PROPOSED TITLE: Increasing the effectiveness of RIS3 implementation through university-to-industry interactions.

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Abstract
The formulation and subsequent implementation of national and regional research and innovation strategies for smart specialisation (RIS3) provide the foundation for the allocation of the 2014-2020 European Structural and Investment Funds (ESIF) across the EU. However, the ability of regions across Europe to develop appropriate strategies and effectively translate them into economic growth is highly heterogeneous.

Less developed regions, where growth is slow or at low levels, receive the majority of the ESIF. Main obstacles to knowledge-based growth in such regions include the lack of highly skilled human capital, the lack of a developed entrepreneurial culture, and low levels of absorptive capacity. Also lacking is sustained engagement among the quadruple helix of innovation stakeholders, particularly between industry and those in academia.

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The majority of SMEs, particularly in less developed regions, are micro-enterprises with low capacity to dedicate resources to research and innovation and high dependence on their regional innovation ecosystem. RIS3 strategies aim to better engage SMEs in this ecosystem, thus increasing their innovation potential, with improved access to both financial resources and human capital.

While smart specialisation implies an increasing focus on areas of strength, the formulation and implementation of RIS3, centred on an effective Entrepreneurial Discovery Process (EDP), can require the identification and subsequent exploitation of potential for significant change. A shift towards more competitive more specialised production may require regional stakeholders to pursue radical developments in either product or processes or even both.

Such developments may require these "radical diversification regions" to commit to university-to-industry interactions. The existence of an effective localised or at least regionalised innovation "eco-system" within the region, facilitates the generation, transfer and absorption of knowledge. However, while university-to-industry partnerships are crucial for upscale path renewal, they have not been yet sufficiently addressed by the RIS3 literature, and their enhanced understanding of their structural role, particularly in the case of radical diversification regions, can inform both academic and policy debates.

In this paper, we examine key aspects of how university-to-industry partnerships are implemented in different European regional contexts, and aim at drawing conclusions for measurably and sustainably improved effectiveness of RIS3 implementation. The paper draws on evidence on such partnerships and approaches from two ongoing closely complementary projects, namely the “BRIDGES” project and “Lagging Regions” project. BRIDGES project is an Interreg EUROPE project, aiming at improving the effectiveness of RIS3 implementation in six regions: one innovation leader and five moderate or modest innovators, all with bio-based industries as RIS3 priorities. RIS3 implementation relies on and reinforces the regional innovation system (RIS) in which it functions. The project implementation process is conceived as a knowledge spillover function in the space of six RIS, centred on bio-based industry sub-sectors.
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with relevant absorptive capacity for innovation, and focusing on three parameters: the base of expertise (innovation infrastructures); university-to-industry interactions; and critical mass issues eventually leading to inter-regional complementarity schemes and funding tools.

For the modest and moderate innovators, the key independent variable for improving RIS3 is the concentration of ongoing bio-based industries, with embeddedness, taken as the starting point. For the innovation leader, the starting point is relatedness, in terms of the proven potential of university-to-industry interactions. The focus is on interactions leading to adding value to existing strengths (specialisation), diversification from existing strengths into technologically related new ones, creation of new industries (radical diversification), and problem solving in industries. The target solution is the promotion of regionalised rather than strictly localised innovation eco systems reflected in university-to-industry investments, leading to path renewal in the modest and moderate innovators and enhanced specialisation in the innovation leader region.

The "Lagging Regions" project of the European Commission's Joint Research Centre implements, in cooperation with DG REGIO, two European Parliament Preparatory Actions. The main aim is to support RIS3 implementation in a selection of slow and low growth regions across Europe. At the core of this activity is sustained stakeholder engagement, taking the EDP further forward towards the implementation of specific project ideas. University-industry interactions are at the core of this

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This classification is from Asheim (Asheim 1998), Cooke (Cooke 1998), for example:

<table>
<thead>
<tr>
<th>Main type of regional innovation system</th>
<th>The location of knowledge organisations</th>
<th>Knowledge flow</th>
<th>Important stimulus for cooperation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Territorially embedded regional innovation network</td>
<td>Locally, however, few relevant knowledge organisations</td>
<td>Interactive</td>
<td>Geographical, social and cultural proximity</td>
</tr>
<tr>
<td>Regional networked innovation systems</td>
<td>Locally, a strengthening of (the cooperation with) knowledge organisations</td>
<td>Interactive</td>
<td>Planned, systemic networking</td>
</tr>
<tr>
<td>Regionalised national innovation systems</td>
<td>Mainly outside the region</td>
<td>More linear</td>
<td>Individuals with the same education and common experiences</td>
</tr>
</tbody>
</table>


* Jaffe 1989 equation which introduces the spatial dimension [GC] into the knowledge production function I

\[
I = \alpha IRD^B_1 \times UR^B_2 \times (UR \times GC^B_3) \times \epsilon (2).
\]
process. Working with nine regions, the project also examines selected horizontal issues in the governance of the RIS3 process in the regions, as well as the mobility of human resources and the role of transnational cooperation. It aims both to provide concrete support to the selected regions, but also to generate wider lessons for other lagging regions and to consider the policy implications.

While the two projects share the same basic aim of supporting the effective implementation of RIS3 in selected less favoured regions, differing perspectives and methodologies are adopted, which, together with the evidence from the various European regions involved, providing a good basis for comparison.

With particular focus on university-to-industry interactions in each project context, comparisons are made between the respective methodologies, the challenges arising and the respective outcomes. Conclusions are then drawn in terms of contributions to both the academic and policy debates on both RIS3 implementation and university to industry interactions.
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