

# Enhancing Innovative Capabilities in Peripheral Regions: An Extra-Regional Collaborative Approach to RIS3

Mariachiara Barzotto

Carlo Corradini

Felicia Fai

Sandrine Labory

Philip R Tomlinson

**(RSA Expo Team)**

**CJRES Cambridge Conference, 12-13 July 2018**

## Introduction

Discourse on smart specialisation (SS) has focussed on advanced regions.

Foray (2012) indicates, smart specialisation strategy starts “*at a certain point in the development cycle where a degree of local commitment and development have already occurred and achieved*”.

Within SS, the focus on specialisation and entrepreneurial discovery may have led researchers to overlook other important elements, especially for those regions that do not have a core technological specialisation.

So, for lagging and emerging regions an essential question is: **What ex-ante characteristics are relevant before the pertinent point in the development cycle is reached?**

Here, we focus on the potential role of external collaborations – ‘*smart collaborations*’ - (Boschma 2015, MacCann, 2012), and the impact of smart specialisation for lagging and emerging regions as opposed to advanced regions in terms of technological development.

## Importance of interregional links in SS

Reasons for importance of interregional links for smart specialisation of lagging regions:

1. Theory: Building and exploiting **related variety** is required for SS - lagging regions generally have low diversity of sectors and lack of critical mass for the cross-fertilisation of ideas between technological domains and sectors, hence interregional links are likely to help (Boschma, 2015; Boschma and Iammarino 2009)
2. **Adoption of GPTs and KETs**: links between lagging regions and core regions at the technological frontier (McCann and Ortega-Argilés, 2013)
3. **Entrepreneurial discovery**: evidence that firms innovate and develop new specialisations by connecting both within and outside the region (Bathelt et al., 2004; Boschma, 2014; Belussi et al., 2010; Boschma and Ter Wal, 2007)

**Studies are focused on specific sectors or specific countries / territories, no systematic evidence → aim of this study**

### Data and variables

Dataset covers 1999 – 2013. It is based on patent applications for 285 NUTS2 regions, using a fractional count of inventors to determine location at the NUTS2 regional level. A 5 digit IPC classification (approx. 650 IPC classes) is used. Time is identified using the priority date.

The dependent variable is defined as growth in patents over a three year period, as follows:

$$Pgrowth_{rt} = \log(P_{rt+3}) - \log(P_{rt})$$

To measure the extent of inter-regional collaboration, we define a simple measure as follows:

$$\text{Inter-regional collab}_{rt} = \frac{C_{rt}}{N_{rt}}$$

Where  $C_{rt}$  is the fractional count of inventors from other regions, and  $N_{rt}$  is the total number of patents in region  $r$  in time  $t$ .

Following Boschma and lammarino (2009), we also define a measure of similarity between the knowledge in a region and the collaboration with inventors in other regions.

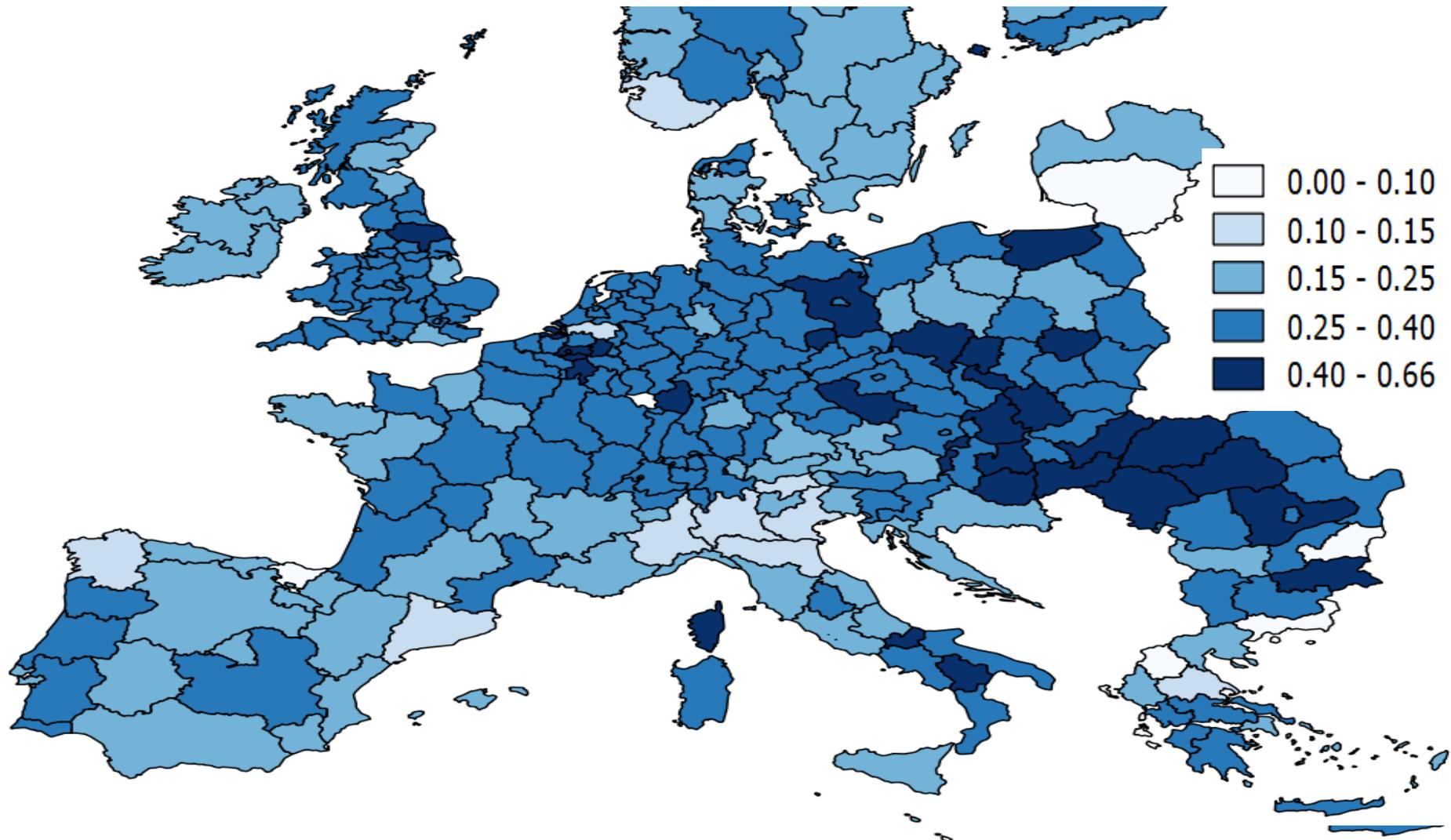
$$know\_similarity = \log \sum_i^I p_{rt,i} Col_{rt,i}$$

Our measure of diversification is weighted with a measure of technological relatedness  $S_{ij}$  defined following Koegler et al. (2017).

$$Tech\_Diversif_{rt} = \frac{N_{rt}}{N_{rt}-1} \left( 1 - \sum_i^I p_{rt,i} \left( \frac{\sum_j^J S_{ij} p_{rt,j}}{N_{rt}} \right)^2 \right)$$

## Data and variables

Share of extra-regional collaboration (4 quantiles) 2005-2010



## Results

P_growth	(1)	(2)	(3)	(4)	(5)
	FE	FE	FE	FE	FE
				Leading	Peripheral
Knowledge_similarity	-0.132*** (0.024)	-0.132*** (0.024)	-0.134*** (0.022)	-0.171*** (0.037)	-0.197*** (0.031)
Knowledge stock	0.334** (0.132)	0.330** (0.141)	0.666*** (0.104)	1.262*** (0.249)	-0.045 (0.143)
Inter-regional collab	2.015*** (0.233)	2.011*** (0.223)	5.016*** (0.571)	1.793*** (0.395)	2.436*** (0.255)
Knowledge stock X inter-regional collab			-0.791*** (0.129)		
Tech_diversif	0.684*** (0.237)	0.588 (0.720)	1.881*** (0.532)	-6.666 (6.561)	0.529 ** (0.203)
Tech-Diversif <sup>2</sup>		0.091 (0.575)	-0.979** (0.481)		
_cons	-1.940*** (0.727)	-1.913** (0.791)	-3.509*** (0.571)	-8.168*** (1.697)	-0.422 (0.503)
N	3148	3148	3148	2035	1113
NUTS2	285	285	285	172	137
Regional dummies	Yes	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes	Yes

Cluster robust standard errors in parentheses

\* p&lt;0.10, \*\* p&lt;0.05, \*\*\* p&lt;0.01

## Results from Analysis

- A *significant and negative effect of knowledge similarity across all model specifications*, perhaps due to lock-in effects and reduced combinatorial opportunities. The negative effect seems to be stronger for lagging regions.
- The key variable of interest, *inter-regional collaboration*, is *positively associated with patent growth*. This effect is stronger across lagging regions as opposed to advanced regions. As expected, regions that have weaker knowledge capabilities may benefit more from external inputs.
- A *significant and negative effect of inter-regional collaboration and knowledge stock*, indicating the positive impact of collaboration reduces as regions are increasingly characterised by a stronger internal knowledge base.
- With respect to *technological diversification*, interestingly, we find a *positive effect for peripheral regions*, suggesting specialisation **may not** be the best solution for regions that are still in the search of a specific specialisation. We also find the expected *inverted U relationship*; that is, a certain amount of diversification allows for more recombination opportunities, yet there are diminishing returns to this effect.

## Case : Cornwall & Isle of Scilly (CIOS)

CIOS = EU lagging region (its economic performance is below 75% of the EU average).

Is a recipient of £600m of EU Growth funding via ERDF+ESF+EAFRD.

Traditional sectoral strengths – tourism, agriculture & mining = ‘bedrock industries’

Ambitious vision for 2030. CIOS Local Enterprise Partnership has identified a limited number of emerging sectors, arranged around 2 priority clusters, where they believe they have a competitive advantage and the potential to exploit new markets and drive growth through innovation and research:

### **ADVANCED ENGINEERING**

**Agri-tech, aerospace (inc. space and satellite),**

**Marine-tech and (renewable) energy**

### **DIGITAL INNOVATION**

**Creative and culture, low carbon living and e-health**

## Cornish RIS Initiatives I

I. **VAMOS!**: Viable & Alternative Mine Operating System: H2020 project. 12.6 million Euros, over 42 months (2015-2019).

**Cornish partners:** Marine Minerals Ltd (Falmouth), Fugro, Cramborne School of Mines

17 International Partners from across 9 EU countries

Value of unexploited European Mineral resources (500-100m depth) is £100b

Novel automated solutions for exploration, extraction and pre-processing of ores found in inland flooded mines or in shallow sea waters in environmentally sustainable way.

**Potential:** Cornwall: hub of marine mining techniques

New Investment & Jobs



[vamos-project.eu](http://vamos-project.eu)

## Cornish RIS Initiatives II

2. **PONToon project:** to improve the employment rates of women from disadvantaged backgrounds by developing a range of digital tools and technologies that will be used to tackle the digital skills shortage

Interreg: FCE: 5.9 mill Euros

Partners: Digital Peninsula Network (Cornwall) &  
10 other UK & French partners

Objective: Re-train 1600 women (aim of 400 returning to work)

**Potential:** Cornwall to become hub for digital training provision, networking events and marketing support



<https://www.digitalpeninsula.org/pontoon-project>

## Other RIS Initiatives in Peripheral Regions

**1. Staffordshire:** Ceramics Industry: initiatives involving Lucid-eon and applications in material science.

**2. Apuglia:** Blue-Boost (€ 1.5 Mn for 2018-19), promoting innovation and cross-fertilisation between clusters and SMEs in maritime sectors (fisheries, shipbuilding, blue technologies), with networking actions.

Others: Puglia Manufacturing RDMI Hub; PAST4Future

**3. Campania:** iOS Academy in Naples (agreement with Apple): training of software developers

## Initial Policy Implications

1. Developing extra-regional collaborations to foster and support the entrepreneurial discovery across a more diverse set of opportunities within region.

2. Formal International Collaborative networks (e.g. H2020/Interreg) are essential for peripheral regions, & regions involved are more active in promoting concrete cross-fertilization actions (e.g. Puglia Vs Campania); this type of project is also useful to increase institutional capabilities (*institutional failure being typical in peripheral regions*).

**Barriers:** - weak local networks in peripheral regions  
- unwillingness of leading regions to collaborate  
- Brexit Funding concerns

3. These barriers **may be overcome**, for example, by

- Developing transferable skills to respond to regional sector-specific shocks and increase absorptive capacity (e.g. ICT skills)
- Building a broad spectrum of extra-regional collaborations involving also medium/low-tech regions

**Thank you**