Moving towards effective RIS3 implementation: An illustrative case study

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Regional smart specialization (RS2) :: personal practical perspective

RS2 = Regional R&D in **niche areas** that are strongly **correlated** with embedded economic sectors in the region, **rapid assimilated** in **specialized innovation projects** by local companies, clusters or economic alliances/consortia that are keen (and capable) to **develop and produce** “blue-ocean” driven (**differentiated**) and disruptive and/or inclusive and/or breakthrough technologies, products and/or product-service systems to **sustainably compete** in international markets using a “positive sum” (**win-win**) competitive strategy.
S2 is NOT about industrial specialization of the region
S2 is about **specializing innovation** and **specialized innovation** in the region based on **niche R&D**

**Recommendation:** Fix potential poorer quality RIS3 through a good quality guide for applicants
**Recommendation:** If too many S2 fields, group them: 1. catapult S2 fields; 2. challenger S2 fields
Effective RIS3 implementation

Revisit RIS3 before implementation and adjust it if new elements are revealed.

If necessary, we can locate the regional poles by replacing region with locality and country with region in the calculation of $IQ_A$, $IQ_B$, $IQ_C$.

Select those sectors with: $IQ_A > 1$ (AND/OR) $IQ_B > 1$ (AND/OR) $IQ_C > 1$.

Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources.

$IQ_A = \frac{a_S}{a_R}$

$IQ_B = \frac{b_S}{b_R}$

$IQ_C = \frac{c_S}{c_R}$

Where:
- $a_S$: Active companies in the X sector from the region
- $a_R$: Total active companies in the region
- $b_S$: Employees in the X sector from the region
- $b_R$: Total employees in the region
- $c_S$: Value added of the X sector from the region
- $c_R$: Value added in the region
- $b_S$: Active companies in the X sector from the country
- $b_R$: Total active companies in the country
- $c_S$: Value added of the X sector from the country
- $c_R$: Value added in the country
Effective RIS3 implementation

Impose clear **quality criteria of eligibility** to access funds in the framework of RIS3

- Best: Strategically aligned functional clusters
- Additional: Informal clusters

Critical mass of functionally aligned companies in the S2 sector “YYY” :: 50+; 100+; 200+; …

Critical mass of strategically aligned researchers in the S2 sector “YYY” :: 200+; 500+; 1000+

Unique research infrastructure in the S2 sector “YYY”

Technology transfer ecosystem

Results

Niche technologies
Differentiation
“Blue-ocean”
Shared value
Multiplier effects

Critical mass of entrepreneurs to start innovation projects in the S2 sector “YYY”

Specialized training in the S2 sector “YYY”

Critical mass of venture capital to support innovation in the S2 sector “YYY”
Effective RIS3 implementation

Introduce adequate metrics (progress indicators) to evaluate the programs for RIS3

- Maturity and no. of functional innovative clusters in the S2 fields
- Level of interdisciplinarity between clusters (integrated meta-clustering)
- No. companies that introduced new innovation activities / new businesses / new non-traditional products (in niche / interdisciplinary areas) [disruptive, inclusive/social, radical disruptive, breakthrough]
- Co-invention of applications (CIA) with KET in the key local economic sectors
- S2 networks between regions (co-patents; co-publications)
- No. patent applications and publications “academia & industry”
- No. of patent applications (EPO) linked to local economic sectors
- No. of EPO, USTPO, WPO patents in the S2 fields
- No. of local patents and licensed patents applied in CIA products and technologies from the S2 fields
- Correlation between the specialized training programs and R&D areas for S2 fields
- Critical mass of researchers in each S2 field
- Level of innovation differentiation (B-O) with respect to the key competitors
- Level of collaborations in polycentric innovation
- No. of joint ventures in innovation projects
- Level of business internationalization based on local R&D and innovation programs
- Turnover from the commercialization of local solutions in the S2 fields from the total turnover
- (No. new KETs in the S2 fields) ……
Case study :: N-W region Romania

... S2 major fields

S2 fields:

- Organic agro-food, bioenergy and biotechnologies
- Energy and technologies for energy storage
- Intelligent systems and technologies for the city of the future
- Public health, oncology and healthy ageing

\[ P_i > P_{i-1} \times \beta_{R&D} + P_{i-1} \times \eta_{T\_T&P}; \beta_{R&D} + \eta_{T\_T&P} < 1 \]
**Case study :: N-W region Romania**

... S2 deeper investigation

**Embedded economic sectors in the region with product/technology-driven innovation potential**

Emerging technologies identified in the core preoccupations of the research labs / structures from the region

**Selected R&D and innovation niche areas to be primarily financed**

Level: sum of weighted S2 criteria
Weights defined with AHP
Criteria assessed on a 1 to 10 scale

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Level: sum of weighted S2 criteria</th>
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</thead>
<tbody>
<tr>
<td>1. research infrastructure and equipment in the sector</td>
<td>1</td>
</tr>
<tr>
<td>2. no. researchers in the sector</td>
<td>3</td>
</tr>
<tr>
<td>3. excellence of applied research in the sector</td>
<td>4</td>
</tr>
<tr>
<td>4. excellence of fundamental research in the sector</td>
<td>5</td>
</tr>
<tr>
<td>5. no. of companies in the sector</td>
<td>2</td>
</tr>
<tr>
<td>6. no. of innovative companies in the sector</td>
<td>1</td>
</tr>
<tr>
<td>7. level of integrated teams academic-industry in the sector</td>
<td></td>
</tr>
<tr>
<td>8. capacity to diversify specialization in the sector</td>
<td></td>
</tr>
<tr>
<td>9. capacity to attract public &amp; private funds to support R&amp;D in the sector</td>
<td>10. capacity to attract public &amp; private funds for TT in the sector (TRL 3 → TRL 6)</td>
</tr>
<tr>
<td>10. capacity to attract public &amp; private funds for TT in the sector (TRL 3 → TRL 6)</td>
<td>11. capacity to innovate (TRL 6 → TRL 9)</td>
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<tr>
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<td>12. horizontal multipliers (leverage effects)</td>
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<tr>
<td>12. horizontal multipliers (leverage effects)</td>
<td>13. vertical multipliers</td>
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<tr>
<td>13. vertical multipliers</td>
<td>14. no. of lead inno-entrepreneurs &amp; expertise for “lean” innovation in the sector</td>
</tr>
<tr>
<td>14. no. of lead inno-entrepreneurs &amp; expertise for “lean” innovation in the sector</td>
<td>15. maturity of the aligned S2 strategy in the sector → 2030</td>
</tr>
<tr>
<td>15. maturity of the aligned S2 strategy in the sector → 2030</td>
<td>16. capacity to achieve deep “blue-ocean” in the sector</td>
</tr>
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</table>

**Recommended S2 criteria:**

- Define
- Test
- Learn
- Evaluate

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... deeper entrepreneurial search → niche areas within the S2 fields

- Technologies and co-invention of applications (CIA) for smart cities
- Co-invention of applications (CIA) in renewable energy (solar, hydro, biogas, geothermal, photosynthesis)
- Smart luxury furniture and smart reconfigurable furniture with the support of information technology
- Permaculture, mountain/highland organic agriculture and e-agriculture for peripheral rural zones
- Balneal tourism with the contribution of holistic medicine and information technology
- Digital medicine in oncology and technologies for e-health
- Gerontology, geriatrics and green/natural cosmetics
- CIA and smart components for vehicles, for FoF and for logistic infrastructure in energy
Case study :: N-W region Romania ...
... exemplification

Technologies and co-invention of applications for smart cities

110 IT and energy companies

Research & innovation topics
→ 2020; → 2028

ITC
Energy
Energy
Creative industry
Environment
Materials
Environment

+ informal clusters
300+ software companies

Cluj IT
TREC
Green Energy
Mobilier Transilvan
ETREC
MetalCluster
AFI Napoca

60 research labs; 600+ researchers;
8 competence units

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Case study :: N-W region Romania strategic functional alignment

Cluj IT cluster

**strategic functional alignment**

40 IT companies
4 R&D universities
2 R&D institutes
9 catalyst organizations
Case study :: N-W region Romania polycentric innovation model

Cluj IT cluster

product-driven polycentric innovation model

Organization model

Business entity for customer interfacing

Lower costs at a given quality
Profit distributed between partner companies on a value-for-money driven rule
Lessons to take away

• RIS3 is not static – adjust it when new elements are in place or new lessons are learned
• Focus on the innovation ecosystem to succeed with RIS3, especially on “lean” TT ecosystem
• Narrowing and inter-, trans -“seasoning” S2 wider fields by deeper investigation procedures (selection quantitative matrices) and evolutionary entrepreneurial search
• Split S2 fields into “S2 catapults” and “S2 challengers” → put local “actors” to compete on maximizing results related to S2 progress indicators; do not let them fighting each-other to share the limited resources
• Promote polycentric innovation models to support RIS3 in practice
• Focus on functional strategic aligned innovative clusters as catapults for RIS3 implementation
• Finance only those projects that bring critical mass of S2-related endowments, balance and cumulate good/high levels of capability/maturity of the S2 progress indicators/criteria → activate “actors” by imposing a clever S2 context
“stump” the speaker

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