



Towards a new Conceptualization of Innovation in Space Territorial Patterns of Innovation

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Stylized facts

Innovation and knowledge are at the basis of the competitiveness of modern economic systems

Importance of R&D as the main source of knowledge creation

Normative interventions to support R&D

Recommandations from the EU in the Lisbon agenda and in the Europe 2020 agenda: 3% of R&D/GDP



However...

Notwithstanding the recommendations and efforts made, in 2009 in Europe R&D/GDP was equal to 1.8%.

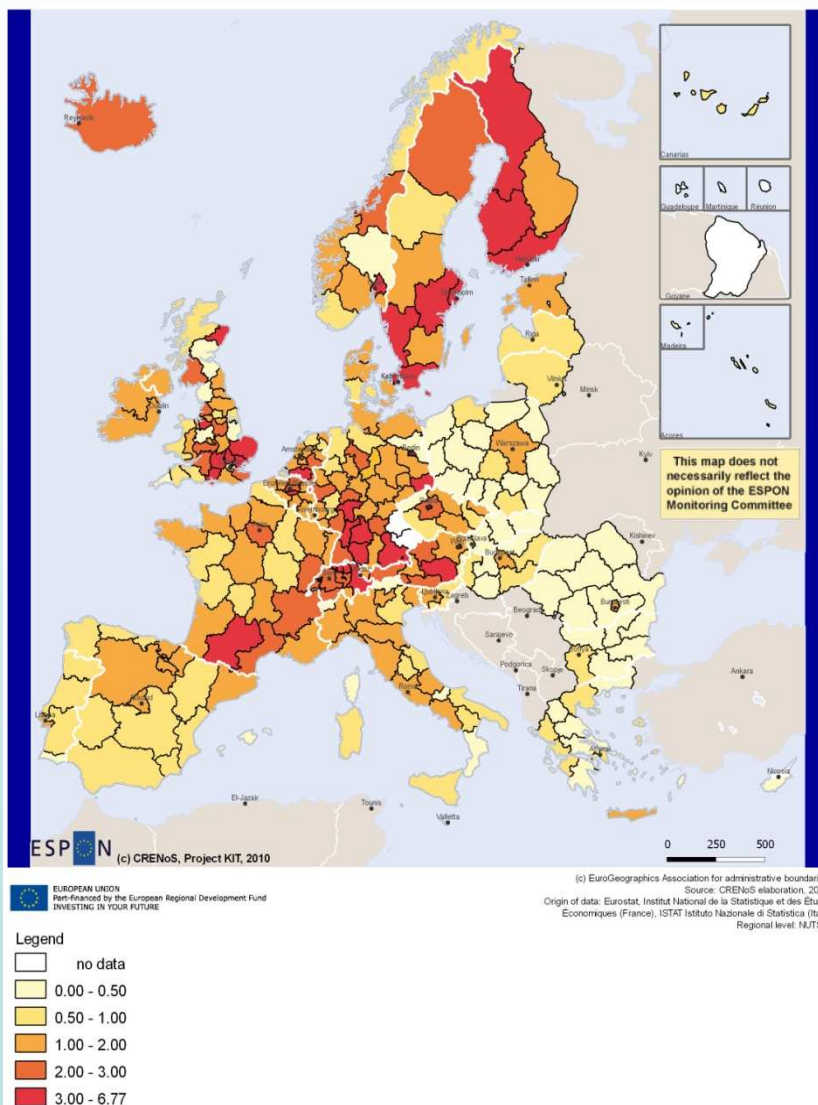
Moreover, the ratio has strong territorial disparities.

Only Finland and Sweden have a R&D/GDP ratio > 3%

At regional level disparities are even greater...



R&D expenditures / GDP



In 2007 regions having reached 3% of R&D expenditures on GDP are in a number of 33 (11% of the European NUTS2 regions) and concentrated in a few countries in the North of Europe. Moreover, a very high number of regions belongs to the lowest class, the one that registers a R&D on GDP lower than 0.5%.



New reflections (1)

New reflections on the need for new innovation policy style based on a “smart specialization” of R&D activities in different regions so to exploit the advantages stemming from specialized R&D concentration (Foray D., David P. and Hall B. 2009):

- core regions are natural places for general purpose technologies;
- peripheral regions are natural places for co-inventions of applications.



New reflections (2)

From a theoretical perspective, there is still space for a *new conceptual framework* able to overcome:

- The simple equation that knowledge equals R&D;
- The simple core-periphery dichotomy in R&D activities;
- R&D expenditures as the only way to boost innovation processes.



Theoretical achievements

	Innovation diffusion	Innovation creation	Knowledge creation		Knowledge diffusion	
			Functional approach	Cognitive approach	Spatial approach	Evolutionary approach
Aim of the theory	Identification of the spatial channels supporting innovation diffusion	Identification of the reasons for local innovation creation	Identification of the reasons for local knowledge creation		Identification of the reasons for local knowledge diffusion	
Knowledge-innovation linkage	Information-adoption short circuit	Invention-innovation short circuit	Spin-offs, spatial spillovers	Collective learning, local synergies Entrepreneurship	Spin-offs, spatial spillovers	Common cognitive codes
From innovation to performance	Adoption-performance linkage	Radical innovation, Schumpeterian profits	Technological breakthrough, royalties on patents	Continuing innovation, productivity increases	Knowledge-performance linkage	
Location regions	Regions along the urban hierarchy	Advanced regions	Scientific regions	Milieux Learning regions	Networking regions	
Role of space	Barrier to information diffusion	Proximity economies, specialisation advantages	Agglomeration economies	Uncertainty reduction, relational capital	Proximity economies	
Period	End of the 1960s and 1970s	Middle of the 1980s	End of the 1980s and 1990s	End of the 1980s and 1990s	Middle of the 1990s onward	Middle of the 2000s
Key references	Hägerstrand, 1952; Griliches, 1957; Mansfield, 1961; Metcalf, 1981; Camagni, 1985; Capello, 1988	Malecki, 1980; Saxenian, 1996	MacDonald, 1987; Massey et al. 1992; Monk et al., 1988; Storey and Tether, 1998	Camagni, 1991; Perrin, 1995; Keeble and Wilkinson, 1999; Capello 2003a; Lundvall and Johnson, 1994	Acs et al., 1994; Audretsch and Feldman, 1996; Anselin et al., 2000	Boschma, 2005; Rallet and Torre, 1995; Capello, 2009



Common features of existing approaches (1)

All these theories base their reflections on *one particular phase* of the innovation process, being either knowledge creation, innovation creation, innovation diffusion or knowledge diffusion.

Some theories even interpret knowledge and innovation as coinciding processes, giving for granted that if knowledge is created locally, this inevitably leads to innovation, or if innovation takes place, this is due to local knowledge availability.



Common features of existing approaches (2)

However, factors that enhance the implementation of new knowledge can be quite different from the factors which stimulate innovation.

The fax machine, first developed in Germany, was turned into a worldwide successful product by Japanese companies.

Anti-lock brake system (ABS) was invented by US car makers but became prominent primarily due to German automotive suppliers.



A new approach (1)

A jump in interpreting regional innovation processes lies in the capacity to build a conceptual framework:

- interpreting *different modes of performing the different phases of the innovation process*, and
- highlighting the *context conditions* (internal and external to the region) that accompany each phase.



A new approach (2)

Two new elements with respect to previous theoretical paradigms:

- separation between knowledge and innovation, treating them as two separate (and subsequent) phases;
- identification of the context conditions, both internal and external to the region, that support the different innovation phases



Territorial patterns of innovation: a definition

A territorial pattern of innovation is therefore defined as a combination of *context conditions* and of *specific modes of performing the different phases* of the innovation process.



Territorial patterns of innovation: basic elements

- 1) agents: identified as regions, in the form of collective actors, when innovation and knowledge processes take place across regions. Local firms and non-corporate entities are instead the referent agents, when intra-regional flows of innovation and knowledge are taken into account;
- 2) phases of knowledge and innovation process: from a knowledge source, into an innovative application, and from innovation to increasing productivity and economic performance.



Territorial patterns of innovation: basic elements

3) territorial conditions for local interaction, highly present in the literature

4) territorial conditions for knowledge and innovation diffusion between regions, less elaborated in the literature and cannot rely on spatial proximity only. They require different concepts of proximities.



Different kinds of territorial patterns of innovation

The main features of a territorial pattern of innovation are the context conditions that enable a pattern to take place.

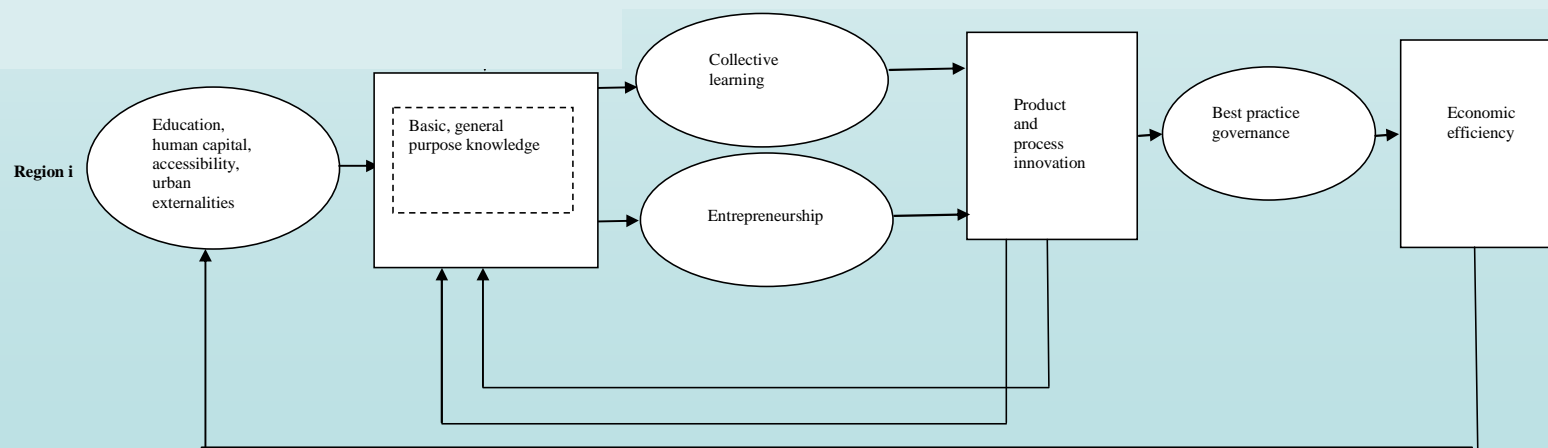
Three interesting cases:

- 1)an endogenous innovation pattern in a scientific network
- 2)a creative application pattern
- 3)an imitative innovation pattern



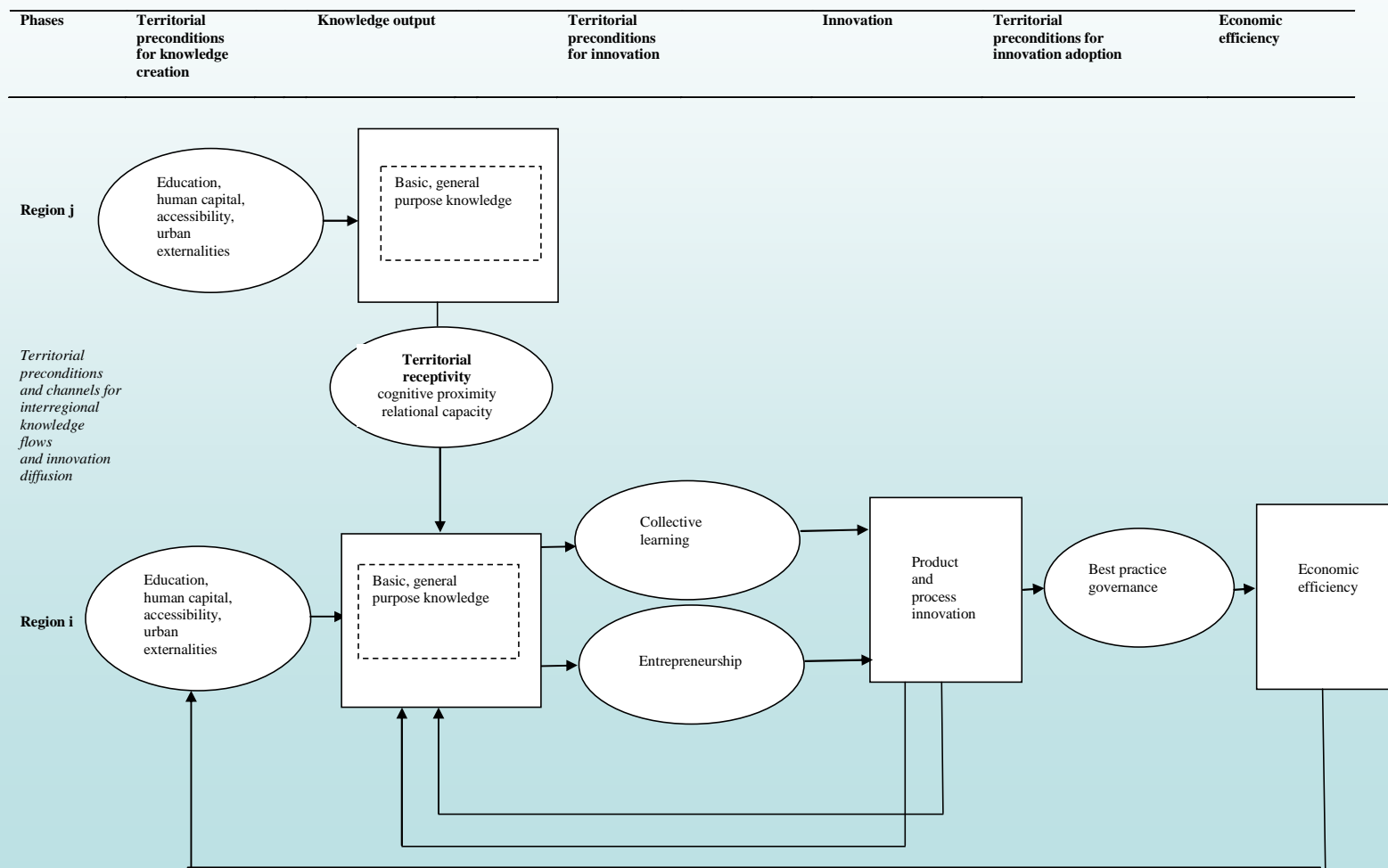
An endogenous innovative pattern

Phases	Territorial preconditions for knowledge creation	Knowledge output	Territorial preconditions for innovation	Innovation	Territorial preconditions for innovation adoption	Economic efficiency
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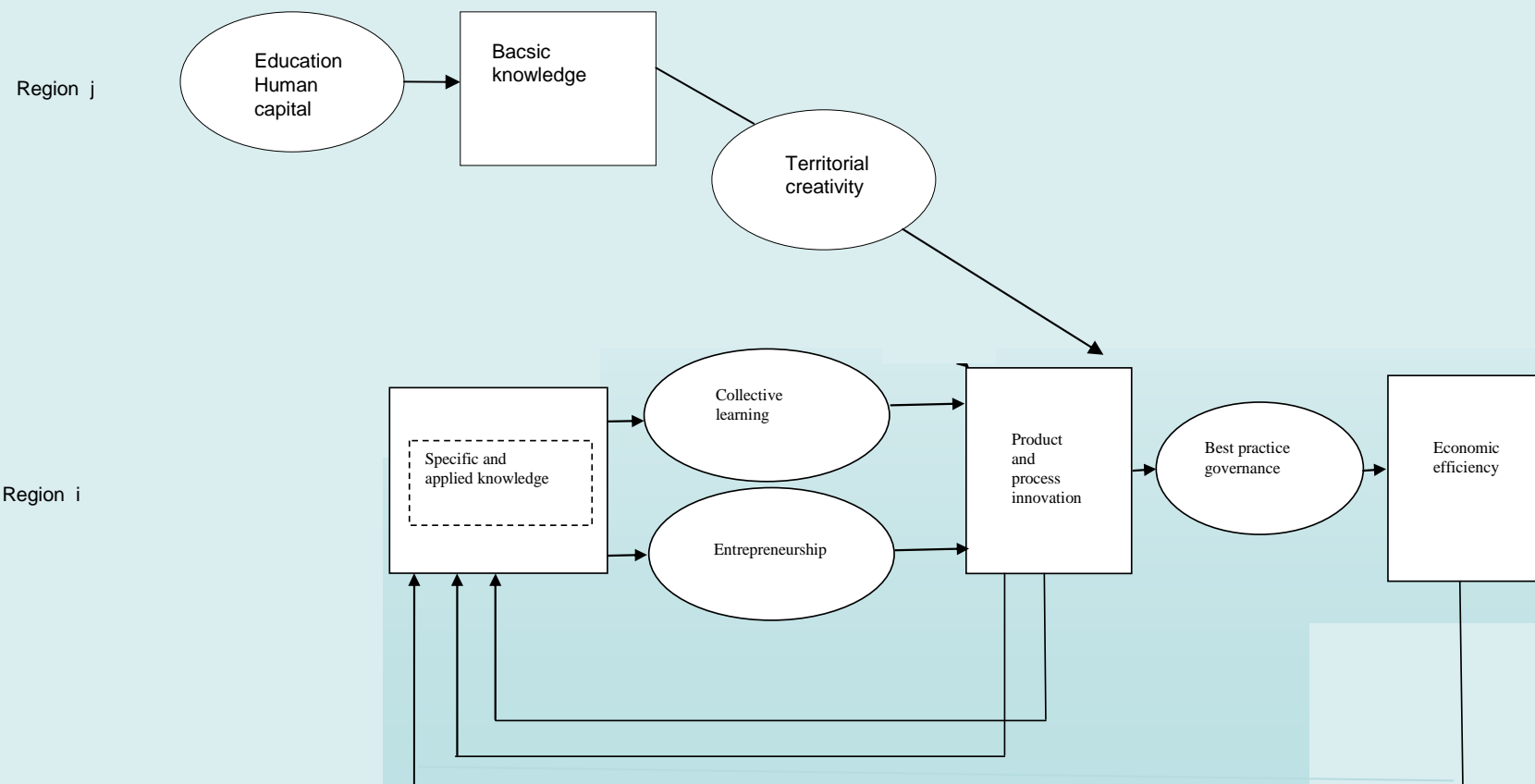
An endogenous innovation pattern in a scientific network





A creative application pattern

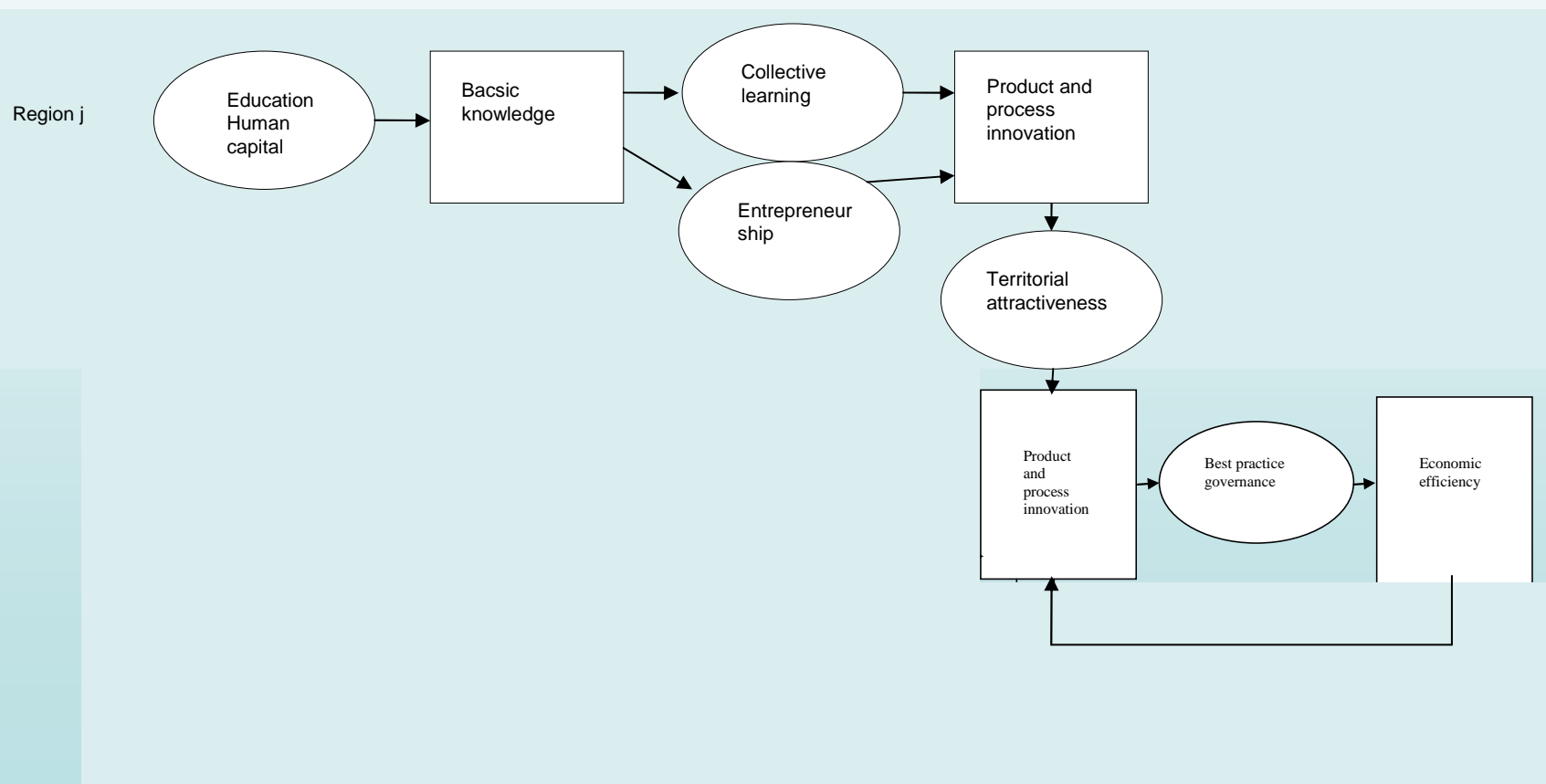
Phases	Territorial preconditions for knowledge creation	Knowledge output	Territorial preconditions for innovation	Innovation	Territorial preconditions for innovation adoption	Economic efficiency
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An imitative innovation pattern

Phases	Territorial preconditions for knowledge creation	Knowledge output	Territorial preconditions for innovation	Innovation	Territorial preconditions for innovation adoption	Economic efficiency
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Characteristics of the different innovation patterns

Innovation patterns Characteristics	<i>Endogenous innovation pattern in a scientific network</i>	<i>Creative application pattern</i>	<i>Imitative innovation pattern</i>
Knowledge/technology	Basic, general purpose technologies	Applied technologies	Creative imitation
Innovative model	Supply-driven	Supply-driven	Supply-driven
Role of the region in the innovation process	Active role	Active role	Passive role
Outcome of the interregional cooperation	Knowledge creation	Creative innovation adoption	Innovation diffusion
Territorial pre-conditions behind the inter-regional flows of knowledge and innovation	Territorial receptivity	Territorial creativity	Territorial attractiveness
Natural regional context associated to the innovation pattern	Metropolitan regions	Second ranked urban regions	Catching-up regions
Innovation policy aims	Maximum return to R&D investment	Maximum return to co-inventing applications	Maximum return to imitation



Context conditions for the different territorial innovation patterns

Territorial receptivity: defined as the capability of the region to interpret and use external knowledge for complementary research and science advances.

It depends on:

- Relational capability of the recipient region
- Cognitive proximity between the two regions



Context conditions for the different territorial innovation patterns

Territorial creativity: defined as the capacity of a region to actually access and absorb the knowledge produced in the world and ultimately utilize it to invent co-applications.

- Openness to innovation in general
- Technological proximity (similarities in productive vocations)



Context conditions for the different territorial innovation patterns

Territorial attractiveness: defined as the capacity of a region to actually attract innovation developed outside the region and embedded in, e.g., foreign firms.

- large final market
- labour cost competitiveness

coupled with local assets are the main determinants of FDI attraction



Policy implications (1)

A thematically/regionally neutral and generic innovation policy - a “one size fits all approach” – is not useful and efficient to generate innovation processes at local level.

On the contrary each territorial innovation pattern calls for specific ad-hoc innovation policy goals.



Policy implications (2)

In particular:

- the maximum return to R&D investment can be the right goal for a region specialized in knowledge creation;
- maximum return to creative applications, for regions that promote innovation in response to external knowledge
- maximum return to imitation, pushing towards a creative imitation, is the right policy aim for regions that rely on external innovation processes.



Policy implications (3)

- There is no pattern that is by definition superior to the other in terms of efficiency and effectiveness of innovation on growth;
- instead each territorial pattern may provide an efficient use of research and innovation activities generating growth.

Our attempt is to test this empirically.



**Thank you very much
for your attention!**