The Europeanization of Research and Policy Innovations in Brussels
Report 1 – Literature Review

GREATPI Working Paper n. 1

Literature Review on territorial innovation models, geography of research and policy innovations.

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FOREWORD

This report is a work in progress.

It provides a review of the literature on the above mentioned topics that does not pretend to be exhaustive. This report is part of a broader project on the European research geography and territorial policy innovation in Brussels. More information are available on the website www.greatpi.eu. The report is open to further contribution for a more exhaustive perspective on the selected research areas.

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1 Introduction: objectives and characteristics of the report

This report aims to provide a review of the literature, which will be used as background for the project “The Europeanization of Research and Policy Innovations in Brussels”. This literature review covers three main research areas:

1. territorial innovation models (TIM),
2. geography of European research, and
3. public policy innovation.

This report aims to provide an overview of major theories and research trends in order to identify major theoretical contributions and missing gaps to be filled in. Nonetheless, this report is a first step, thus it has an open structure to be integrated with further references, which will be progressively collected during the research. This report can be considered as a theoretical toolbox in the above-mentioned areas of research.

Finally, the theoretical framework for the research will be presented and discussed referring to the case of Brussels and the purposes of this research (see Section 5). The cross-disciplinary nature of the research requires the integration of different theoretical contributions aiming to address and overcome existing theoretical limits and providing a framework to be applied to the specific case of Brussels. According to the nature of this report, even the theoretical framework shall be considered as an open contribution to be further developed with innovative contribution and cross-disciplinary fertilizations.

From a methodological point of view, references were identified referring to major scientific journals in related fields. Moreover, institutional reports, mainly those prepared by and for the EU, were considered as an integrative source of reference regarding the process of Europeanization of research and policies. Using a ‘snowball’ method, it was possible to identify mainstream debates integrating previous already available knowledge on these topics. Even though this method cannot be considered exhaustive, the analysis of major scientific journals was complete and enabled to identify major trends in the literature and their links with the policy debate. Therefore, the selection of readings refers mainly to policy-oriented research articles. Furthermore, the major interest of this research is to identify missing gaps in the literature and possible cross-fertilization across research fields, which are often divided among ‘traditional’ disciplines.

The structure of the report follows the topics presented above. In Section 2, the large literature on “territorial innovation models” (TIM) is presented highlighting main concepts, common trends and open issues. In Section 3, the literature on the analysis of the European research geography is presented focusing on major features and recent trends. Section 4 focuses on dynamics of policy innovation referring to the general debate on policy making for territorial development. Section 5 presents a first contribution to develop a theoretical framework for the following steps. Finally, in Section 6 there are conclusions and issues that need to be further developed.
2 Territorial Innovations Models

2.1 Starting point

The starting point for the discussion on territorial innovation models is based on the assumption that this literature has more similarities than differences. Even though each sub-field has different origins, labels and focus, the debate on TIM is based on a common perspective. This perspective has been provided by Frank Moulaert who proposed the label “territorial innovation models” (TIM), although it is common also to other scholars that sometimes prefer other labels (Iammarino, 2005; Moulaert and Sekia, 2003; OECD Reviews of Regional Innovation: Regions and Innovation Policy, 2011; Tödtling et al., 2006; Werker, 2006).

2.2 The territorial innovation models: different origins towards a common framework

Innovation has become the core of economic process in an age of globalization. This idea has been consolidated in the scientific and policy debate at least since 1990s. In economic terms, innovation is relevant because it provides firms with a competitive advantage determined by a (temporary) monopolistic situation thanks to a ‘more advanced product’ (product innovation) innovation or a ‘more efficient production system’ (process innovation). This is not the case to discuss all the dynamics and meanings of ‘innovation’, even because they are more often referred to firms than to policies. As starting point, it is necessary just to recognize the centrality of ‘innovation’ as a positive capacity to do something ‘new, ‘useful’ and ‘exploitable’ that competitors are not able to do.

2.2.1 The origins of the debate

In economic geography, the Endogenous growth theory (Pack, 1994) can be considered the first theory looking for territorial basis of economic competitiveness specifically considering R&D investments as key-aspect for economic dynamics (Crescenzi, 2005; Durlauf et al., 2005; Fagerberg, 1994; Fagerberg et al., 1997; Fine, 2000; Midelfart-Knarvik and Overman, 2002). According to this perspective, it is not possible to have perfectly competitive markets because regions compete based on their resources, which are heterogeneous across space. Technology, moreover, is unevenly distributed across space, thus market competition cannot achieve the required conditions of equal conditions for competitors (Fine, 2000; Sachs and Warner, 1997). Recently, the Endogenous growth theory has been integrated with more advanced approaches:

- The regional catch-up model has been articulated distinguishing between leader, follower and non-innovative regions, which have differentiated challenges and dynamics (Fagerberg, 1994);
- The Social filter (Crescenzi and Rodriguez-Pose, 2009) aims to consider not just human capital and technology, but also the availability of social and cognitive capitals in urban areas (Glaeser and Redlick, 2008);
- The Territorial Capital (Camagni and Capello, 2012; Camagni, 2002) is an innovative research approach integrating tangible/immaterial and rival/non-rival localised assets affecting regional productivity.
In economic theory, the Endogenous growth model has been the base for the ‘New Economic Geography’ (NEG) that was able to integrate different economic paradigms (Combes et al., 2005; Krugman, 1991; Ottaviano and Puga, 1998; Puga, 1999; Thisse, 2000). While this model has become largely accepted thanks to the Nobel winner Paul Krugman, the NEG focuses on the role of spatial agglomeration of economic activities highlighting the following aspects:

- Spatial agglomeration reduces ‘transaction costs’ between firms and with consumers;
- Spatial agglomeration increases inter-regional disparities giving competitive advantage to some regions, mainly where agglomerations are (e.g. comparative advantages for firms localised in regions where there are lower transport costs and more pecuniary externalities determined by increased spatial competition);
- Spatial agglomeration can be determined by ‘historical accident’, and this implies very long-term dynamics in the their rise or decline;
- Increasing global flows determine increasing competition and inequalities because actors can move where it is more rentable, and they tend to go where spatial agglomeration provides more returns;
- International flows are more interested in urban areas where they can find better endowment of human and social capitals (Bathelt et al., 2004; Florida, 2002; Glaeser and Redlick, 2008). This provides firms with competitive advantage in terms of access to local labour market (more qualified people, more suppliers and possibilities to identify niches of specialized human capital) as well as basis for innovative activities.

Before discussing more specifically the territorial basis for innovation, a linguistic distinction has to be clarified. In the NEG literature, they refer mainly to “agglomeration” (Thisse, 2000) meaning spatial concentration of economic activities and their interactions. Nonetheless, a literature more based on empirical quantitative analysis uses the expression ‘neighbourhood effects’. This can be considered relatively similar, although etymologically neighbourhoods are smaller than agglomeration and, often, they can be considered part of them. Nevertheless, within these two literatures, substantial analogies appear, and then they can be considered as substantially equivalents.

The debate on Endogenous growth theory and the NEG represents the mainstream debate on economic theory; while, in the sub-field of economic geography a major area of interest is represented by the TIM (Moulaert and Sekia, 2003). This debate originated and evolved starting from three completely different and separated perspectives. Starting from different origins, the following approaches created a common field, which is the base for our research.

- The **Italian Industrial Districts** (IID) (Brusco, 1986; Trigilia, 1992) have studied the territorial benefits of spatially concentrated systems of SMEs in North-East and Central Italy. This school of thoughts was the base for the italo-french school of **innovative milieu** (IM) (Camagni, 1991; Crevoisier and Camagni, 2000; Maillat et al., 1993), which can be considered the first complete model for TIM. Nonetheless, these schools had a late influence on the international debate because they were mainly for French- and Italian-speaking debates;
- The **Californian school** (Saxenian, 1996; Scott et al., 2001; Storper, 1997) started from the Silicon Valley as first case study, and then it has had a very large influence all over the world, (re-)discovering the IID. While they have been able to open the way to the debate at a large scale highlighting the importance of TIMs, their major contribution has been the integration of the original IID approach in the general
debate on TIMs. In the US context, a particularly influential contribution comes from the Porter’s clusters (Porter, 1990, 1998). Even though this approach became very successful and popular across policy makers, Porter’s clusters have to be considered more as an applicative implementation of TIMs than a real theoretical contribution due to the large application of the previous contribution by Porter and his colleagues working as consultants (Hospers and Beugelsdijk, 2002; Martin and Sunley, 2003);

- The Nordic school on Innovation Systems (National Innovation Systems, NSI, and Regional Innovation Systems, RIS or RSI) provided two main contributions to the international debate: the focus on technological innovation based through many case studies (mainly in Denmark and Sweden) and, most important, the systemic perspective on innovation dynamics (Cooke et al., 1997; Crescenzi and Rodriguez-Pose, 2009; Iammarino, 2005; Lundvall, 2001; Werker, 2006). This approach has many similarities with ‘management’ studies on the Triple Helix (Etzkowitz and Leydesdorff, 2000), which focuses on relationships among firms, university and government.

These three schools were been progressively integrated and influenced each other showing more commonalities than differences. In the European context, the IM and RIS have progressively evolved towards the so-called ‘learning regions’ (Antonelli and Quéré, 2002; Capello and Faggian, 2005; Cooke et al., 1997; Morgan, 1997; Simmie, 1997) emphasising a dynamic perspective on knowledge as base for innovation. In spite of a large creativity on labels and acronyms for TIMs, these different debates converged progressively.

2.2.2 Common elements across TIMs

In the debate of TIMs, we can identify some key aspects that can be used as base for our research.

- Spatial agglomeration creates external economies of scale providing more business opportunities (both quantitative and qualitative) as well as an increased and more advanced labour market (Marshall, 1890);
- The spatial concentration of activities provides access to information and shared knowledge across firms (Storper and Venables, 2004).
- TIM (agglomeration, clusters …) reduces the Granovetter’s transaction costs thanks to shared institutions and social capital. This aspect is fundamental to reduce risks for uncertain activities such as innovation (Schumpeter) and creation (Pratt, 2004);

Based mainly on this last argument, the following elements regarding innovation and knowledge have been identified.

- Innovation is collective, interactive and fundamentally uncertain. “In sum, localised technological knowledge is more and more viewed as the result of the repeated and dynamic interactions of agents embedded in a variety of specific and highly idiosyncratic constraints” (Antonelli and Quéré, 2002, page 1053);
- Knowledge comprises “all cognitions and abilities that individuals use to solve problems, make decisions and understand incoming informations” (Döring and Schnellenbach, 2006, page 377). For this reason, sharing knowledge is fundamental for firms in order to compete on the market. An open issue about knowledge flows were identified on the ‘absorptive capacity’ of firms (Cohen and Levinthal, 1990) and their capacity to benefit from external source of knowledge (Bathelt et al., 2004). This implies that firms have to be organised to manage this knowledge flows (Patrucco, 2003) and, even more, this is valid also for knowledge sources such as universities.
and research centres. The Triple Helix literature addresses specifically the different forms of organization for cooperation on R&D activities (D’Este and Iammarino, 2010; Etzkowitz, 2003);

- An open issue regards **dimension and sizes of firms** in the cluster: large and multinational enterprises, SMEs, or both. What are the implications for having differentiated structures and sizes? Moreover, what are the implications for TIM dynamics and evolution? (Bathelt et al., 2004; Gordon and McCann, 2000; Markusen, 1996; Werker, 2006). Recently, the concept of ‘related variety’ proposed by Boschma has highlighted the importance of the mix in terms of industries, although this seems not being related with the purpose of this research (cf. Boschma and Iammarino, 2007);

- A common distinction exists between **codified and tacit knowledge**: while the first one can be easily transferred, the second one is much more place-based (Antonelli and Quéré, 2002; Dang et al., 2009; Gertler, 2003; Polanyi, 1967; Storper and Venables, 2004). More categories to distinguish typologies of knowledge have been proposed such as ‘concrete vs. abstract’ and ‘diffused vs. non-diffused’ knowledge;

- **Knowledge is cumulative**, and then **geographically located** and **path-dependent** (Audretsch and Feldman, 1996; Crescenzi et al., 2007; Döring and Schnellenbach, 2006; Jaffe, 1989; Moreno et al., 2005; Sonn and Storper, 2008; Storper and Venables, 2004; Storper, 1995; Werker, 2006). In a systemic perspective, there is a heuristic division that is particularly relevant. “Next to the economics of the production of knowledge, the economics of the distribution of knowledge has emerged as a distinct area of investigation dedicated to understanding the role of external knowledge and interactive learning in the production and usage of new knowledge. Each bit of technological knowledge is not only the end-result of a process of generation, but also the input for the generation of new bits” (Antonelli and Quéré, 2002, page 1051);

- A large emphasis has been devoted to ‘**spatial spillovers of knowledge**’ (Anselin et al., 1997; Autant-Bernard, 2012) considering their costs, spatial dynamics and existing filters enhancing or inhibiting it (Acs and Armington, 2004; Audretsch and Feldman, 1996; Breschi et al., 2003; Capello and Faggian, 2005; Crescenzi, 2005; Döring and Schnellenbach, 2006; Fagerberg et al., 1997; Gertler, 2003; Moreno et al., 2005; Rodriguez-Pose and Crescenzi, 2008; Werker, 2006). In this field of research, a fundamental contribution upgrade has been provided by the discussion on ‘**local buzz and global pipelines**’ (Bathelt et al., 2004; Storper and Venables, 2004) which has highlighted the importance of supra-local connections and their interactions with local TIM (Bathelt and Turi, 2011; Dang et al., 2009; Malmberg and Maskell, 2006; Maskell et al., 2005). More recently, this branch of the literature has analysed different kinds of ‘pipelines’ (Maskell et al., 2005): permanent clusters, stable inter-firm networks, inter-firm projects and temporary clusters.

While the importance of human capital for TIM was recognised since the original debate on the Endogenous growth model, the discussion on knowledge and innovation dynamics has progressively integrated and investigated the idea of **social capital**. This concept has been extremely successful across scholars and policy makers as well, despite its ambiguous definition (Basu, 2008; Knack and Keefer, 1997; Putnam et al., 1993). Nevertheless, three
fundamental elements have to be considered in terms of contribution provided by the social capital to TIMs (for a complete discussion see Storper, 2005).

- Trust reduces uncertainty in collective activities such as innovation.
- Social capital enforces trust.
- Innovation is a fundamentally an uncertain activity as well as a collective process.
- Social capital is often (but not exclusively) territorially based.

In this debate on the role of social capital, a significant distinction exists between community and society (Rodriguez-Pose and Storper, 2006):

- Community refers to features of the group of life (norms, traditions, social conventions, interpersonal contacts, informal networks…). Being a member sustain collective action, which is costly, cognitively complex and with highly personalized barriers;
- Society is the set of codified and transparent rules, which tend to be less costly but still providing a mechanism of incentives and sanctions.

While they argue that society and community should reinforce each other, the debate on the role of social capital for territorial development is still open. An interesting synthesis between the idea of social capital and the above-mentioned contribution on local buzz and global pipelines is the idea of ‘organised proximity.

“Organised proximity refers to the capacity of an organisation or an institution to make their members interact. On a one hand, the organised capacity relies on the development of a relational proximity, that is to say the sense of belonging developed with the sharing of common identity, values and rules that foster the motivation to exchange and combine knowledge. On the other hand, this organised proximity relies on the emergence and development of a shared repository (cognitive proximity) that improve the capacity to exchange and combine knowledge.

(Dang et al., 2009, page 4).

This contribution provides a significant basis for our research, but needs to be integrated with the broader debate on institutions (North, 1990, 1992, 2005) conceived as shared norms of behaviours. In spite of a general and positive consensus on the importance of shared norms of behaviours, those institutions are not always positive and they might also prevent the exploration of new opportunities (lock-in) because “[i]t is particularly difficult to unlearn successful habits of the past, and institutions may be retained and sometimes even aggressively defended long after they have been made redundant by internal or external events” (Malmberg and Maskell, 2006, page 6). These aspects will need to be further discussed regarding the evolution of TIMs.

2.2.3 Critical aspects and open issues

In the debate on TIMs, the current literature has highlighted many open issues that are still relatively unexplored and unclear. The following elements represent the most relevant open fields of research related to the purpose of this project.

- While RISs were largely investigated and mapped, mainly around Europe, this is not always associated with higher rate of economic growth. “[C]omparison of empirical evidence from different versions of the European Regional Innovation Scoreboard
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(ERIS) (Hollanders, 2002, 2003, 2006; Hollanders et al., 2009), with data from the official statistical service of the European Union (Eurostat), reveals an intriguingly persistent anomaly. In particular, it reveals that most regions — which have been repeatedly ranked in the top quartile of innovation performance in all versions of the regional scoreboard — have grown at a slower pace than other regions in the nation under consideration. In addition, more than half a dozen of these regions — for example, the regions of Berlin, Braunschweig, Dresden, Northern Finland, East-Middle, South and West Sweden—present surprisingly lower income per capita statistics and significantly higher unemployment rates” (Fragkandreas, 2013, page 3).

- What are the distinction between vertical, horizontal and geographical clusters (Hospers and Beugelsdijk, 2002)? While many empirical studies are available, a complete categorisation of TIMs does not exist, mainly considering dynamic aspects and policy implications. Among several proposed classifications, the following ones seem the more exhaustive:
  o hub-and-spoke, satellite platform, and state anchored district (Markusen, 1996);
  o pure agglomeration (Marshall), industrial complexes and social network models (Gordon and McCann, 2000).

- RIS (as well as the Triple Helix) introduced a systemic perspective on innovation, but in this literature there is little about feedback mechanisms. The use of purely quantitative indicators does not seem to be adequate for this purpose (Caniëls and van den Bosch, 2011). “It is important to note that, while NIS theory gives us an impressive description, it does not (yet, at least) allow us to make very many predictions. It is not likely to do so without better coupling to other bodies of knowledge. We lack a control theory for the NIS. There is currently a great deal of policy interest in ‘benchmarking’ economic and innovation performance” (Arnold, 2004, page 7). In this perspective, an evolutionary approach seems necessary in order to understand those dynamics.

- The policy that have been derived for TIM are based on the idea of ‘market failures’ whether firms have to invest on knowledge which is a non-excludable (or partially excludable) asset (Hoekman et al., 2009). However, the experience on innovation policies showed much more complex dynamics and these assumptions need to be redefined because the idea of market failures seem to be too restrictive (Bonaccorsi, 2009; OECD Reviews of Regional Innovation: Regions and Innovation Policy, 2011). A specific field of research was identified in the relationship with the financial sector (Cooke et al., 1997), although this shall be considered not the only aspect to be addressed for innovation.

- Regions are often seen as independent actors competing each other. There are few studies considering their interdependencies both in terms of innovation or policy competition (Dotti, 2013; Todtling and Tripl, 2005). This would need to overcome certain perspectives that conceive regions as ‘atomistic actors’ in favour of approaches based on regional benchmarks and interactions.

- While the importance of social and institutional factors is still an open issue, an even more relevant aspect to be addressed is represented by their evolution. How do

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2 In this paper, Arnold speaks about National Innovation Systems (NIS) which are a kind of TIM.
3 Some interesting case studies come from Sweden where clusters have been combined in an integrated and multi-scalar perspective (Hospers and Beugelsdijk, 2002; Lundequist and Power, 2002; Moodysson et al., 2005).
institutions reducing uncertainty to share knowledge and enhance innovation evolve? This research question can be articulated in three sub-questions, at least:

- How do institutions as formal bodies evolve to support knowledge and enhance innovation? How are these related to informal institutions?
- How do innovation policies evolve, according to TIMs characteristics?
- Which kind of external policies can improve TIM governance mechanisms? Which feedback mechanisms exist within TIM to ‘understand’ if they are evolving in the desired direction?

2.3 Innovation and Proximity: issues for governance

“The generation and diffusion of innovation is a dynamic process where institutional frameworks and individual actors as well as governmental bodies co-evolve. Therefore, innovation policy cannot be adequately guided by static policy conceptions. Innovation processes driving structural change and growth in regions comprise chance and necessity, i.e. they are not completely random” (Werker, 2006, page 5).

“Given these considerations, one could argue [...] that ‘there is no compelling reason to assume that ‘community’ implies spatially contiguous community, or that local ties are stronger than ties at a distance.’ Relational proximity can [...] exist between actors located in different parts of the world. Modern technological and institutional developments facilitate both the transfer of information and the travelling of people across space.” (Maskell et al., 2005, page 11).

The importance of territory for innovation dynamics was described above highlighting theoretical sources and main concepts. Before moving towards the debate on related policies, a seminal contribution by the evolutionary school of economic geography provides a framework to define ‘territory’ and the five different dimensions of proximity supporting innovation (Boschma, 2005):

- Cognitive proximity,
- Informational proximity,
- Institutional proximity,
- Social proximity,
- Geographical/Spatial proximity.

These five dimensions support innovation and are boosted by spatial proximity, although they are not exclusive and proximities can exist even without spatial dimensions (e.g. the above-mentioned ‘transfer of people’). This contribution provides also a framework for governance issues because proximity enhance also collective action for territorial development (Cheshire and Gordon, 1996; Olson, 1965). Accordingly, territorial proximity support both innovation and governance enhancing cooperation, collective action and policy processes as well as trust, sharing information and reducing uncertainty. In this perspective, the
‘organised proximity’⁴ becomes a normative element emphasizing the importance of institutions in terms of shared values and norms as well as collective/public bodies.

However, in the debate on TIMs the policy dimension has been largely under-considered often reducing it to a generic message for “more investments on R&D”. In this perspective, a significant mismatch between economists and policy makers was highlighted by Andrea Bonaccorsi (2009)⁵ in the more general debate for the future EU regional policy (Barca, 2009). Along this idea, (Moulaert and Sekia, 2003) argued that the concept is quite confused and unclear, although very ‘successful’. Ambiguities are determined by unclear definitions of innovation and confusion between normative and positive aspects. They have proposed the Integrated Area Model (IAD) saying that

“IAD questions the restrictive existential finality of the TIM in following a market logic only, without caring about the outcomes of market failures for development, and argues that territorial development should be based on a multi-dimensional view of innovation, economic dynamics and community governance. Territorial development does not only mean enabling the local and regional market economy, but also empowering the other parts of the economy (public sector, social economy, cultural sector, low-productivity artisan production) as well as community life (socio-cultural dynamics as a level of human existence by itself, political and social governance of non-economic sections of society, cultural and natural life).” (Moulaert and Sekia, 2003, pages 299–300).

In the case of the Netherlands and, specifically, regarding scientific cooperation, an interesting application was carried out showing that closer research centres are more likely to cooperate, although geographical proximity needs to be combined with industrial proximity.

Geographical proximity is frequently claimed to be beneficial for successful collaboration and knowledge exchange. This is most often explained by the importance of face-to-face contacts for the exchange of tacit knowledge. In many studies this localised interaction is however, only implicitly assumed rather than examined in an explicit manner. A number of authors have theoretically questioned the importance of geographical proximity in itself for collaboration and knowledge exchange (see for example Breschi and Lissoni 2001; Howells 2002; Gertler 2003; Torre and Rallet 2005; Boschma 2005). The main argument is that ‘simple’ co-location is neither a prerequisite nor a sufficient condition’ (Boschma 2005, p. 71) for collaboration. (Ponds et al., 2007, p. 425).

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⁴ “Organised proximity refers to the capacity of an organisation or an institution to make their members interact. On one hand, the organised capacity relies on the development of a relational proximity, that is to say the sense of belonging developed with the sharing of common identity, values and rules that foster the motivation to exchange and combine knowledge. On the other hand, this organised proximity relies on the emergence and development of a shared repository (cognitive proximity) that improve the capacity to exchange and combine knowledge. (Dang et al., 2009, page 4).

⁵ Another good synthesis, although for different purposes, is (Todtling and Trippl, 2005).
A synthesis of all the main policy approaches has been proposed in (OECD Reviews of Regional Innovation: Regions and Innovation Policy, 2011) highlighting that it is not possible to use the same policy for innovation across regions. Among the main recommendations, they have suggested focusing on

- Establishing multi-level, open and networked governance structures: vertical coordination, horizontal coordination (public and private stakeholders), and targeting functional areas.
- Foster policy learning though better metrics, evaluation and experimentation.

Useful elements come from the Triple Helix and the RIS literatures (which might be easily integrated each other combining economic geography with management issues). Specifically, they emphasize the systemic perspective for innovation.

**The Innovation Paradox:** “there is a mismatch between academic knowledge and knowledge that directly contributes to economic development, which causes and innovation paradox” (Caniëls and van den Bosch, 2011, page 272).

Regarding analogies between innovation dynamics and governance issues it has been argued that “Physical proximity facilitates the integration of multidisciplinary knowledge that is tacit and therefore ‘person-embodied’ rather than ‘information-embodied’ and it also facilitates the rapid decision-making needed to cope with uncertainty” (Morgan, 1997, page 495). In terms of innovation, three elements have been highlighted by (Antonelli and Quéré, 2002):

1. Firms can use their knowledge to innovate only in fields where they are experts;
2. Knowledge is organised in ‘bundles’ and those are localised;
3. “the generation of new technological knowledge relies upon the capability of agents to scan globally and reinvent locally”, combining new generic knowledge with the specific idiosyncratic product, market and technical conditions of application within which each agent operates. The generation of new technological knowledge by each agent relies systematically upon its ability to access, retrieve, understand and use external knowledge.

   External technological knowledge, however, does not fall from heaven like manna. [...] It requires specific search, identification, transaction, acquisition, absorption and ‘listening’ costs which depend upon the variety of codes and the number of communication channels selected by companies. This is why the localised character of technological knowledge matters.” (Antonelli and Quéré, 2002, page 1053).

A useful framework for typologies of knowledge and governance was proposed by (Dang et al., 2009, page 7). The interest for this classification based on codified/tacit and individual/collective knowledge is the relation with different kinds of governance and ways to share knowledge.
Based on these categories, they identify several different dimensions of ‘neighbourhood effect’ (say also ‘agglomeration’):
- local social interaction (simplest mechanism),
- emulation (do similar to others), and
- environmental observation (perceive what you see, and behave accordingly).

The question is relevant because knowledge is spread around many people (cf. Hayek), but to access it you need previous shared knowledge because “Collaborative efforts in knowledge creation and exchange are facilitated among individuals who share values and identity” (Malmberg and Maskell, 2006).

Derived from the debate on RIS and innovation dynamics (see also Chesbrough, 2003), the systemic perspective on innovation can be related with the debate on “local buzz” (Bathelt and Turi, 2011; Bathelt et al., 2004; Storper and Venables, 2004) and the need to adapt policies to specific contexts of innovation (Bonaccorsi, 2009). Specifically, it was argued that

“Systemic interactions are characterised by relevant dynamic features, due to the role of feedbacks. In other words, the generation and distribution of knowledge become specific, depending on the local conditions into which this knowledge is embedded. Make no mistake here: this ‘localised’ character of knowledge is not in an exclusively geographical sense. The localised character of knowledge has in fact to do with the architecture of intrafirm and interfirm relations—that is, the set of inputs and relations required to implement their activities (Metcalf, 1995).” (Antonelli and Quéré, 2002, page 1053).

In terms of innovation policy evaluations, a very common reference is the study of patents, scientific publications and education outcomes (Bornmann et al., 2011, 2012; Leydesdorff and Wagner, 2008). Nonetheless, knowledge often does not leave measurable outcome, as it was argued—among others—by Paul Krugman. An even more interesting aspect is the lack of
attention or interactions and feedback mechanisms (Caniëls and van den Bosch, 2011). Most of these studies have highlighted the willingness to cooperate, yet there is limited attention on evolutionary perspectives. The following table seems to be a good synthesis of possibilities for cooperation between universities, firms and government.

Table 3 (Caniëls and van den Bosch, 2011, page 278).

<table>
<thead>
<tr>
<th>Domains</th>
<th>HEI-Industry collaboration mechanisms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research</td>
<td>Content of research has a regional focus</td>
</tr>
<tr>
<td></td>
<td>• Research agreement between regional actors</td>
</tr>
<tr>
<td></td>
<td>o commissioned by industry/policy; undertaken by university researchers only; original research</td>
</tr>
<tr>
<td></td>
<td>o undertaken by several parties jointly; original research</td>
</tr>
<tr>
<td></td>
<td>o commissioned by industry; undertaken by university researchers only; no original research</td>
</tr>
<tr>
<td>Education</td>
<td>Build training relationships with firms</td>
</tr>
<tr>
<td></td>
<td>o Training of postgraduates and internships at firms (e.g., joint supervision of PhDs)</td>
</tr>
<tr>
<td></td>
<td>o Temporary exchange of personnel</td>
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<tr>
<td></td>
<td>o Training of firm employees provided by the university</td>
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<tr>
<td></td>
<td>• Adapt education programs to meet firm’s needs</td>
</tr>
<tr>
<td></td>
<td>• Strong regional focus on student recruitment and graduate retention</td>
</tr>
<tr>
<td>Active collaboration with (regional) public and private actors</td>
<td>Industry sponsored meetings and conferences</td>
</tr>
<tr>
<td></td>
<td>Setting up spin-off or start-up companies</td>
</tr>
<tr>
<td></td>
<td>Creation of physical facilities with industry funding / use or renting of facilities or equipment</td>
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</table>

Moreover, they have suggested to consider the following aspects (Caniëls and van den Bosch, 2011):

- For HEI, the internal motivation and capabilities to cooperate with other actors, their institutional characteristics and scientific areas;
- For regional firms, their internal motivation and absorptive capacity;
- In terms of relational aspects, the level of trust, familiarity, relational norms and commitments;
- In terms of environment, the systemic aspects, the role of governments and characteristics of the local labour market.

“Research shows that HEIs perceive a tension between excellent in teaching and research and regional engagement (cit. omitted), and there is an internal motivation to let excellence in research prevail over excellence in education and engagement in the region. Extensive research in the field of radical innovation management and stimulation of creativity suggests that internal motivations generate more effects than external motivations” (Caniëls and van den Bosch, 2011, page 280).

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6 For a general debate on the role of governments, see (Bennett, 1997).
From an empirical perspective, this debate has emphasized the importance of Technological Transfer Offices (TTOs) for universities as a way to link them with firms (e.g. Curi et al., 2012; D’Este and Iammarino, 2010; Deiaco et al., 2012). The encouragement of these kinds of collaboration has been a central issue in the policy debate. Nonetheless, this requires strategic behaviours orienting the management of universities (Benneworth and Jongbloed, 2010; Dodgson and Staggs, 2012; Goddard et al., 2012); thus nothing is said regarding the engagement of universities towards policy makers.

2.4 Main open issues

In the debate presented above the main open issue regards policy aspects. Little attention on policy dynamics was devoted. While the RIS/Triple Helix has had the positive role of highlighting the importance of systemic perspective, the debate on innovation policy was often limited to generic ideas: “promote more R&D investments”, and “synergic actions”. In the latter aspect, some normative conclusions were identified in terms of organizational changes, while the former one is often a generic claim for more investments, although there is the recognition of the strategic importance of R&D activities. In this perspective, three main areas seem to be interesting and promising for further research.

1. **[An ecology of TIM]** Regions are often seen as independent and atomistic actors, whereas they have to compete in a strategic environment interacting (acting, re-acting, competing, cooperating) with other regions. In spite of highlighting the importance of an internal systemic perspective, regions are not seen as competing each other or having possibilities for synergic and strategic specialisations. In this perspective, the ‘smart specialisation strategy’ (ERRIN, 2011; EU Commission, 2010; Foray et al., 2009) seems to be an interesting way to explore it and the strong support promoted by the EU Commission can pave the way to innovate this conception.

2. **[Evolving TIMs]** Once the importance of systems of innovation, local buzz and territorial proximity has been recognized, little attention has been devoted to normative elements and evolutionary dynamics. How do TIMs evolve? Recognizing the specificity of each TIM, how do their structures and organizations affect the dynamic evolution in a long-term perspective?

3. **[TIM governance]** The debate has largely focused on firms and interaction with universities referring to governments as fundamental actors to support them promoting a systemic perspective; however, the focus on policies and governments is still limited, mainly regarding long-term dynamics, institutional frameworks, and collective learning for policymaking.

These three themes are the most relevant regarding the purpose of the project, although many other open issues exist in the debate.

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7 Regarding regions, the idea of ‘innovation networks’ (Camagni, 1991) has been relevant showing possibilities and strategic importance for synergic specialisation supporting by networks of cities.
3 Geography of research: towards Europeanization

3.1 Starting point

The geography of research activities aims to map and understand where research is carried out and how this specific and unevenly distributed function is spread across space. Research is one of the sources of knowledge and it is assumed to be the most relevant one, although other and less formalised sources of knowledge can exist.

In this report, the aim is to focus on the European research geography and its major trends during last decade. Two missing research fields were identified from this debate: the research governance and the differences across discipline structures. These two domains rely mainly on political sciences and science sociology, and they will be analysed later, thus the identification of these gaps in the literature is of particular interest.

3.2 The increasing internationalisation of research

“If anything has characterized knowledge production in science and technology during the twentieth century, it is the increased collaborative nature of knowledge production [...] In science, co-authorships accounted for less than 10% of all publications at the start of the twentieth century, while co-authorships account for over 50% of all publications at the end of the twentieth century” (Hoekman et al., 2009, page 722).

“To realize sustainable collaborations, especially between North and South, much effort from both sides is required. Nevertheless, international collaboration has increased in many fields, as numerous scientometric studies have indicated. Two general trends are broadly discussed in the literature. First, we observed a rise in the rate of multi-author papers that started in the 19th century, albeit slowly in the beginning but at a faster pace since World War I (Beaver and Rosen, 1979). Multi-author papers are widely used as an indicator of growing collaboration in science (e.g. Beaver and Rosen, 1978; 1979; Wagner-Döbler, 2001). Second, not only collaboration in general but also collaboration across national borders rose steadily; usually measured by the rate of international coauthorship of articles (e.g. Glänzel, 2001; Wagner and Leydesdorff, 2005; Leclerc and Gagné, 1994).

Worldwide, the share of publications with one institutional address sank from 60.3% in 1988 to 41.3% in 2003; whereas the share of multi-author-papers within national borders rose from 31.5% to 39.1% and the share of internationally co-authored papers from 8.2% to 19.5% within the same time frame (National Science Board (NSB), 2006: Fig. 5-39).

(Engels & Ruschenburg, 2008, p. 348)
In the field of geography of research, several sub-fields exist. For the purpose of this research, we aim to focus on research networks. Those ‘knowledge pipelines’ are expected to supply regions with knowledge for territorial policy innovation. “From this overview of research on scientific collaboration we draw the following conclusions for our own research. International scientific collaboration does not occur automatically and can be costly. As we are seeing a steady increase in collaboration it is plausible to assume that several factors internal to the scientific system foster collaboration. However, the large differences between fields lead us to the question how the field of global environmental change research relates to the overall trend.” (Engels and Ruschenburg, 2008, page 348). Nonetheless, there are also other subfields of the geography of research such as:

- Geographical mobility of researchers (Faggian and McCann, 2004; Kale et al., 2008), while the mobility of students has attracted a large literature which has limited interest for the purpose of the research (Baryla Jr E. A. and Dotterweich D., 2001; Bratti, 2002; Bratti et al., 2004; Ciriaci and Muscio, 2010; Dotterweich and Baryla, 2005; Dotti, 2007; Dotti et al., 2013; Faggian et al., 2006; Frenette, 2004; McCann and Simonen, 2005; Sá et al., 2006),
- Spatial distribution of patents and private R&D activities (Jaffe, 1989) as well as the more recent role in promoting spin-offs (Autant-Bernard et al., 2007),
- Geographical distribution and evolution of university campuses and research centres (e.g. van Heur, 2010).

A specific research field is the study of the Europeanization of research geography. Specifically, the study on impacts of the EU Framework Programmes (FP) and European Research Area (ERA) has provided the opportunity to investigate the growing flows of academic research across European countries and worldwide. In general, this process of Europeanization has progressed in a context where new technologies have allowed investigating it. Tools like ‘ISI Web of Science’ and the progresses of new research areas like the ‘scientometrics’ have enabled the study of academic publications, scientific co-authorships and citation networks (Autant-Bernard and Chalaye, 2013; Autant-Bernard et al., 2007; Bormann et al., 2011, 2012; Defazio et al., 2009; Engels and Ruschenburg, 2008; Heller-Schuh et al., 2011; Hoekman et al., 2009; Ponds et al., 2007).

Two main trends characterise the general framework for the geography of research:

- There is a growing trends towards international cooperation overcoming national boundaries, both in Europe and in the world (Defazio et al., 2009; Engels and Ruschenburg, 2008; Hoekman et al., 2009, 2013; Leydesdorff and Wagner, 2008);
- The EU has allowed and explicitly boosted this on-going process through FPs and ERA.

3.3 The European research geography studies

The debate on the evaluation of the FP constitutes a ‘special’ case that is attracting a specific attention because it allows tracking trans-European research networks. While the EU is interested in showing the strategic importance of its own policy, the FP has provided the opportunity to experiment methodologies of social network analysis (Barber et al., 2011; Must, 2010). Those methodologies were developed for other purpose, but the availability of FP data has opened this specific field. Even though there is not any other comparable programme, the FP has highlighted some specific and relevant trends in the Europeanization of research geography.
A core of Europe exists in the research geography of regions because there are few regions with many connections and many regions with few connections (Protogerou et al., 2010; Scherngell and Barber, 2011). “Hence, in research collaboration, regional hierarchies are likely to emerge, with regions hosting the elite researchers—which we call ‘excellence regions’—networking primarily among them and much less with less advanced regions.” (Hoekman et al., 2009, page 724). “To some extent a European core of research performing entities is already visible in the research system, in which leading city-regions that are located in close geographical vicinity to one other (e.g. London, Paris, Randstad Region, Milan, Munich, Geneva) are disproportionally connected” (Hoekman et al., 2013, page 8). Nevertheless, some sub-clusters of inter-national cooperation have emerged in certain areas of Europe determining a very complex framework (Autant-Bernard and Chalaye, 2013).

The core of the European research geography is different depending on disciplines (Barber and Scherngell, 2013) and it has cumulative dynamics: “... find that the funded collaboration networks are dominated by a small ‘oligarchic core’ of research actors, whose central network positions in the program have only strengthened over the successive funding rounds” (Hoekman et al., 2013, p. 9).

The evolution of networks have moved towards a progressive polarization in favour of some nodes which are open to cooperate with newcomers (Heller-Schuh et al., 2011; Hoekman et al., 2013; Protogerou et al., 2010). Using other words, there is a centre that is becoming even more central. This centre is open to cooperation with newcomers that have never participated in FP projects and can finally access those European networks; whereas, who is in between risks to progressively reduce its share of participation.

The Europeanization of research geography has been boosted by the EU mainly towards public/academic research, thus private one have had a minor involvement in the FP.

An interesting link exists between FP participation and the scientific productivity of actors involved in this EU policy (Hoekman et al., 2013; Mattsson et al., 2010). Specifically, FP collaboration enhances scientific productivity through increasing co-authorship, even if this takes time: “... find that the funded collaboration networks are dominated by a small ‘oligarchic core’ of research actors, whose central network positions in the program have only strengthened over the successive funding rounds” (Hoekman et al., 2013, p. 9).

The geography of public and private research does not match (with few exceptions such as Ile-de-France). Industrial research is much more concentrated and suffer for a distance decay; whereas, public research is more capable to overcome distances (D’Este and Iammarino, 2010; Scherngell and Barber, 2011).

The participation in FP networks has required a re-organization of research centres in order to exploit this new opportunity (Ortega and Aguillo, 2010; Primeri and Reale, 2012). “The rationales for collaborative knowledge production are straightforward: actors engage in collaborations to learn from each other and to make a stronger impact on the field than could be achieved individually. Indeed, collaborations are expected to increase the quality of the research output, but at the same time the pursuit of quality is restricted by several constraints. The time and money required to engage in collaboration are substantial, which forces researchers to be highly selective in choosing a collaboration partner. Thus, the strength of interaction
between any two actors, and any two regions, will be dependent on the learning opportunities involved in collaboration at the one hand, and the time and money required to participate on the other hand.” (Hoekman et al., 2009, page 724)

3.4 Main open issues

In this scenario, the debate on the FP participation has been left relatively closed and for specialists. While the use of network analysis has determined significant progress identifying major trends, this debate needs to be integrated in a broader perspective. In relationship with research presented above, some open issues can be identified.

- **What relationships exist between the evolution of the European research geography and the economic one?** In economic geography, Europe seems to be characterised by a trend toward a so-called ‘club convergence’ (Beugelsdijk and Eijffinger, 2003; Brakman and van Marrewijk, 2008; Hagen and Mohl, 2009; Hospers and Beugelsdijk, 2002; Rodríguez-Pose and Fratesi, 2007). Meanwhile, the research geography presents a similar polarization with the creation of sub-regions that are internally connected across national boundaries (Protogerou et al., 2010; Scherngell and Barber, 2011), and these geographies do not always match (Fragkandreas, 2013). The question is how these two dynamics of economy and research co-evolve (self-reinforcing? Concentration? Specialisation? Which strategies are more suitable?).

- **The evolution of the European research geography seems to be a relatively marginal issue on the policy debate.** “From its inception there has been much concern that the policy objectives pursued as part of the Lisbon strategy would compromise the cohesion objective of the European Union (Sharp 1998; Hoekman et al. 2009; Begg 2010). After all, Europe’s research policies are not intended to intervene in the European scientific and technological landscape at large, but to bundle resources with the purpose of supporting collaborative efforts between “excellent” actors in a few strategic scientific fields.[...] Given the current unequal distribution of scientific and technological capabilities across the European landscape it can be reasonably inferred that such strategies may well disproportionally support high-performance core regions, possibly even at the expense of peripheral regions.” (Hoekman et al., 2013, pages 3–4). Nonetheless, regions and cities shall consider it for their strategic policies orienting their research investments to fully exploit growing internationalization of research. This implies a link between Europeanization of research geography and regional strategies for research. In this perspective, the focus on the evaluation of the FP policy shall move from the organization of research networks to public policies aiming to improve regional competitiveness in that area.

- **The EU has started considering possible synergies between research and regional policies** (Reid et al., 2007; Tödtling-Schönhofer et al., 2009). However, those two policies are based on antithetic perspective because the Structural Funds aims to support lagging regions, whereas the FP picks up the winner funding research centres capable to present the best research proposal. Even though the FP evaluation is fundamentally anonymous and even universities/firms localised in poorer regions can be part of the FP networks, synergies across the two policies do not exist.

Regarding this last point,

“Attention has already been drawn to the potential conflict between European policies aimed at competition and cohesion and
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the current emphasis on concentration of scientific resources, building economies of scale and networks of excellence will only exacerbate this situation (SHARP, 1998; HERAUD, 2003). This raises key issues relating to the distribution of the scientific and technological expertise on which economic development is predicated and questions over the appropriateness of different scales for action.” (Crespy et al., 2007, page 1072).

At the EU level, the new policy frameworks for regional, innovation and research policies (CIP and FP7) offers many opportunities for synergies with the new Structural Fund programmes in support of the Lisbon strategy. Specific additional instruments should facilitate this outcome, such as the EIB RTD risk-sharing facility, JEREMIE or the Europe Innova Initiative. However: this potential needs to be developed and exploited at ‘grassroots’ level since complementarities will only develop if exploited by local and regional actors through more structured and permanent forms of collaboration.

The needs for regional innovation policies can be summarised as follows:

- To recognise the diversity of regional innovation potential, which implies distinct ‘tailor-made’ approaches to target setting and programming of innovative measures in Europe’s regions.

- To launch and test more ‘complex projects’ or ‘multi-actor-multi-measure’ initiatives with a clear focus on marketable applications of new technologies rather than R&D infrastructure based approaches to technology development and transfer.

- Adopt a longer-term planning and more sustainable process of strategic management of regional innovation policies.

- Exploit the new European Territorial Cooperation Objective to create inter-regional innovation platforms.

(Reid et al., 2006, page v).
4 Policy Innovations

4.1 Starting point

“Policy innovation, as distinct from policy invention, is described in the literature as the adoption of a policy or program by a government entity that had never before utilized it; that is, it is new to the government adopting it, but is not necessarily an altogether new idea.” (Krause, 2010, page 47).

Among the three research areas, this third field on innovation of public policies needs to be further explored and linked with the previous two areas. For the purpose of this report, three main issues have already been identified providing promising links: the interaction between research and policy, the spatial flows of policy innovation and the challenge of policy evaluation. This enables the definition of a preliminary analytical framework that can be integrated with literatures on TIMs and geography of research (cf. Section 5).

In a general perspective, the challenge is how to re-define the TIM from a production-oriented concept to a policy-oriented one. In other words, the TIM was conceived around firms and their technological innovations determining an increase in their economic competitiveness, while in this case the focus shifts towards policy makers and their capacity to improve policies; however, these policy makers do not have a profit function to maximise like firms. The goal of policy makers is (expected to be) the “growth and development” of their territories, according to what they consider ‘suitable’.

4.2 Research and policy interactions

In the relationship between research and policies, there are two fundamental dynamics (Pohl, 2008):

- **Type I: reorganizing knowledge.** The academic community is asked to organise their information for a public, which is ready to listen.

  “Type one transdisciplinary research reorganizes knowledge that is produced with regard to the (perceived) audience and its demands. This type of transdisciplinary research does not differ significantly from research carried out in institutes described as boundary organizations. The researchers are concerned with establishing and maintaining boundaries between the academic and other policy cultures, and consider the academic policy culture to be responsible for reorganizing knowledge. Whether the reorganized knowledge suits the interest of the audience policy culture will depend on how clearly the audience policy culture and its interest are analyzed and defined” (Pohl, 2008, page 52).

- **Type II: co-producing knowledge.** In conflicting environments, experts are called to work together producing new knowledge dealing technical issues.

  “Type two transdisciplinary research participates in and facilitates a co-production of knowledge by the four policy
cultures. The boundaries between the policy cultures are of minor interest, and the researchers’ emphasis is on initiating and participating in the co-production of knowledge as a collective endeavour. The researchers consider the academic policy culture to be responsible for making the co-production of the four policy cultures (the academic being one of them) happen. Transdisciplinary research of type two is the appropriate way to bridge science and policy if, several policy cultures, besides the academic, are concerned and a co-production is needed. The researchers involved in the modules considered the development of sustainable waste technologies and the management of the coast as two such issues, where policies must be developed in a collective process of multiple policy cultures” (Pohl, 2008, page 52).

These two kinds of interaction change according to the policy demand and the level of definition of the political issue. On the research side, this interaction depends also on the level of knowledge that research has on certain challenges. In this perspective, we can distinguish between technical and social problems: technical problems require new technologies, while social ones can require a redefinition of the problem or the development of new theories, frameworks and perspectives. Nevertheless, in a territorial perspective the knowledge to address a certain problem might not be available in the region and this requires to access supra-territorial flows of knowledge and, even more problematic, to adapt that knowledge to specificities of the context.

“Investments in increased mobility or extending relational systems might make ideas travel more readily but the crucial point is the extent to which such alien ideas can be absorbed into the national, regional or local institutional setup and, by becoming part thereof, revitalize it and help break the lock-in.” (Maskell and Malmberg, 2007, page 609).

“This implies that changes of policy occur if the economic experts’ understanding of the underlying mechanisms changes. The crucial aspect here is that we suggest to systematically exploit known as well as newly arising scientific knowledge on regional dynamics.” (Werker, 2006, page 6).

4.3 The spatial mobility of policies

Starting from the assumption that international actors, processes and institutions increasingly affect domestic policy changes, our efforts are guided by the question as to through which mechanisms they reach the domestic level and contribute to policy convergence. (Busch and Jörgens, 2005, page 861)

In the literature on local policies, the flows of idea across local contexts have been identified as a crucial aspect for policy innovation because this allows local policy makers to learn from experiences elsewhere. This process of ‘policy transfer’ has been boosted by the process of European integration as well as other supra-national organizations such as the OECD and the World Bank. “Next to financial and technical assistance, the EU also provided accession countries with legitimacy to enact domestic change. The strong domestic consensus in favour
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of EU membership in their ‘return to Europe’ allowed CEE decision-makers to silence domestic veto players inside and outside government, despite the considerable costs incurred by EU policies.” (Börzel, 2011, page 399).

“Berry and Berry (1990, 1999) identify two distinct perspectives from which policy innovation is typically studied, which they stress are not mutually exclusive under Mohr’s theory. **The first perspective considers the internal determinants of the adopting government.** According to this view, the factors encouraging or restricting innovation are the political, economic, and/or social characteristics of the potentially adopting government. The second perspective, tested via diffusion models, holds that **innovation is the result of the emulation of policies previously adopted by other governmental units, which have been communicated via intergovernmental channels.**” (Krause, 2010, page 48).

In this perspective, political science has started analysing flows of policies across cities, mainly regarding common issues such as climate change adaptation and resilience. This concept has been labelled as ‘**policy transfer**’ (Börzel, 2011).

“The term policy transfer is, as Stone (1999) noted, an umbrella concept referring to the practices of national policymaking elites who “import innovatory policy developed elsewhere in the belief that it will be similarly successful in a different context” but also to the involuntary adoption of new policies as the result of external pressures from supranational institutions like the International Monetary Fund (Dolowitz and Marsh 1996; Stone 2000; cf. Gilbert 2002) and to structural convergences and diffusions (R. Rose 1993) in the policy realm in which elites play less of an initiatory role.” (McCann, 2011, page 110)

In this paper (McCann, 2011) has proposed the concept of ‘**fixity and mobility**’ to analyse dynamics of policy transfer focusing on two main aspects: mobility of knowledge and how certain knowledge become predominant in urban/territorial policies.

“the "global consultocracy." This collection of individuals, firms, and think tanks can be divided into two groups: incoming policy consultants—those who come to a city from elsewhere to impart knowledge—and outgoing policy consultants who, like Bing Thom, are based in one city and present stories of its successes to people elsewhere as part of their professional practice.

The mobility of these consultants and their tendency to gather information on best practices from various places to bolse their own specific recommendations makes them particularly powerful conduits of information among far-flung and, in many cases, quite different cities.”

(McCann, 2011, page 114)

In the same article, he identified three main informal infrastructures for policy mobility:
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- Educators and trainers that identify certain experiences as ‘positive’ (e.g. academic scholars teaching selected ‘success stories’);
- professional organizations and international institutions (e.g. OECD, World Bank ...);
- traditional media.

The interest for this categories rely on the significant analogy with ‘local buzz and global pipelines’ (Bathelt and Turi, 2011; Storper and Venables, 2004), although those two research areas have developed on different paths and for different purposes. Moreover, (McCann, 2011) has proposed three research questions:

- Why do some policies move and others not?
- Where these ideas go? Moreover, from where do they come?
- Are other regions able to access this (absorptive capacity)?

In (Witt, 2003), author argues that policy makers depend on the information they can get in order to define the agenda settings. Moreover, Witt has proposed the idea of induced learning meaning something learnt from the market through the action of a policy. This relates to a creative responses determined by the induced learning.

In order to identify how policy moves from one context to another, three categories have been proposed:

“(1) the co-operative harmonization of domestic practices by means of international legal agreements or supranational law;
(2) the coercive imposition of political practices by means of economic, political or even military threat, intervention or conditionality; and
(3) the interdependent, but un-coordinated diffusion of practices by means of cross-national imitation, emulation or learning.”

(Busch and Jörgens, 2005, page 862).

Most of the analyses were carried out at the national level; whereas the local and regional levels are often under considered.

**National policy-makers are motivated by several reasons to emulate other countries’ policies. Firstly, they may act in a rational and problem-oriented manner by looking across national borders for effective solutions to pressing domestic problems (Dolowitz and Marsh 2000; Rose 1991). Secondly, they may be persuaded, but in contrast to imposition not forced, by other actors to adopt policies from abroad (Finnemore 1993; Keck and Sikkink 1998). Thirdly, they may be motivated by norm-driven and legitimacy-oriented considerations. Once a policy innovation has been adopted by a fair number of countries, this will result in increased pressure for conformity. Moreover, it will offer domestic political élites new means for increasing their legitimacy and for enhancing their self-esteem in an international society structured by emerging normative standards of appropriate behaviour (Markus 1987; Finnemore and Sikkink 1998). (Busch and Jörgens, 2005, page 866)**
4.4 The challenge of evaluation

The issue of policy evaluation is a crucial aspect to understand policy dynamics and, specifically, feedback mechanisms. Nevertheless, it is necessary to clarify the context for the application of policy evaluation within the framework presented above which assumes a systemic perspective on innovation dynamics.

“This poses an immense challenge to evaluation, because it implies that cause-effect relations in these fields are much more complex than we previously thought. It suggests that a simple ‘a’ versus ‘b’ comparison is inadequate because change (both evolutionary and more radical) is endogenous. It implies new rationales for intervention, in which not only market failure but also failures in capabilities, behaviour, institutions and framework conditions damage system performance and justify intervention.” (Arnold, 2004, page 3).

There are three inter-related arguments justifying a special interest for this topic:

1. Policy evaluation provides feedbacks on policy interventions;
2. These feedbacks are necessary whether a systemic perspective on TIM is assumed;
3. The analysis of those feedbacks within a systemic perspective becomes crucial to understand the long-term evolution of TIMs and how research flows can enhance policy innovations.

The issue of policy evaluation is very extensive and just fundamental coordinates have been selected for the purpose of this report. The fundamental question for policy evaluation is “what would happen without my policy?” (Bartik and Bingham, 1997).

This fundamental question implies another more radical question: why not everybody evaluates. In a seminal paper (Wildavsky, 1972), it has been argued that organizations tend to not evaluate her own policies because fundamentally trust what were done. Therefore, organizations tend to avoid evaluation, but this limits the possibility to have feedbacks, which become even more fundamental whether a systemic perspective is assumed. Indeed, this opens a set of questions about policy evaluation (Arnold, 2004; Bartik and Bingham, 1997; Diez, 2001; Wildavsky, 1972):

- Policy evaluation is neither easy nor obvious to do. This process requires skills and expertise to address significant methodological challenges that are specific to each policy.
- Policy evaluation requires knowledge that has to be developed analysing the specific case, shared among stakeholders as well as already-available knowledge to identify the context of each policy.
- Policy evaluation is costly both in terms of resources (cost to hire evaluators, collect data and share results), and political consensus and legitimacy (who will ca Who chose evaluators and methodologies? With whom share evaluation results? …).
- Policy evaluation requires leadership, organization commitment and ethics to carry out a ‘useful evaluation’ able to access all the relevant information.
- Policy evaluation requires a combination among general methodological standards, needs to adapt them to the specific case and feasibility in terms of political support, organization commitment, available resources and data.
Policy evaluation results become a useful feedback if they are share. This rise the question about the level of involvement of stakeholders, which information can be shared and at which stage stakeholders have to be involved (Since the beginning when evaluation goals are defined or just when results become available? Or in any other phase in between?)

Several classifications were proposed on different typologies of policy evaluation. Among others, the following one seems fitting with the debate presented in Section 2. The interest is on the distinction between process/formative and outcome/summative evaluations based on a continuum, which assumes a possible articulation among different parts.

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<th>Process/Formative EVALUATION</th>
<th>Outcome/Summative EVALUATION</th>
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<tr>
<td>Monitoring daily tasks</td>
<td>Assessing program activities</td>
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<td>Enumerating outcomes</td>
<td>Measuring effectiveness</td>
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<td>Costs and benefits</td>
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<td>Assessing impact on the problem</td>
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Table 1 (Bartik and Bingham, 1997, page 2)

### 4.5 Main open issues

“A second key idea, which stems from the central role of evolution and learning, is that of historical path dependence (North, 1990). What a company or institution can do today depends upon what it could do yesterday (Rosenberg, 1976) and what it has learnt in the meantime. Not only the flow of new knowledge, but the socially and internally available stock of knowledge influences behaviour and economic outcomes.

Often, the elements of the system of innovation either reinforce each other in promoting processes of learning and innovation or, conversely, combine into blocking such processes. Cumulative causation, and virtuous and vicious circles, are characteristics of systems and sub-systems of innovation. (Lundvall, 1992)”.

(Arnold, 2004, page 6)

Starting from this quotation, we can identify some specific open issues in the field of policy innovations related to previous sections.

- The idea of TIM is often oriented towards technological and market-led innovations with minor attention on policies and, specifically, on their innovations, although policies are explicitly required to promote and support TIMs overcoming market failures. Are TIMs able to promote also policy innovations to further enhance themselves?
- The importance of networks of knowledge have been highlighted both by TIM and policy innovation literatures. Nonetheless, their interactions are an under-explored
field of research, although similarities in knowledge flows can be assumed. *How does flows of innovation, research and policy knowledge interact?*

- In the debate on policy transfer, the importance of consultants and intergovernmental networks (e.g. policy observatory) was identified (although still under-explored); whereas, research centres and their knowledge networks seem under-considered. Nevertheless, in a TIM perspective it can be assumed that if they are able to supply firms with knowledge for innovation, they should be able to supply also policy makers, although required knowledge is different.

- Research on policies can be assumed as an evaluation activity itself with significant implications. The scientific debate on certain policies enables the identification of success stories (or failures). This provides further knowledge for policy makers to understand their own policies:
  - Policy makers can promote their own practices further reinforcing their success, and then their consensus and legitimation (or vice versa),
  - They can access broader network of knowledge to understand their policies and how to improve them supporting incremental innovation,
  - Research can change the perception of certain policies and/or challenges addressed through the access of knowledge available elsewhere.
  - The scientific discussion on certain policies can produce further knowledge available for other policies as well as increasing the endowment of territorially available knowledge where that knowledge was developed.
5 Analytical framework and Research Questions

5.1 Starting point
The aim of this last Section is to combine the literature analysed in previous sections with the objective of the research in order to define an analytical framework for the next steps. The analytical framework is presented along the three main parts of the whole research project, while in the last sub-section some meta-issues are presented addressing more theoretical aspects. Specifically, the research aims to contribute to the theoretical debate on how territories can promote research and how this research can enhance policy innovation in a systemic perspective. According to the purpose of this report, this framework shall be considered as open and as a first contribution in order to have a base and to identify fields requiring further developments.

5.2 Towards the Europeanization of Research: a territorial perspective
The importance of territories for innovation has been largely presented considering the main different dimensions, as discussed in Section 2. The TIM framework is the general reference assuming a certain consistency across the different schools and definitions that were given to different sub-models of TIM (Iammarino, 2005; Moulaert and Sekia, 2003; OECD Reviews of Regional Innovation: Regions and Innovation Policy, 2011; Tödtling et al., 2006; Werker, 2006). Based on that literature, the following aspects can be considered as crucial referring to the purpose of the research:

- Research activities are unevenly distributed across space. In principle, this geography does not match with geographies of R&D and of innovations, although commonalities exist as expected.

- The debate on TIM has mainly focused on technological and market-led innovations with minor attention on the production of knowledge (public/academic research and research policies enabling knowledge production). While knowledge is considered a fundamental factor enabling innovation, dynamics of research for knowledge production are rarely analysed considering their specificities, mainly across disciplines.

- The importance of public policies is largely recognised to support the TIMs, but the discussion on tools and governance is very limited and often reduced to a generic claim for ‘more funding’ and ‘more cooperation’ to ‘exploit synergies’.

- Since 1990s, there is a growing importance for international flows of research and the EU has further enhanced this trend through its policies (mainly FP and ERA). However, the relationship between the Europeanization of research and the related geography was explored with little relationships with the broader geographical debate.

In this perspective, the debate on ‘local buzz’ and global pipelines (Bathelt and Turi, 2011; Bathelt et al., 2004; Malmberg and Maskell, 2006; Maskell et al., 2005; Storper and

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8 It is necessary to consider that in this case the definition of ‘local buzz’ becomes slightly different from the original one. In this specific meaning, we refer to the local research capability including both human and social capital as well as other local intangible aspects; whereas, in the original version the ‘local buzz’ refers to something broader and more general related to more market-oriented innovations. Nonetheless, for the purpose of this report the definition can be left open.
Venables, 2004) provides an interesting framework for the analysis of territorial preconditions and importance of supra-local connections. In terms of preconditions, regions need to have their ‘territorial capital’ (TC) (Camagni and Capello, 2012; Camagni, 2009) supporting their knowledge production through infrastructure, human and social capital, cooperation networks. The management of this capital plays a fundamental role for long-term development, although this field has (not yet) been explored. Along this idea, the access to European research networks, and specifically to the FP projects, can be assumed as an indicator of ‘European pipelines’ of knowledge in terms of both capacities to be involved in and as way to further develop knowledge production. Regarding the different kinds of knowledge flows, the categories proposed for pipelines can be easily re-adapted for the purpose of the research (cf. Table 1). These two main aspects will be the focus for the analysis within the broader context of local development theories, which include other issues like social capital, territorial institutions, social filter, agglomeration benefits and external economies of scale as well as collective learning and proximity dimensions.

“[T]he insistence of the importance of localized learning should not be interpreted as saying that local interaction is always superior to extra-local interaction. On the contrary, the ability to build well-functioning network relations—pipelines—to knowledge sources around the globe is in itself perhaps one of the most important localized capabilities”. (Malmberg and Maskell, 2006, page 11).

Table 1 – Types of knowledge pipelines (Maskell et al., 2005, page 9)

<table>
<thead>
<tr>
<th>Focus of Knowledge Creation</th>
<th>Time Horizon for Knowledge Creation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Quasi-permanent</td>
</tr>
<tr>
<td>Strong focus (goal-oriented)</td>
<td>Stable inter-firm networks</td>
</tr>
<tr>
<td>Broad/diffuse focus (vision-oriented)</td>
<td>Clusters</td>
</tr>
</tbody>
</table>

Along this perspective, three steps will be analysed.

1. **[Territorial Preconditions]** Only regions with advanced research capacities can be able to participate in FP projects because this requires scientific excellence in specific disciplines and a well-structured organization. This requires two main (inter-related) aspects: the presence of a ‘local buzz’ allowing the region to promote research (Storper and Venables, 2004) and the availability of a territorial capital to carry out excellent research (Camagni and Capello, 2012). Therefore, the analysis of territorial capacity to participate in European knowledge flows has to be related to regional characteristics (see next point).

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9 While the TC approach refers to localised assets supporting general productivity, in this case TC refers to localised assets for knowledge production, which is different from other kinds of production. The use of the TC framework aims to include in the analysis a broader range of localised assets, not just what is directly related to research. This definition is consistent with the open definition for ‘local buzz’ that is a bit more vague.

10 (Autant-Bernard and Chalaye, 2013; Autant-Bernard et al., 2007; Bornmann et al., 2011, 2012; Heller-Schuh et al., 2011; Hoekman et al., 2009).
2. [European Research Networks] The competitive mechanism of FP calls for projects allows for the analysis of evolutionary competitiveness of regions considered as capability to develop scientific excellence [competition] as well as create inter-regional research networks [cooperation]. These dynamics structuring the European Research Area shows the regional competitiveness in terms of knowledge production as well as their capabilities to promote cooperative networks.

3. [Evolutionary Perspective] The FP dynamics are a self-reinforcing mechanism because regions participating in FP networks can further reinforce themselves through more funding for their research activities as well as accessing knowledge available elsewhere, and then recombine it. Nevertheless, this requires the above-mentioned conditions: territorial preconditions (local buzz and territorial capital) and capability to participate in the competitive-cooperative FP dynamics.

### Research questions #1

- How is evolving the European research geography? What are the major trends?
- Which are the most competitive regions able to play a central role in that scenario? What are their structural characteristics in terms of internal organization (local buzz and territorial capital)?
- How is the Brussels Capital-Region in this context? How are other capital-regions?

### 5.3 Regions for Research: strategies, governance and policies

[Policies for research and innovation are perhaps the most difficult policies in modern democracies. Opportunities for government failures are pervasive. This is even more so in less developed regions of Europe, in which the need for more research and innovation is acute, but the framework conditions are poor. (Bonaccorsi, 2009, page 3).](#)

Moving from the general perspective on the Europeanization of research flows, the second step is the analysis of regional strategies to promote knowledge production locally and/or accessing those research networks. This implies a change in the focus from the European ones to some selected case studies. These strategies can be defined as ‘regional research policies’ aiming to articulate localised research activities (‘territorial capital’ and ‘local buzz’) with non-territorial knowledge flows (‘European pipelines’). This makes regional research policies particularly complex (Bonaccorsi, 2009) due to their specificities:

- Research is an uncertain activity with long-term results that cannot be really identified in advance,
- Research requires both competitive and cooperative dynamics,
- Research outcome cannot be always identified in terms of returns, and these returns might be significantly delayed.

The aim of the second part of the whole research focuses on those strategies and it will be based on the framework presented above (see sub-Section 5.2). Specifically, three orders of questions can be identified.

1. [Regional Research Policies] In a territorial perspective, regions have to combine their strategies in order to embed research activities in their territories as well as
accessing supra-local knowledge flows. This issue has significant trade-offs and requires complex strategic choices that need to be addressed.

2. [Proximity for Research] Using (and adapting) the Boschma’s definitions for proximity dimensions (Boschma, 2005), regions can aim to increase some of them reducing uncertainty among knowledge producers and then enhancing research activities. This implies that regional research strategies can aim to invest on cognitive, organizational, social, institutional or spatial proximity and this choice becomes crucial for long-term regional strategies.

3. [Evolutionary of Regional Research Policy] These aspects evolve in time requiring mechanisms for policy makers to collect feedbacks understanding results of their policies. This implies mechanism to evaluate policies as well as evolving governance able to adapt to long-term changes.

“Taking an evolutionary perspective when designing and implementing policy means ‘... adding the dimension of historical time to the picture, a dimension that allows the consequences of changing knowledge constraints to be accounted for’” (Werker, 2006, page 5).

### Research questions #2

- Which are regional strategies to support knowledge production embedding research activities territorially as well as participating in European networks?
- In which proximity dimensions do regions invest to be more competitive? Assuming the five Boschma’s categories (technological, organizational, institutional, social, geographical proximities), which one have more influenced the most competitive research regions?
- What is the evolutionary trajectory of regional policies for research? Which mechanisms have they created to provide feedbacks on their research strategies and governance?

### 5.4 Research and Policy Innovations in Brussels

“[C]hanges of policy occur if the economic experts’ understanding of the underlying mechanisms changes. The crucial aspect here is that we suggest to systematically exploit known as well as newly arising scientific knowledge on regional dynamics.” (Werker, 2006, page 6)

Once regional strategies to promote knowledge through research have been identified analysing the European context and comparing regional strategies, the last part of the research focuses on how regions use that knowledge to enhance their policies. For this last part of the research, the focus is limited to Brussels, which presents significant specificities.

- Brussels has a size comparable to many other capital cities in Europe. This implies that lessons learnt from this case can be compared with other similar contexts (e.g. Madrid, Wien, Copenhagen, Stockholm, Prague …); thus, Brussels is neither a large ‘global city’ (e.g. London or Paris) nor a small-medium town. Moreover, Brussels seem having similar conditions in terms of universities and research centres able to access European knowledge flows, whereas the institutional framework of Brussels is
highly specific due to the articulation amongst federal, regional and community governments, then it can be analysed the effect of this further specificity.

- Brussels is a political capital for both Belgium and the EU. This co-presence makes this city a unique centre for policy makers and related flows of policy knowledge. These flows represent a unique opportunity for accessing a ‘European pipelines’ of specialised knowledge that can be potentially combined with knowledge available elsewhere.

In terms of channels for policy transfers, McCann (2011) has proposed three main categories:

- The mobility of educators and trainers for policy makers,
- The circulation of knowledge promoted by supra-national organisations like OECD and the World Bank as well as independent policy observatories managed by NGOs,
- The role of media rising awareness and diffusing policy practices,

In the relationship between research and policy innovations, the following aspects have been identified according to the literature review. Specifically, a policy innovation can be supported through the following channels:

- [Research Channel] Knowledge production and use depends on the ‘absorptive capacity’ of policy makers. This can be produced:
  - Internally (e.g. local HEI) or externally (e.g. inter-regional research networks),
  - For general purposes (theories) or directly applied (case studies).

- [Experts Channel] Knowledge for policies can become available also through new expertise that can be either consultants or applied scholars joining the policy arenas for different purposes and reasons.
  - Experts are called by policy makers to deal with already-defined problems (demand-driven),
  - Experts propose themselves to deal with problems they have already managed elsewhere and that local policy makers do not recognize or have not yet properly identified (supply-driven),
  - Experts are trained in-house, commonly because policy makers have recognised a long-term need for specific expertise (internal-supply).

- [Political Channel] Knowledge follows directly policy makers, which have their own specific mobility bringing with them their expertise, way of thinking and defining problems, as well as their networks of contacts (Witt, 2003). Among policy makers, two main categories can be distinguished.
  - Politicians can be elected at different levels during their carriers and, sometimes, even at the same time
  - Civil servants can have similar mobility than politicians moving across tiers of governments (vertical transfer) or across different sectors (horizontal transfer).

According to these characteristics and possible knowledge channels, Brussels can be considered as a unique case and a potential centre for policy innovation. Nevertheless, Brussels has to be able to exploit those knowledge flows combining and adapting it to address territorial political challenges.

11 E.g. in the case of Brussels, Charles Piqué was both president of the Brussels Capital-Region and Mayor of St. Gilles (one of the Brussels’ municipality). During his carriers, he was also minister at both national/federal and community levels. Basically, during his carrier he has covered all the possible tiers of government. Even though this is a particularly rich and successful carrier, this is not a unique case and many others exist in Belgium as well as in other countries.
1. [Proximity and Policy Innovations] ‘Policy innovations’ can be defined as a change in the rationale of a public policy, and this type of innovation can be assumed to have similar dynamics and bases as in the theory of TIMs. This project focuses on territorial policies implying that both policy makers and impacts are territorially localised. This recalls the Boschma’s categories for proximity and innovation, and the analysis aim to identify which of them and how (spatial, cognitive, organisational, social and institutional proximity) have enhanced policy innovations.

2. [Research for Policy Innovations] Once the critical factors for policy innovations have been identified, the role of research as knowledge suppliers will be considered. The analysis aims to identify two main aspects: has research played a role in the policy innovation? If yes, has research played a role in producing new knowledge or just gathering what was already available (Pohl, 2008)? Moreover, has research contributed in developing new technical solutions or in redefining the problem changing political perceptions?

3. [Learning from Policy Innovation] According to the TIM framework and assuming a systemic perspective on innovation dynamics, feedbacks are fundamentals in innovation systems. The collective learning to enhance policies is part of the systemic perspective; evaluation\(^\text{12}\) is the phase for policy maker to learn from their experiences enhancing a cumulative process of policy innovations (feedback mechanisms). In this perspective, research can play a role to boost this collective process of learning.

The third set of arguments is elaborated on the analysis of the role of external knowledge and absorption and communication costs (Griliches, 1992; Stiglitz, 1994, 1998). As Stiglitz (1999a and 1999b) puts it, the generation of new technological knowledge relies upon the capability of agents “to scan globally and reinvent locally”, combining new generic knowledge with the specific idiosyncratic product, market and technical conditions of application within which each agent operates. The generation of new technological knowledge by each agent relies systematically upon its ability to access, retrieve, understand and use external knowledge.

External technological knowledge, however, does not fall from heaven like manna. It cannot be considered as a customary input that can be immediately acquired in the market-place and internalised by companies. It requires specific search, identification, transaction, acquisition, absorption and ‘listening’ costs which depend upon the variety of codes and the number of communication channels selected by companies. This is why the localised character of technological knowledge matters. (Antonelli and Quéré, 2002, page 1053)

\(^{12}\) In this case, evaluation can be seen as a general phase of policy making process, rather than a ‘mere’ procedural technique (Diez, 2001).
Research questions #3

- Which are the critical factors for territorial policy innovations in Brussels? Which dimensions of proximities have facilitated these innovations?
- Which role has research played in those policy innovations? Production of new knowledge or re-organisation of available knowledge? Does research contribute producing new solutions (policy outcome) or by changing perceptions (policy process)?
- Which are the mechanisms for policy makers to learn from policy innovations? Can this learning be ‘induced’?

In the following graph, there is the effort to try to summarize the theoretical framework considering the most relevant elements for the purpose of the project.

Figure 1. TIM: research and policies

5.5 Theoretical Challenges

“Based on this literature we will distinguish in the following between two dimensions, resulting in four main categories of relations. The first dimension refers to Storper’s (1995, 1997) differentiation between traded and untraded interdependencies in the innovation process. Storper has argued that it is in particular the untraded, often informal relations which might explain the
The central question is how TIMs are able to ‘induce policy learning’. While dynamics of technological and market-led innovations are largely studied (although the discussion is still open), our research focus is on the complementary chain of policy innovations. If TIMs are systems enhancing innovation, how is this related to policies? While it is clear that market-led and policy innovations are clearly two different paths, in the TIM theory many similarities exist and we propose to keep these fertile similarities, mainly referring to the systemic nature of innovation.

In the TC and collective action theories (Camagni and Capello, 2012; Cheshire and Gordon, 1996), territorial stakeholders are called to promote collective actions to pursue their own interest and, specifically, investing in localised assets. Therefore, territorial stakeholders are expected to be interested in promoting even policy innovations for their own territory in order to improve cooperative networks and trust, to increase policy effectiveness, and then further enhance territorial competitiveness. Nevertheless, this is costly, not just in financial terms.

The fundamental question is how territories organise themselves to further enhance policy innovations. Firms organise to promote an innovative environment supporting their own competitiveness, and similarly policymakers are expected to promote an environment facilitating policy innovations. This is the concept of induced learning because TIMs are interested not just in policy innovation, but in learning how to innovate their future policies. The concept of learning regions becomes extended to policy outcome because TIMs want not just to innovate, but to learn how to innovate to promote a virtuous circle.

In terms of learning, a promising field comes from the concept of ‘related variety’ proposed by Boschma (cf. Boschma and Iammarino, 2007). Despite being a re-interpretation, in this case there are two different categories to be distinguished:
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- The related variety within research activities (e.g. close disciplines able to build bridges and cross-fertilization), and
- The related variety between research and policies fields (e.g. in Brussels there are centres for European studies and in Roma there are theological research centres, more rarely vice versa).

In a policy-oriented perspective, both are relevant. Whether policy challenges are complex, mono-disciplinary knowledge cannot be sufficient to adequately address issues; on the other hand, inter-disciplinary relationships needs an outcome to policy-making to become effective as in the case of knowledge for innovations requiring a technology transfer to firms.
6 Conclusions for Next Steps

This report has reviewed the literature on geography of research and policy innovations providing a structure for future steps of the research. According to the purpose of this report, the literature review has been left open for further integrations and these materials have been developed as reference for next steps.

Based on this structure, three main needs arose.

- The literature review on policy innovations is rather limited, mainly if compared with the one on TIMs. Even though some promising conceptual aspects have been already identified, it is necessary to develop that field of literature.
- The theoretical framework shall be reinforced and completed. This part has been already planned for next steps and the report has already identified specific key-concepts.
- The theoretical framework needs to be adapted to the case of Brussels developing a methodological strategy to implement next steps.
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