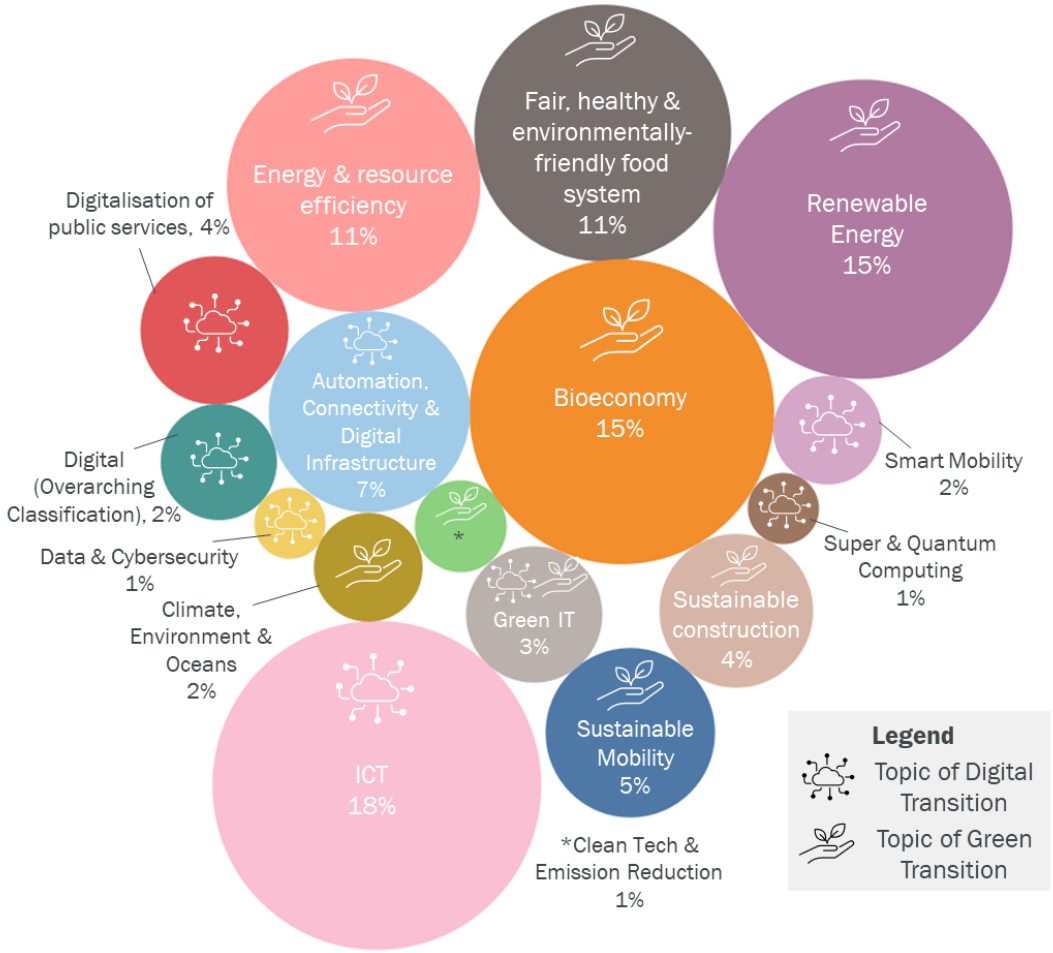
Priority areas of the 185 S3 show significant connections to topics of the Twin Transition

Conceptual taxonomy for topics of Twin Transition

Green Transition	
Bioeconomy	Circular Economy
Clean Tech & Emission Reduction	Climate, Environment & Oceans
Energy efficiency & resource efficiency	Renewable Energy
Sustainable Construction	Sustainable Mobility
Fair, healthy & environmentally friendly food system	
Digital Transition	
Artificial Intelligence	Automation, Connectivity & Digital Infrastructure
Blockchain	Data & Cybersecurity
Digital Skills	Digitalisation of public services
Hardware	ICT
Smart Mobility	Super & Quantum Computing
Digital (General Classification)	

Green IT

Key topics of the Twin Transition addressed by S3 priorities, by % of identified matches with high relevance



Source: Prognos/CSIL (2022), n=361 matches with a high relevance from 275 priority areas. One priority area can have multiple references to topics of the Twin Transition. If a region had updated its strategy during the period 2014-2020, only the updated strategy is included in the analysis. Note: no matches with a high relevance for Artificial intelligence, Blockchain, Circular Economy, Digital Skills, and Hardware

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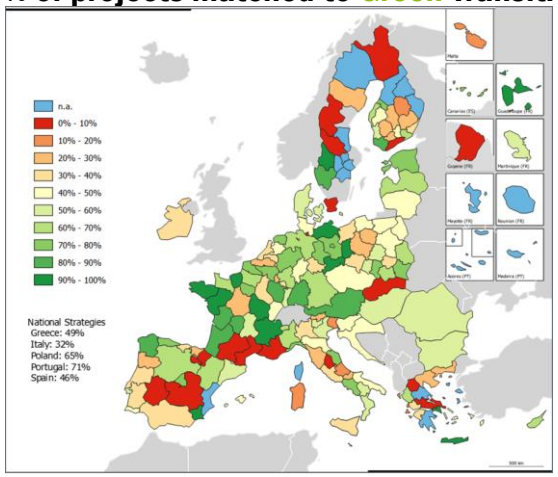
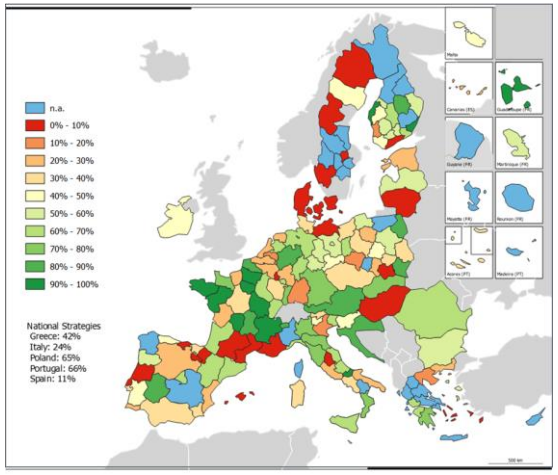
ERDF R&I projects implemented during the 2014-2020 period have considerably contributed to the Twin Transition

% of projects matched to Green Transition



% of projects matched to digital Transition



Overall, **71% of the projects** that were connected to the priority areas in the predecessor study are generally linked to topics of the green & digital transition (35,157 out of 49,749)

Around **€14.9 billion (75%)** of the project budget that has been channeled into the priority areas can be generally linked to topics of the Twin Transition

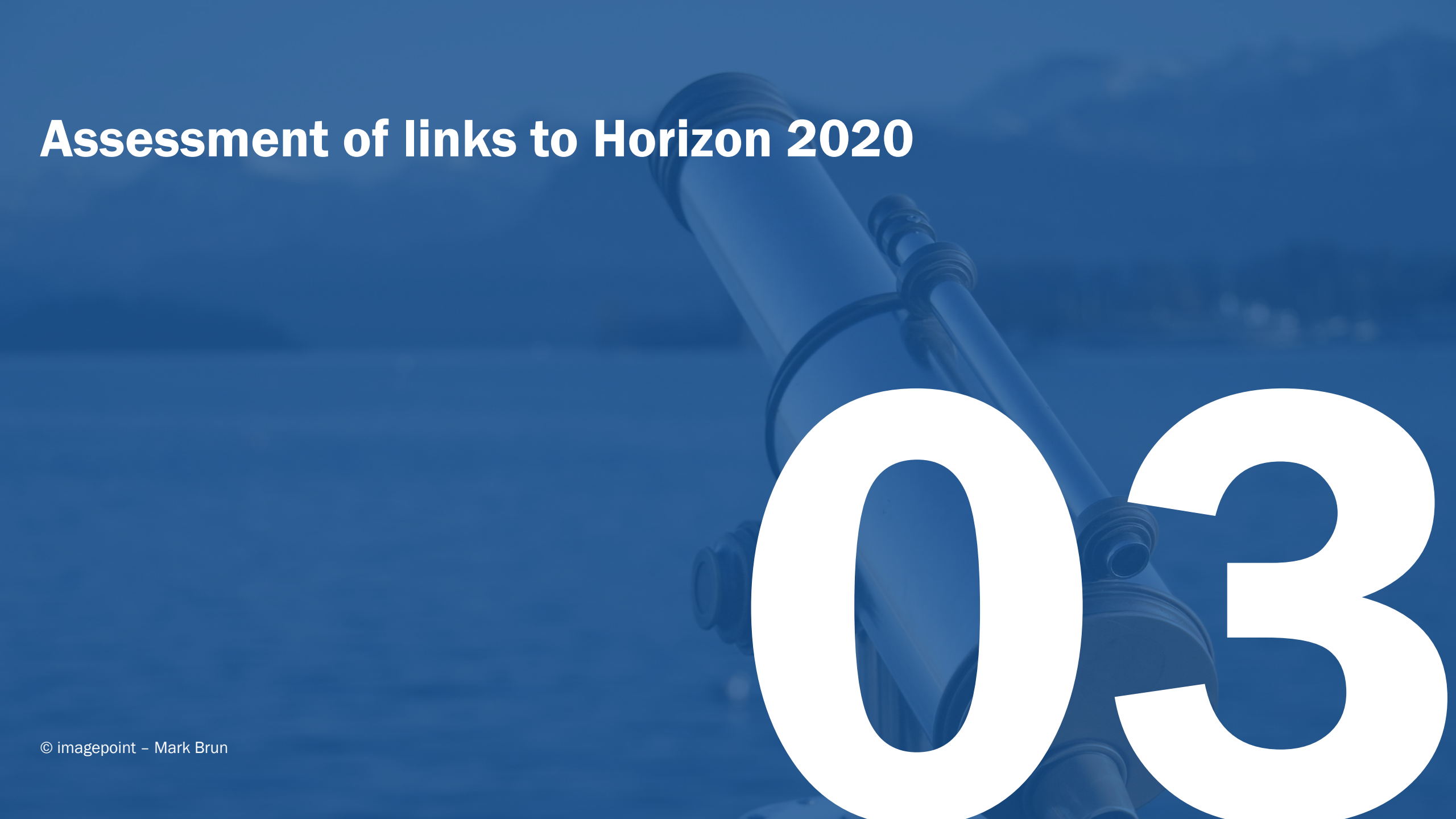
17,861 of the 49,749 projects (36%) can be connected to priorities with a **high relevance** to the Twin Transition

More projects can be matched to priority areas with a high relevance to the **green** compared to the digital transition

EU13: More projects & budget matched to priority areas with a high relevance to the green Transition
EU15: More projects & budget matched to priorities with a high relevance to the digital transition

Source: Prognos/CSIL (2022). n = 181 regions. Note: The number show the share of project budget connected to priority areas that are relevant to topics of the green/digital transition relative to all successfully connected projects. Blue regions without available projects and/or priority areas that have been linked to topics of the green / digital transition. Data for Romanian regions is aggregated at the NUTS0 level. When a region is covered by both a national strategy and a sub-national strategy, the coloured area of the sub-national region refers to the correspondence of the sub-national strategy. The values for the national strategies are given by the figures next to the respective regions.These Member States are Italy, Greece, Spain, Poland, and Portugal.

Assessment of links to Horizon 2020



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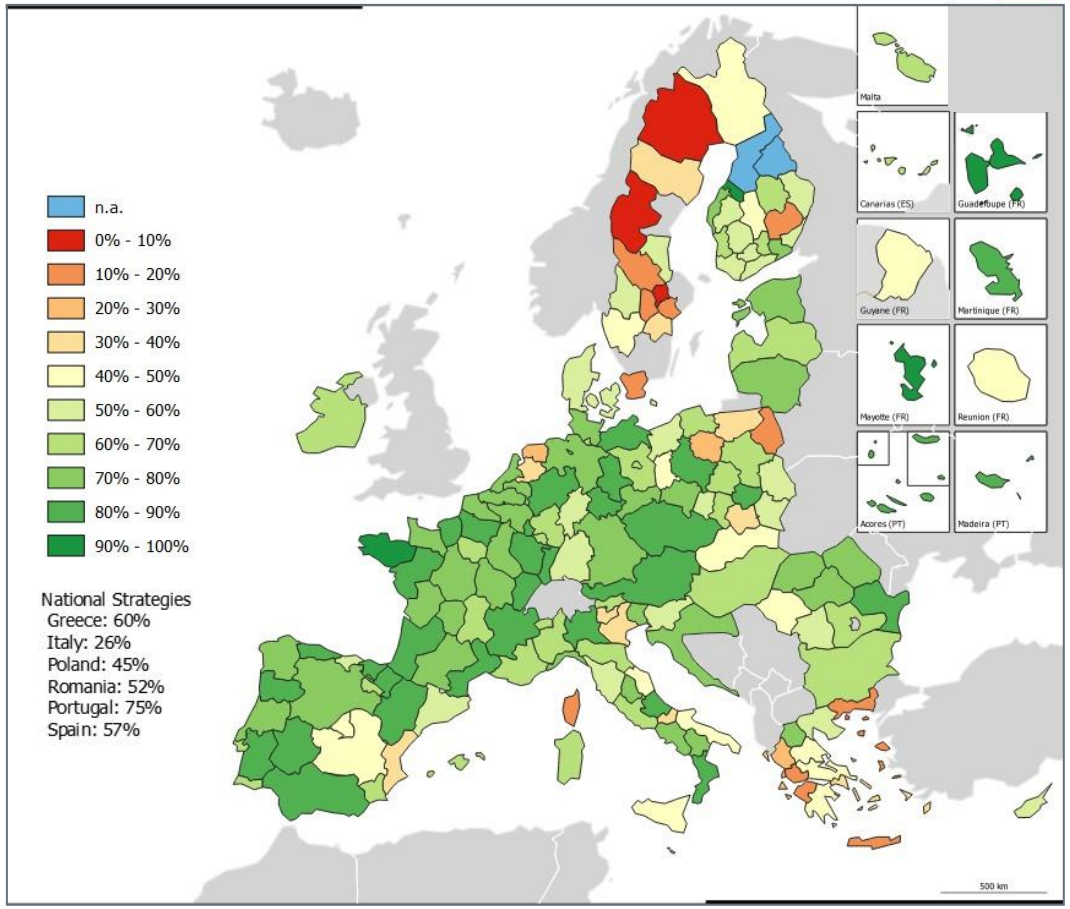
High degree of thematic coherence found between S3 and H2020 projects

Overall, around 69,540 out of around 108,300 H2020 projects (64%) and can be linked to S3 priority areas

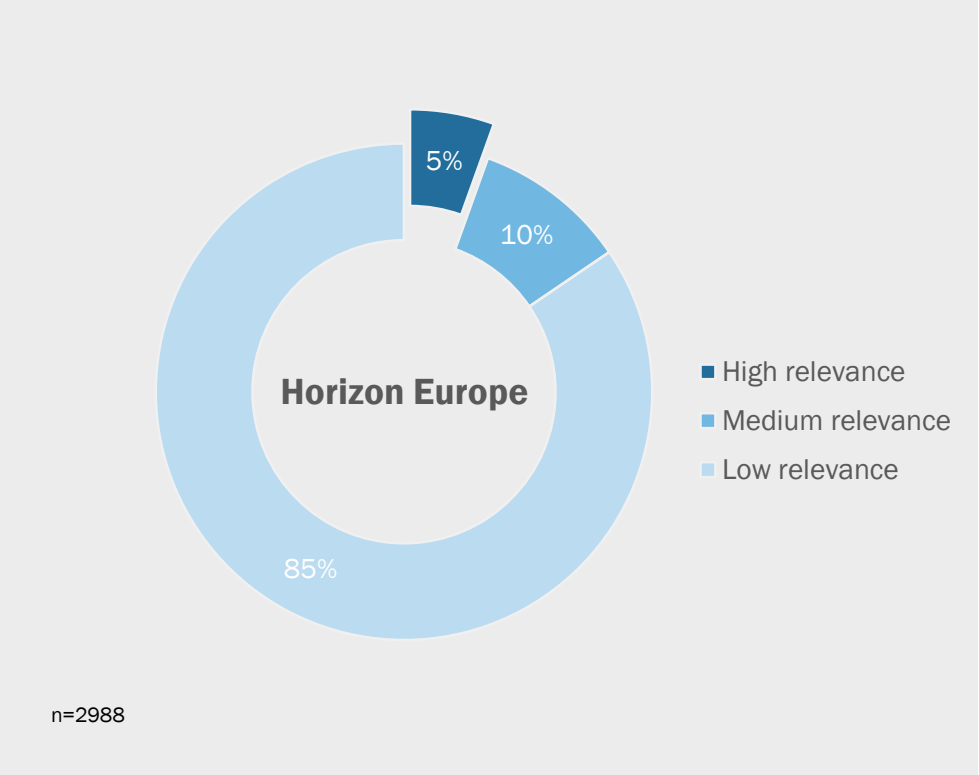


- Around 48% (€28.6bn out of €60bn) of the **H2020 budget** in the respective regions can be linked to the priority areas
- The majority of these projects are assigned to the following overarching **topics**:
  - "Health & Life Sciences" (21%)
  - "ICT & Industry 4.0" (19%)
  - "Agrofood & Bioeconomy" (14%)
- At least **7% of the ERDF funded organisations** are also conducting projects funded by Horizon 2020 between 2014 to 2020 (3,417 out of 51,674 organisations).
- **Regional distribution**: Share of organisations funded by both ERDF & Horizon 2020 is significantly higher among the EU15 Member States/regions

Source: Prognos/CSIL (2022). n= 179 regions. Note: When a region is covered by both a national strategy and a sub-national strategy, the coloured area of the sub-national region refers to the correspondence of the sub-national strategy. The values for the national strategies are given by the figures next to the respective regions. These Member States are Italy, Greece, Spain, Poland, and Portugal No H2020 projects in Northern Ostrobothnia and Kainuu

High degree of coherence between Horizon Europe key funding areas and S3 priority areas

Matches between S3 priorities & Horizon Europe key funding areas, by their relevance



Source: Prognos/CSIL (2022). n=2988 matches from 924 priority areas. One priority area can have multiple references to key Horizon Europe funding areas. If a region had updated its strategy during the period 2014-2020, only the updated strategy is included in the analysis

- **Almost all S3 priority areas matched with Horizon Europe** key funding areas (924 out of 1018; 91%)
- **130 priority areas** with high relevant matches to the Horizon Europe key funding areas. The majority of those priority areas been matched to the funding areas:
  - Health
  - Soil health and food
  - Food, Bioeconomy, Natural Resources, Agriculture & Environment
  - Climate-neutral & smart cities
  - Digital, Industry & Space

➢ It is important to **exploit the complementarity and to further create synergies** between ERDF & Horizon funding

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Analysis on related vs. unrelated diversification

04

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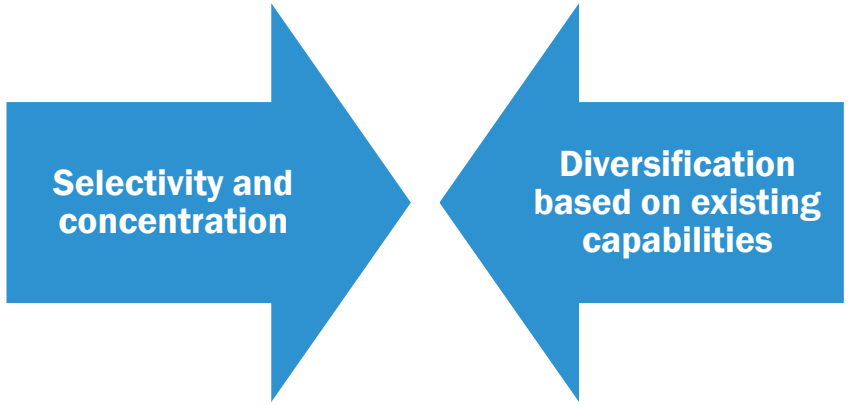
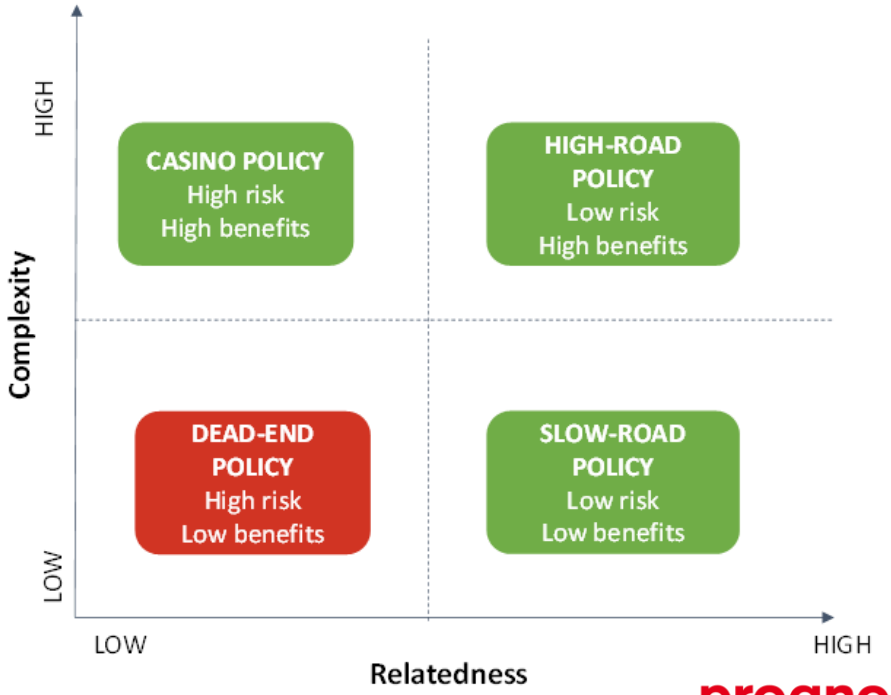
Analysis contributes to the literature by developing a “theory for a good S3”

Have regional and national authorities selected S3 priority areas that can be regarded as optimal with respect to their profile, capabilities, and other fundamental socio-economic features?

General principles of a good S3



Four potential specialisation strategies



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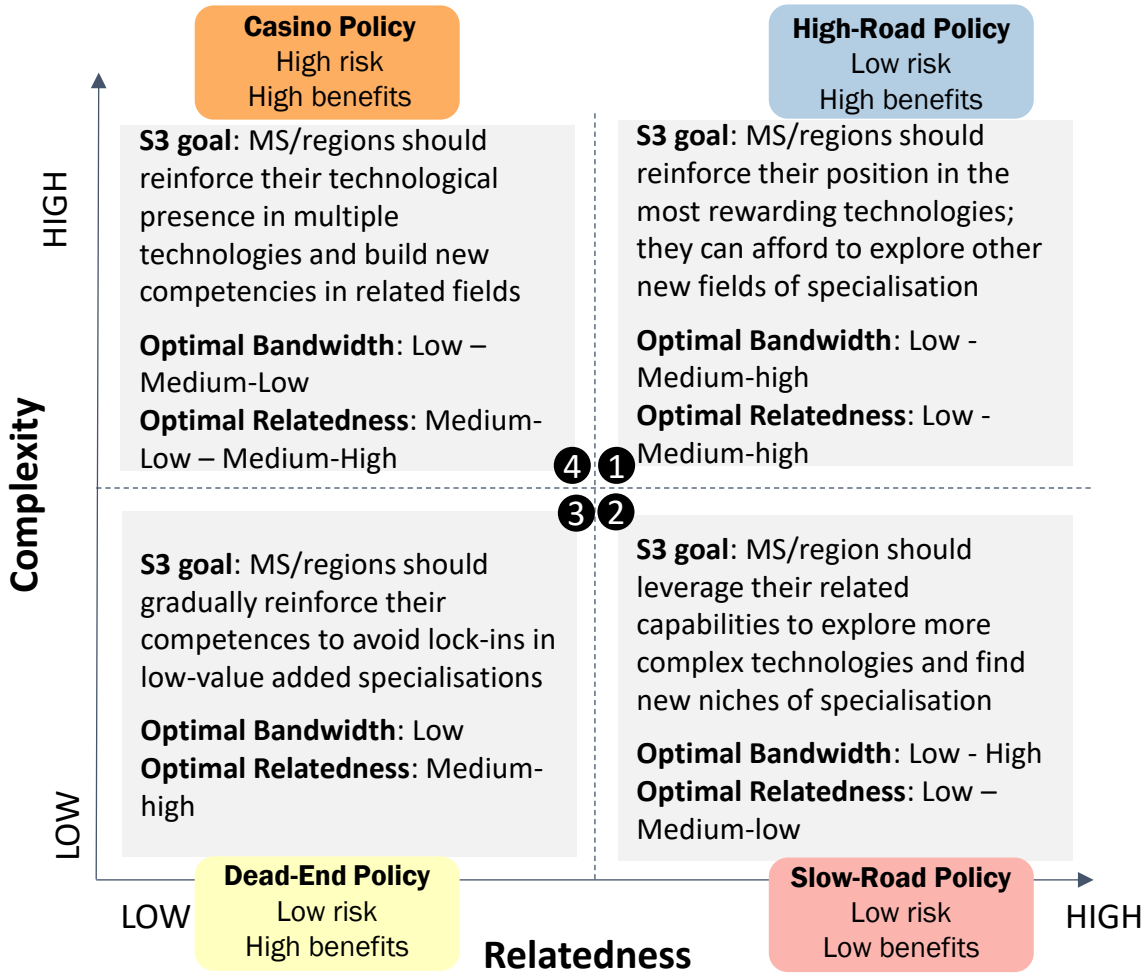
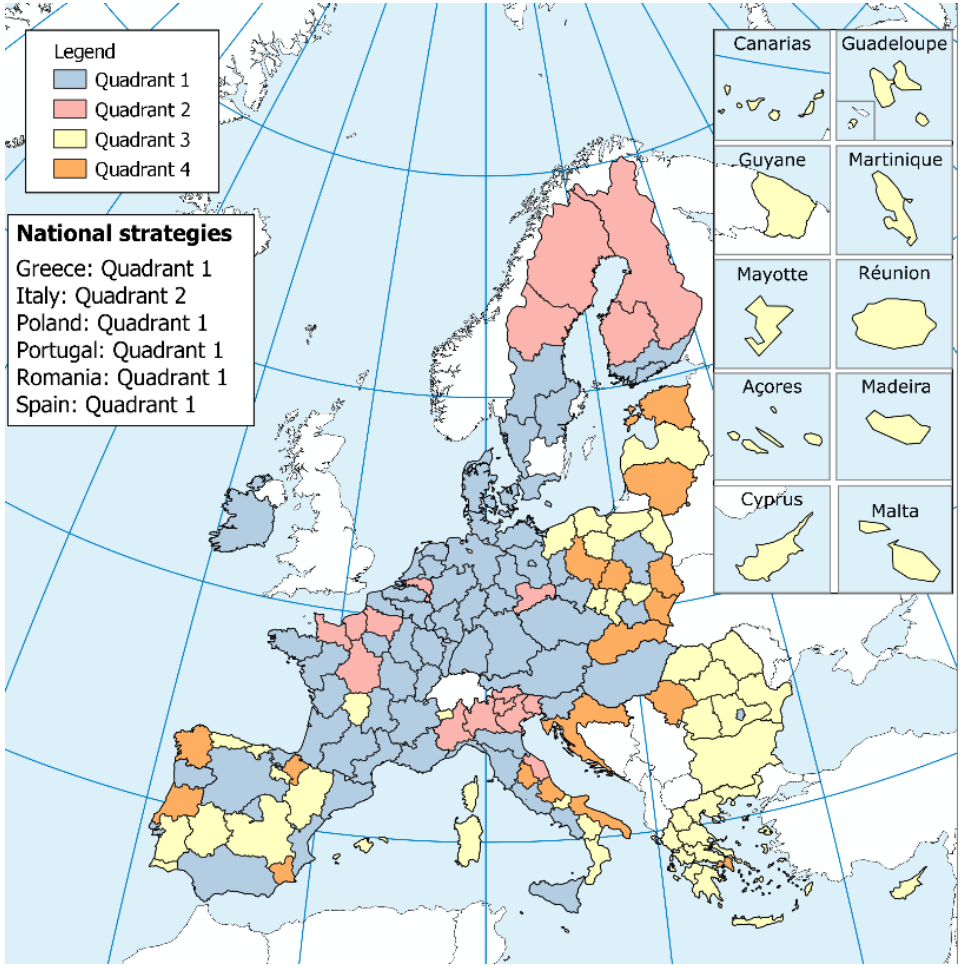
Majority of MS/regions have followed a High-Road Policy

Theoretical framework to assess the optimality of S3



Distribution of MS/regions in the 4 quadrants



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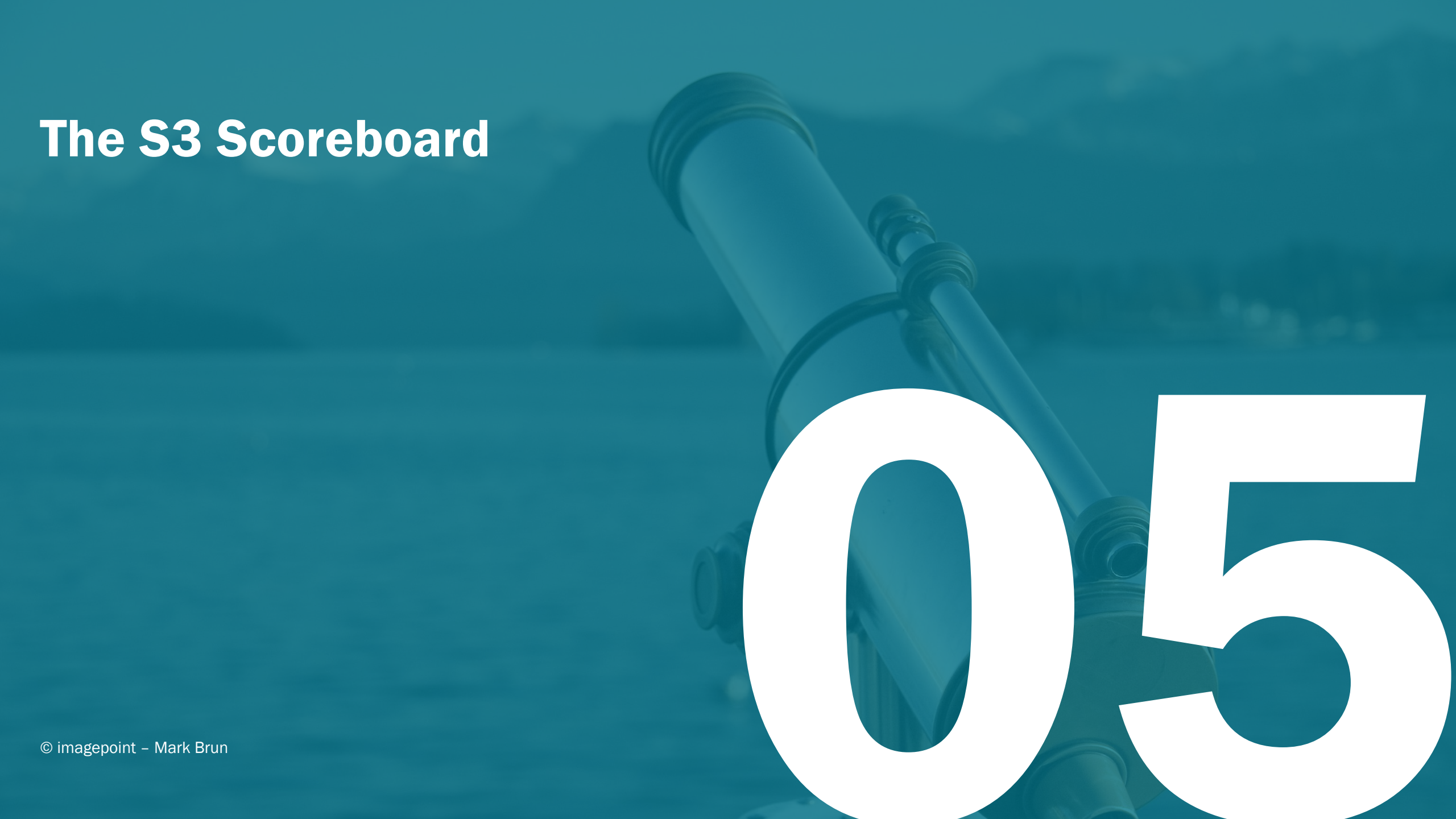
The S3 Scoreboard



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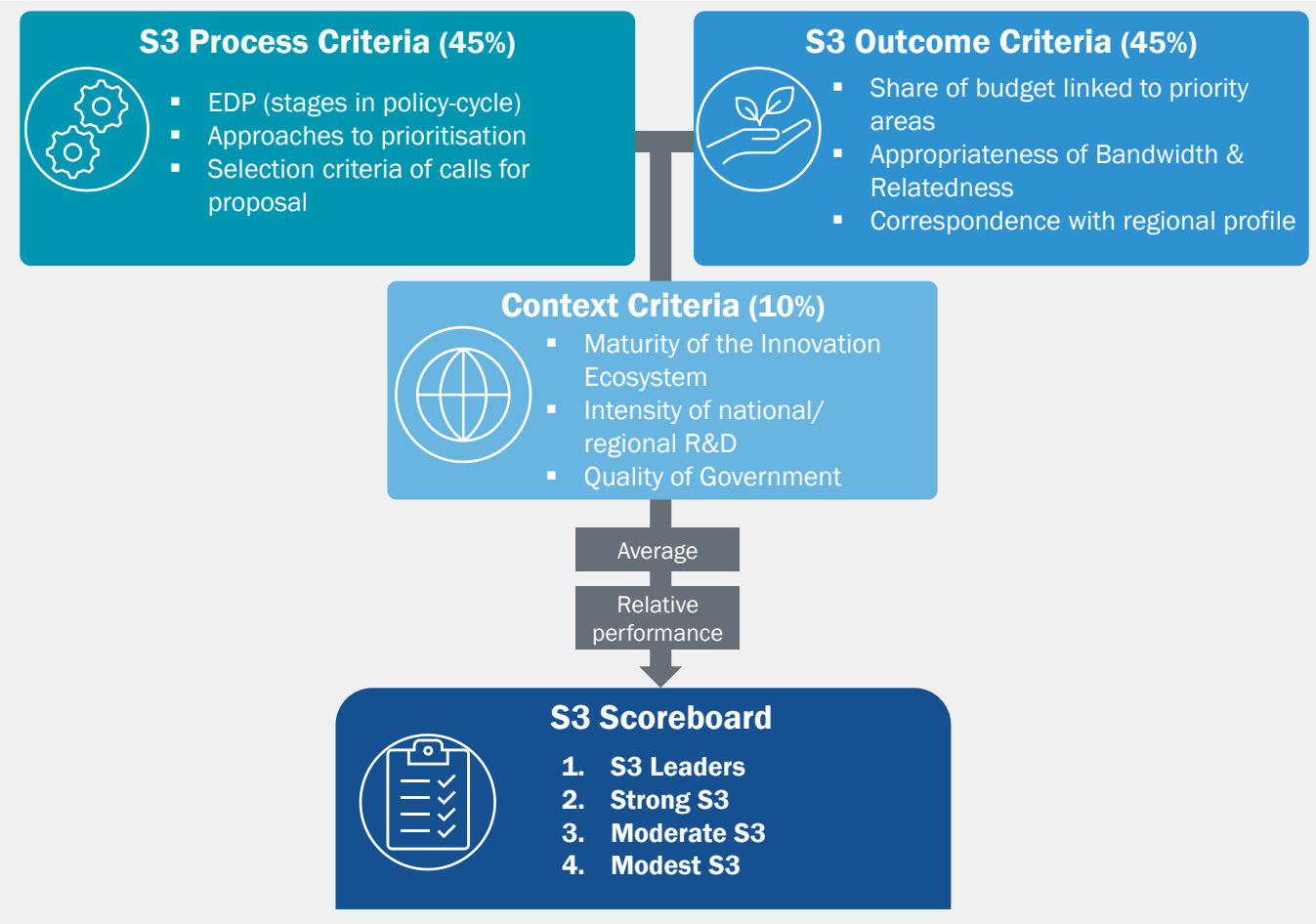
S3 Scoreboard as a unique and overarching assessment tool for smart specialisation strategies across the EU

Inclusion of Context Criteria as well as information on Optimality of Bandwidth and Relatedness



- Scoreboard was constructed following the concept of an "**ideal" S3 process**: from development of S3 over identification of priority areas & transformative activities & critical mass to the implementation of projects
- **Process and Outcome criteria** build the foundation of the assessment of the S3 strategies across the EU
- **3 Context Criteria** account for different levels of development, differences in the intensity of funding & different capacities of the innovation ecosystems among the regions

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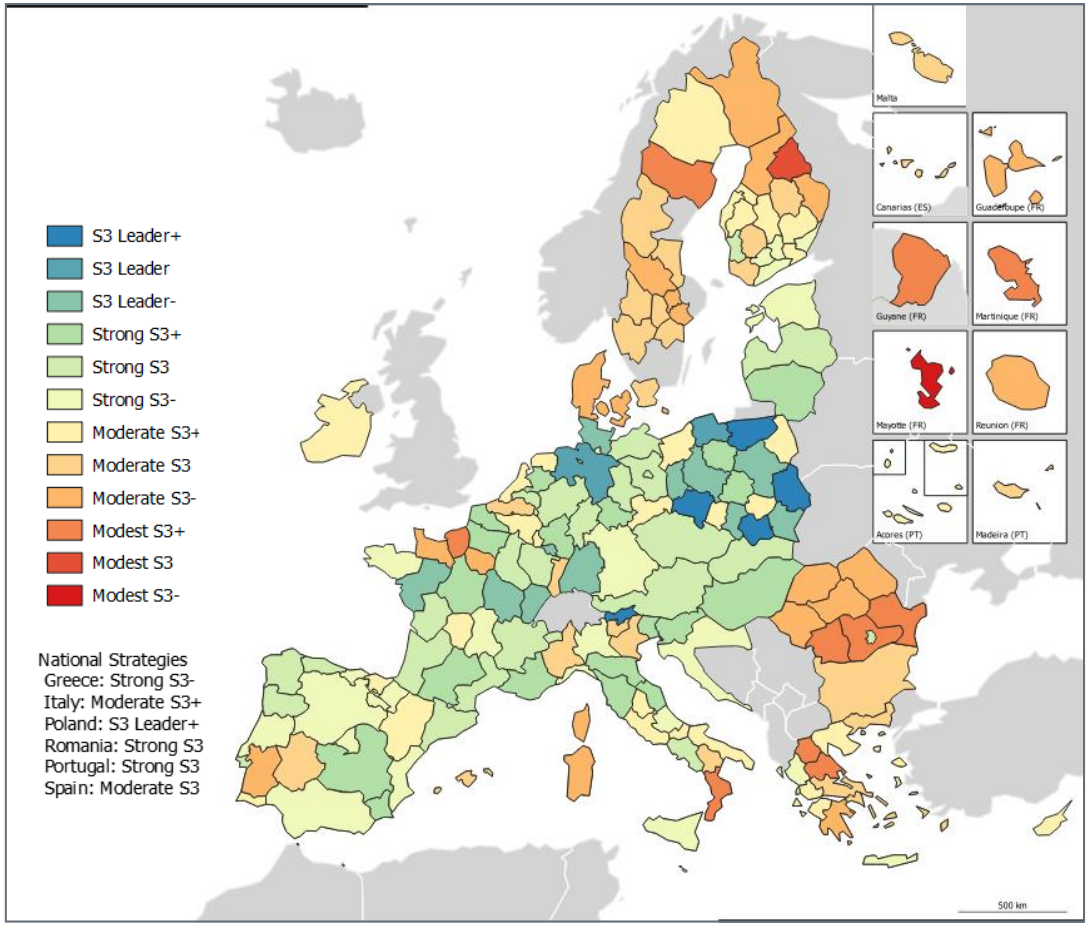
S3 Scoreboard suggests that good performing regions have closely followed the ex-ante conditionalities for 2014-2020



- Overall, out of 181 strategies:
  - 19 are classified as S3 leaders (10%)
  - 71 S3 are Strong S3 (39%)
  - 79 S3 are Moderate S3 (44%)
  - 12 S3 are Modest S3 (7%)
- Regarding the regional classification by Cohesion Regions, the relatively high share of S3 Leaders in **Less Developed Regions** stands out (10/55).
- Many **Polish regions** perform quite well.
- Many regions in **Southeast Europe** (such as Romanian & Greek regions, Bulgaria etc.) perform below the EU average.
- Many regions that usually perform well in terms of their innovative capacities & quality of government underperform in the S3 Scoreboard (e.g., **Scandinavian** regions).

Source: Prognos/Foray (2022). n = 181 regions. Note: When a region is covered by both a national strategy and a sub-national strategy, the coloured area of the sub-national region refers to the sub-national strategy. The information for the national strategies is provided by the figures on the left. These Member States are Italy, Greece, Spain, Poland, and Portugal. The United Kingdom is not included in the updated S3 Scoreboard

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Conclusions & Outlook

Boosting interregional cooperation and using synergies

Interregional Cooperation

1. **I3 funding instrument** relevant tool for tapping the large interregional cooperation potential
2. **Thematic S3 platforms** as hubs for interregional cooperation
3. Utilising opportunities of S3 in contributing to **Twin Transition** through interregional cooperation
4. Supporting and utilising the role of **cluster organisations** for the S3 (e.g., in finding suitable partners for interregional cooperation projects)

Horizon Funding

1. Utilizing thematic overlaps between ERDF and Horizon (KIC, European Partnerships, Joint Undertakings)
2. Exploit **complementarities of ERDF and Horizon** funding and further create synergies between the two programmes
3. Bottom-up S3 priority setting & Thematic platforms can also support finding **suitable cooperation partners in H2020** funding

Strategy setting and the S3 Scoreboard

Related vs unrelated diversification

1. **Reinforcing the competencies of local authorities** since Strong institutional capacities are an imperative enabling condition of optimal S3
2. Design S3 at the **regional/sub-regional level** to facilitate the selection and prioritisation of target areas.
3. In **more developed MS/regions**, higher ambition is advisable. This might result in realistic policy targets & help create new engines of innovation-based growth.
4. In **less developed MS/regions**, more prudence is advisable to avoid channeling resources into new "cathedrals in the desert" and pursue a more path-dependent and gradual transformation process.

S3 Scoreboard

1. Introduction of a standardised **definition of the EDP** since the understanding might vary among the regions
2. Utilising (parts of) the S3 Scoreboard for **continuous S3 monitoring** to monitor & manage S3 in real-time

Thank you very much

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