

# Unfolding Smart Specialisation for Regional Economic Resilience: the role of Industrial Structure

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# Motivation

The Cohesion Policy 2014-2020 emphasizes a strategy of innovation based on “**Smart Specialisation**” for a more productive use of resources to favour regional transformation and growth (McCann and Ortega-Argilés 2015).

The SS strategy is devoted to stress the **industrial strength** of regions, to enhance **competitiveness** and to **foster resilience** (European Commission 2017).

Regional economic resilience and SS theories assert that the industrial structure is fundamental in fostering the emerging of new paths:

- Adaptive resilience involves a structural adjustment of regions in response to shocks through the creation of new industrial trajectories (Martin 2012).
- SS strategy looks at industrial structure for the development of new industrial specializations (Foray et al. 2011).

# Criticisms/Gaps

- Both notions of resilience and smart specialisation are widely criticized. Doubts have emerged about novelty and ‘fuzziness’ of these concepts (Hassink 2010; Simmie and Martin 2010; Cooke 2017; Marques and Morgan 2018).
- Resilience:
  - Missing of long-term perspectives of economic change in response to shocks.
  - Few consideration of determinants of resilience.
  - Poor connection with policies.
- Smart Specialisation:
  - Weak connection between theoretical assumption of SS and innovation policy practices.
  - Need of institutional capabilities.
  - Poor operationalization of smart specialization.
  - Question of measurability of the success of the strategy.

# Purpose of the study

The research aims to analyse the relationship between **Smart Specialisation (SS)** and **Regional Economic Resilience** to understand if a SS strategy may promote regional economic resilience in the face of shocks.

To do that, the study analyses the **relatedness** of new industrial specializations to the existing industrial structure before and after the shock occurrence.

# The industrial structure and resilience

Both **Regional Economic Resilience** and **SS** stress the role of the **existing industrial structure**:

- Theoretical debate of **regional economic resilience** focuses on the most suitable form of industrial structure in influencing responsiveness to shocks. Moreover, according to the evolutionary definition, a resilient economy should adapt its structure to external changes (Martin 2012).
- Concerning the type of industrial structure that may favor resilience, the concept of **relatedness** is particularly useful because it allows to measure the distance between industrial sectors (Neffke et al. 2011).

# The industrial structure and smart specialisation

- The goal of **smart specialisation** is developing a strategy based on those sectors or capabilities in which the region has a competitive advantage exploiting them to develop related activities.
- A new specialisation is related to the existing economic structure in which the region has a competitive advantage compared to other regions. The result is not just a technological innovation but a structural change (Foray et al. 2011).
- The objective of SS is to favour a **specialised diversification** into related technologies which generates new economic activities that are rooted in the region and that can draw on local related resources (Boschma and Gianelle 2014).

# Transformation of the Industrial structure

**Transformation of industrial structure** has been discussed according to concepts of adaptation and adaptability (Grabher 1993):

- **Adaptation** represents a path-dependent process that involves a non-radical transformation of the regional path based on the existing structure. **Adaptability** deals with a long-term change within the regional economy that may occur through a shifting in the industrial path (Hu and Hassink 2017).
- Regions become resilient when they are able to ensure adaptation and adaptability **simultaneously** (Boschma 2015).

# Conceptual Framework

We define:

- Adaptation as the reconfiguration of the existing industrial structure.
- Adaptability as the process of creation of new industrial specializations.
- Resilience as the capacity to combine adaptation and adaptability.

Moreover, because of SS focuses on the strengths of the regional economy to create new competitive advantage (Balland et al. 2018), we use the relatedness approach to analyse the industrial structure.

New industrial specializations (as indicator of adaptability) may emerge as related to the existing industrial structure (as indicator of adaptation).

**RQ: Can a Smart Specialization Strategy foster resilience of regions?**



# Unit of analysis and data

## **Unit of Analysis:**

103 Italian Provinces

## **Source of Data:**

- The source of main data is **AIDA** Bureau Van Dijk database.
- The data are about the number of employees at provincial level (103 provinces) and disaggregated at the 4-digit level of detail.
- Other data are drawn from different sources (ISTAT, EUROSTAT, EPO).

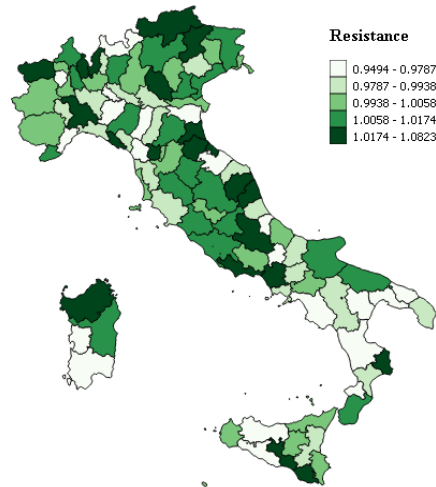
# Resilience: methodology

1) We measure **Resilience** through resistance and recovery indices (Martin 2012; Faggian et al. 2017)

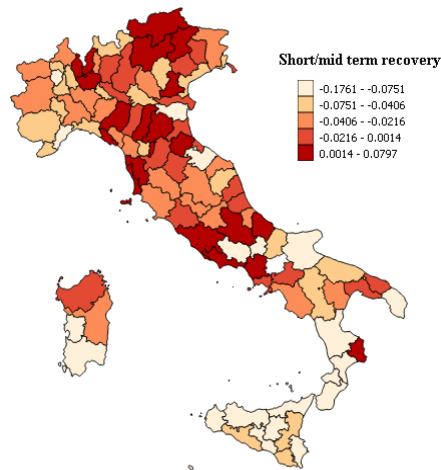
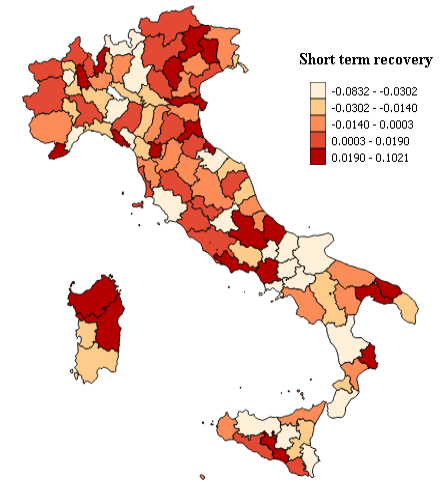
- **Resistance**  $RES = \frac{\frac{E_{p,t}}{E_{p,t-1}}}{\frac{E_{n,t}}{E_{n,t-1}}}$

- **Recovery**  $REC = \% \Delta E_p$  is the regional percentage of change in the years following the crisis.

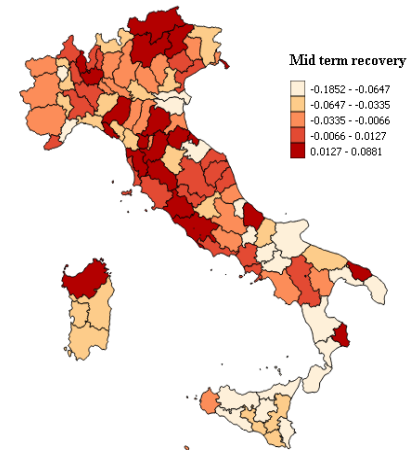
# Resilience: Resistance and Recovery in Italy



The **resistance** to the shock is higher into northern regions. Even if some high values of resistance are found also in some provinces of the south (North Sardinia, south Sicily etc.)



The **recovery** after the shock is higher into north-east and center of Italy. This trend becomes more concentrated in the mid term after the crisis and shows some high values also in the south of Italy (north Sardinia, Crotona, Brindisi etc.)



# New industrial specialisations: methodology

2) We computed a LQ for every industrial category of each province for the whole period to understand which **new industrial specialisations (Xiao, Boschma and Andersson 2018) occurred during the period 2006-2014.**

$$LQ_{pi} = \left( \frac{E_{pi}/E_P}{E_I/E} \right) \quad (1)$$

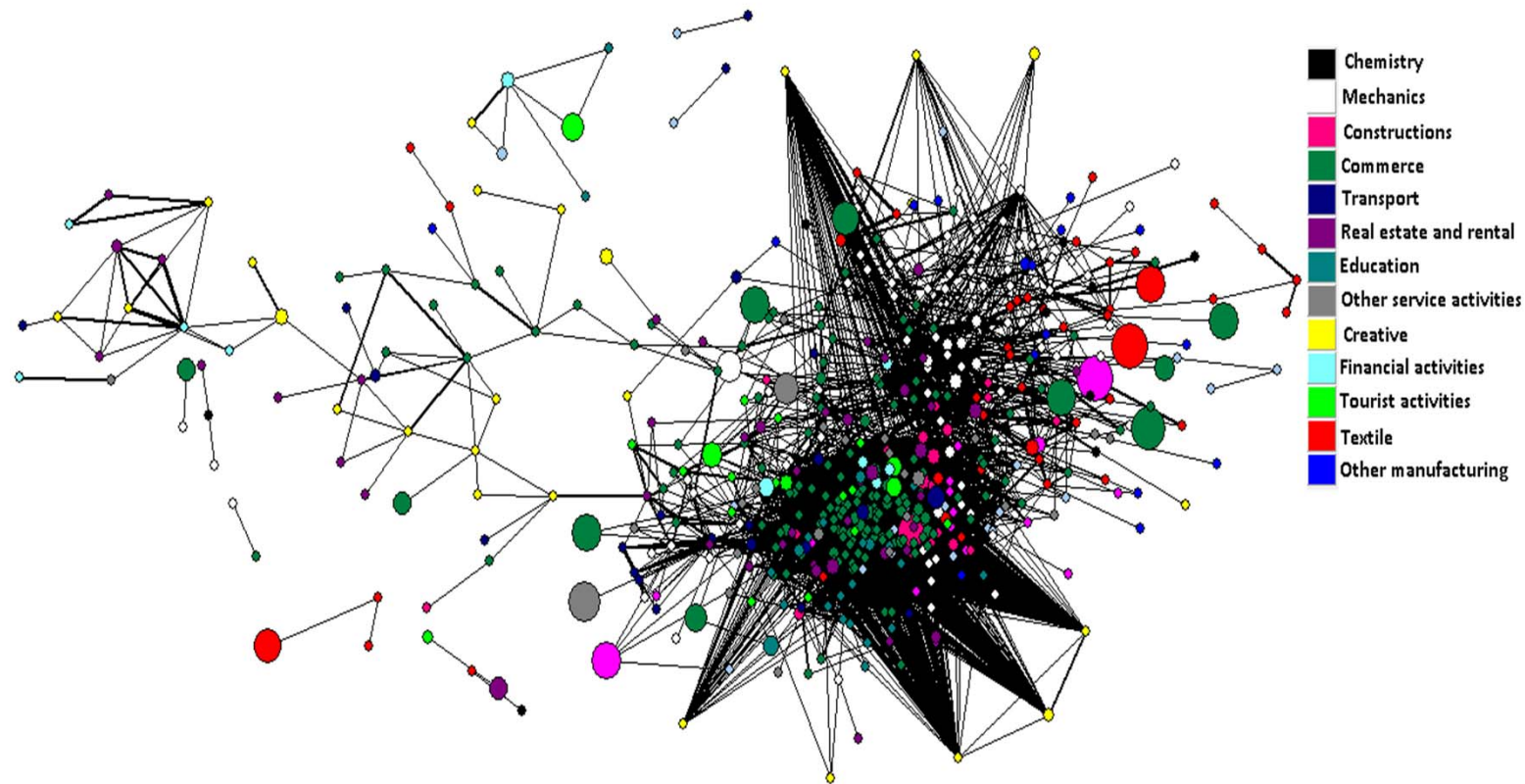
A new specialisation here is defined as follow:

- The LQ is higher than 1.
- Since the 2006 the LQ was always lower than 1.
- The industry employment increased compared to the previous year.
- At least the 0.5% of the workers of the province are employed in that sector.

Following this analysis, **9684 new specialisations** are found in the considered period.

# Industry space

3) We compute the relatedness measure between each pair of industrial categories to identify the industry space.



# Adaptation/adaptability: methodology

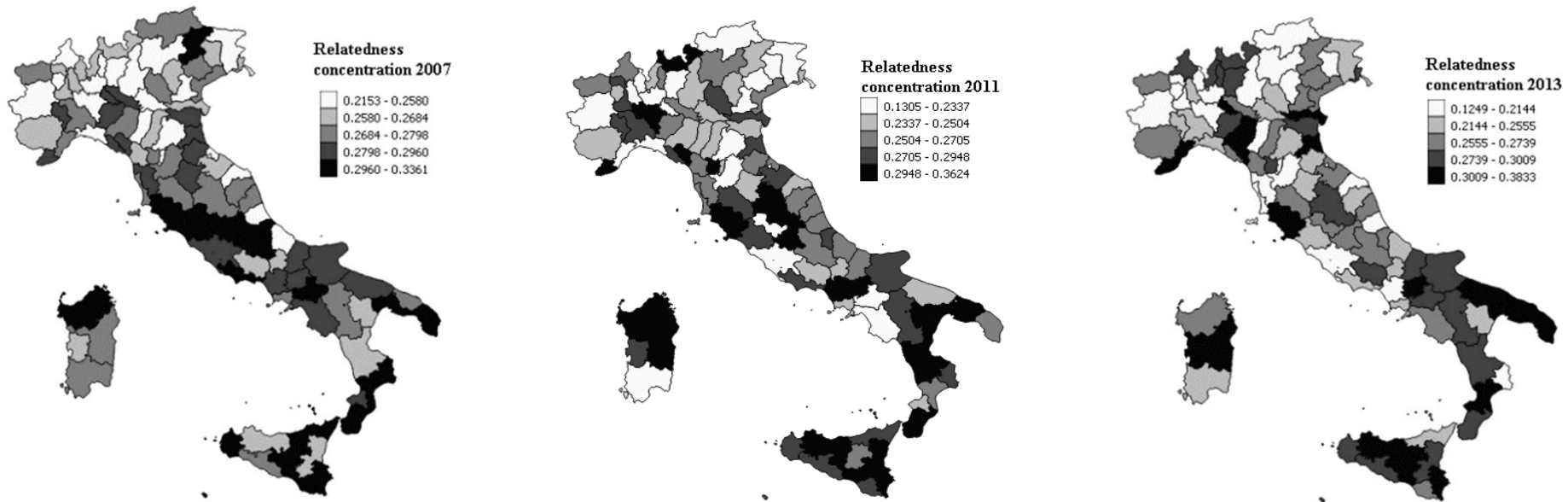
4) We measure the **relatedness concentration** of each new industrial specialization to understand how related is the new specialisation to the already existing specialisations of the province.

The measure of relatedness concentration is then **aggregated at provincial level**, the results give us a measure of **how the new specialisations** of the area are connected to the already existing specialisations.

This can be considered an ex post determination of which **“hidden”** specialisation strategy was followed by every Italian province in the period 2006-2014.

- A high value of relatedness concentration indicates a propension for a **coexistence of adaptation/adaptability**.
- A low value of relatedness concentration indicates that new specializations are **un-related** to the existing specialisations.

# Relatedness Concentration in Italy



**The maps show the relatedness concentration of new specialisations for each Italian province**

Higher level of relatedness concentration appears in the south and center of Italy and this trend is strengthened after the shock (2011 and 2013), suggesting that after the crisis less developed regions tried to cover the gap jumping into less related specialisations, while highly developed regions were more cautious, diversifying into activities more related to those already existing.

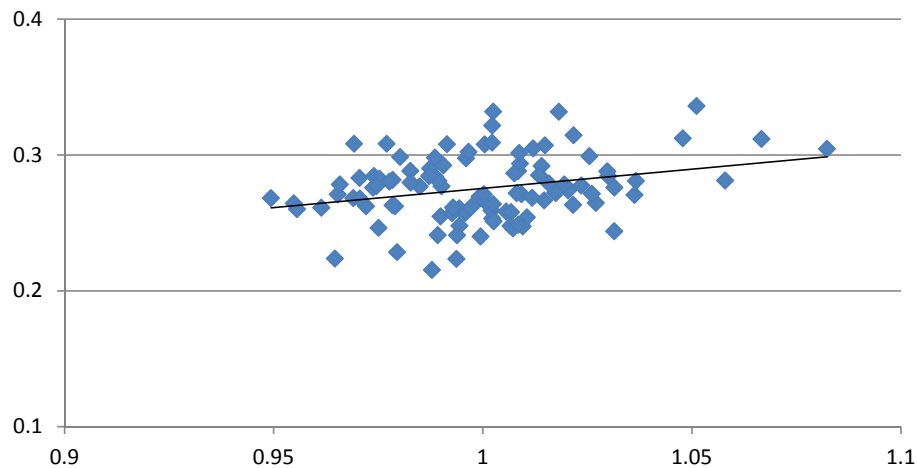
## Research Question

**Can a Smart Specialization Strategy  
foster resilience of regions?**

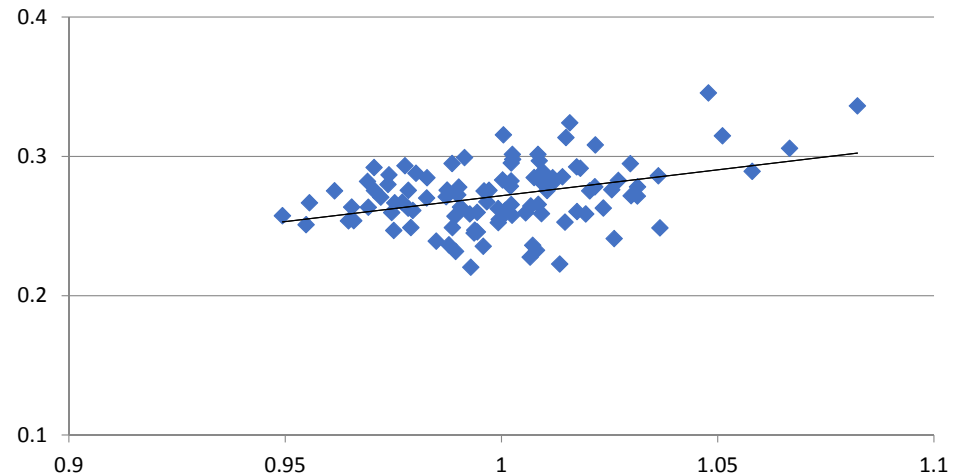


# Preliminary Results: Resistance

**Relatedness concentration 2007 and resistance**



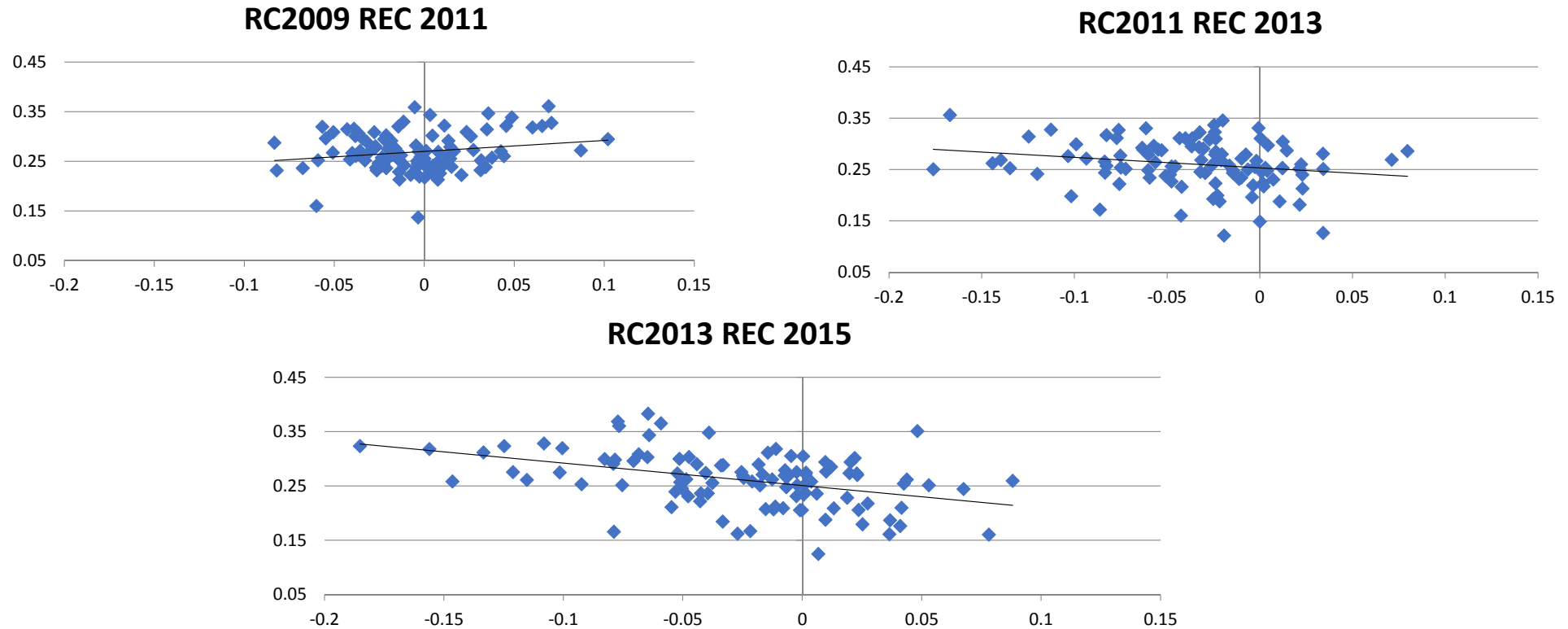
**Relatedness concentration 2008 and resistance**



## **When comparing relatedness concentration and resistance**

Our results show how regions that followed an adaptation/adaptability path in the period 2006-2008 performed better in term of resistance to the economic crisis occurred in the 2008.

# Preliminary Results: Recovery



## When comparing relatedness concentration and recovery

Our results show how regions with a lower relatedness concentration of new specialisations born after the crisis performed better in term of recovery in the low medium term (3-5 years).

# Conclusions

- The research focus on the relationship between smart specialisation and regional economic resilience, studying SS through **relatedness concentration of new specialisations** and integrating results of relatedness concentration index with **indices of resistance and recovery** as measures of resilience.
- Results suggest that **simultaneity and co-evolution of adaptation and adaptability** (Boschma 2015; Hu and Hassink 2017 ), in which adaptation is source of adaptability, may foster higher resilience **in the period coinciding with the shock occurrence**.
- However, in the recovery period, higher recovery – thus resilience – needs to **move away from the existing path** toward new “unrelated trajectories”.
- Despite the fact that results suggest that the SS framework may have positive effects only during the crisis period, **debate of SS is still open** and many criticisms still remain unsolved.
- The lack of an influence of SS framework in a post-crisis period could be **in line with the critical positions on SS theory** (Marques and Morgan 2018) that evidence the divergence between the theory of the SS and the operationalization of policies.

# Main contribution

## Theoretical contribution:

- The study is a first contribution to combine smart specialisation and resilience enlarging the debate of the determinants of resilience.
- The research tries to advance the understanding of the industrial structure in affecting resilience applying concepts of adaptation and adaptability.
- Adaptive process and evolution of industrial structure in relation to economic shocks is studied both in a short and mid-term perspective through the evaluation of dimensions of resistance and recovery.
- The analysis, proposing a conceptual framework based on main assumption of SS, tries to connect resilience with a policy dimension.

## Empirical contribution:

- Applying the methodology of relatedness, the research has made an effort to develop a framework to operationalise the concept of smart specialisation.
- We propose a new measure of smart specialization through relatedness concentration.

# Limitations and future research

- Our analysis only focuses on Industrial Structure as a determinant of resilience.
- However, SS and resilience frameworks suggest that other factors may affect the creation of new industrial specialisations and structural change.
- Future researches should focus on innovation capacity, endowment of territories, quality of institutions or interregional linkages as determinants which may foster industrial structure evolution.