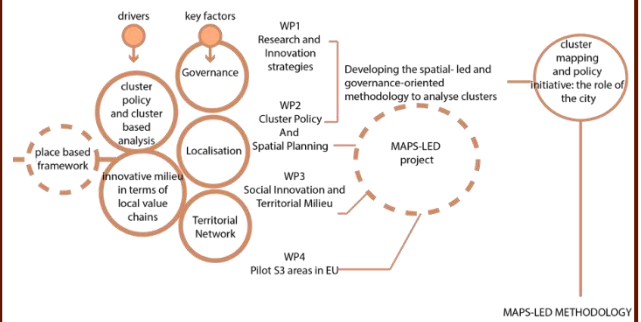


# RESEARCH AND INNOVATION STRATEGIES IN CLUSTER POLICIES

METHODOLOGICAL APPROACH TO CLUSTER SPATIALISATION



## RESEARCH FINDINGS

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## MAPS-LED Project

Multidisciplinary Approach to Plan Smart specialisation strategies for Local Economic Development

Work Package no.1

# RESEARCH AND INNOVATION STRATEGIES IN CLUSTER POLICIES

Deliverable 1.3

METHODOLOGICAL APPROACH TO CLUSTER SPATIALISATION

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# The MAPS-LED Network



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## List of Acronyms

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ATECO: Attività Economiche  
CNR: Centro Nazionale delle Ricerche  
CORINE: Coordination of Information on the Environment  
CSC: Center for Strategy and Competitiveness, at Stockholm School of Economics  
DPS: Department for Development Policies and Economic Cohesion  
EAFRD: European Agricultural Fund for Rural Development  
EAGLE: Eionet Action Group on Land monitoring in Europe  
EARSel: European Association of Remote Sensing Laboratories  
EC: European Commission  
ECO: The European Cluster Observatory  
EEA: European Environment Agency  
EEG: Evolutionary Economic Geography  
EIONET: European Topic Centre on Urban Land and Soil systems  
EMFF: European Maritime and Fisheries Fund  
ERDF: European Regional Development Fund  
ESRI: Environmental Systems Research Institute  
EU: European Union  
FUA: Functional Urban Areas  
HBS: Harvard Business School  
ISIC: International Standard Industrial Classification of all economic activities  
ISPRA: Istituto Superiore per la Protezione la Ricerca Ambientale  
ITC: **INFORMATION** and communications technology  
IU: Innovation Union  
K4G: Knowledge for growth  
KET: Key Enabling Technologies  
LQ: Location Quotient  
LUCAS: Land Use/ Cover Area frame Survey  
MISE: (Italian) Ministry of Economic Development  
MIUR: (Italian) Ministry of Education, University and Research  
MSA: Metropolitan Statistical Area  
NACE: Statistical classification of economic activities in the European Community (from the French Nomenclature statistique des activités économiques dans la Communauté européenne)  
NAICS: North American Industry Classification System  
NUTS: Nomenclature of Territorial Units for Statistics (from the French Nomenclature des unités territoriales statistiques)  
PA: Partnership Agreement  
PRG: Adopted Town Plan (from the Italian Piano Regolatore Generale)  
R&D: Research and Development  
RAMON: (Eurostat's) Reference And Management Of Nomenclatures  
RIS3: Regional Research and Innovation Strategies for Smart Specialisations  
ROP: Regional Operational Program  
S3P: Smart Specialisation Platform  
S3: Smart Specialisation Strategies  
SA: Specialisation areas  
SME: Small Medium-sized Enterprise



SME: Small-to-medium enterprise  
UMA: Universidad de Málaga  
UNSD: United Nations Statics Division

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## Introduction

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The report aims at summarizing the research activities conducted within the MAPS-LED project's work package N°1 (WP1). The activities carried out in Boston (MA, USA), by the PAU and the FOCUS Unit involved 22 Experienced Researchers (ER) and 13 Early Stage Researchers (ESR). Drawing from the objectives and the sub-objectives stated by the GA No. 645651 concerning the WP1, the report recalls the main findings of literature review activities carried out by the PAU and the FOCUS.

Thanks to these activities, insights arose concerning both topics of the project: Smart Specializations and Economic Clusters.

Knowledge and Innovation have been introduced in Europe 2020 strategy as drivers to overcome the limited or declining economic growth and development affecting regions and cities. Europe 2020 was launched in 2010 in order to build an operative framework for smart, sustainable and inclusive growth. The role of regions acquired a more incisive role in designing "tailored – policy" within the European framework, because "Regional policy, through an integrated territorial approach that encourages regional cooperation and improves synergies with Community policies for research, innovation and education, can speed up smart growth right across the EU" (EC, 2011). It is request that regions, in following the place-based approach, are able to design policy interventions coherent with a more balanced development pattern and able to strengthen their competitive advantages. Knowledge and Innovation have arisen as new development paradigm with the aim to boost competitiveness of firms and territories and contribute to social cohesion. European Regions and Cities are experiencing this paradigmatic shift put in place by the EU focusing on Smart Specialisation Strategies (S3) as main driver in stimulating a smart, inclusive and sustainable growth through the Innovation Union (IU) flagship programme within Europe 2020. The IU flagship placed innovation as an open system in which actors cooperate and interact. The objective is to address R&D and Innovation Policy toward the current challenges of our society such as climate changes, efficient use of resources and energy health and demographic changes. IU is the main reference policy for the development of 'place-based' smart specializations, and identifies regions as the main institutions capable to achieve these objectives by creating positive outlook for innovation, education and research.

Yet, Europe still presents deep differences: regions more competitive and able to compete in the globalised market and regions with unsolved structural weaknesses, highlighting an "innovation gap". It is possible to argue that the Cohesion Policy has already experienced heterogeneous spatial impacts due to the complexity and heterogeneity of the European cities and regions. This consideration leads to better understand and investigate the implications of the territorial (intended as the combination of economic, social and spatial factors) dimension of such policy paradigm. The National and Regional Research and Innovation Smart Specialisation Strategies (RIS3) are in their beginning implementation phase. It is not possible at this moment to establish, clearly, what effects/impacts these strategies will produce in the mid and long terms.

RIS3 regional plans have the objectives to ensure "knowledge transfer between university and firms, intellectual property rights, training, partnerships, funding mechanism and coordination institutions. According to Saravalli (2009) the territorial dimension of the innovation policy occurred at the same time of the regionalization

process in Europe, relating innovation dynamics and collective learning with local institutions. (...) territorial conditions that stimulate knowledge generation and diffusion in the region, particularly local institutions and networks of local firms, universities and other actors can make a difference" (Dosi, 2014). Two questions seem to be less investigated within RIS3 plan: the spatial perspective, in physical, economical and social dimension, and the social perspective, in terms of expression of continuously changing behaviours, which sometimes is not captured from the governance structures. Place-based approach (Barca, 2009) could extrapolate some peculiarities of territories and Social Innovation could represent a sort of S3 institutional framework. It is possible to argue that the two apparently dichotomist approaches spatially blind vs place-based policies can respectively contribute or reduce the gap among more or less developed regions, if they are not applied properly (Servalli, 2015). Spatially blind approaches, stemming from the World Bank Report (2009), sees in the individual/people boost of incomes, productivity, and knowledge the main drivers for regional economic development considering "space" as an "effect" of these policies. In this case is the "mobility", of people, capitals, goods and ideas, which is able to support and spread the development across territories. Place-based approach stems from a different perspective arguing that the interaction between institutions and spatial dimension is crucial for development. In this scenario, regions and cities have the potentials to contribute to regional economic growth independently by their size or density "because it is the performance of the urban and regional system as a whole which is critical, rather than just the cities at the top of the urban hierarchy" (Barca, McCann & Rodríguez-Pose A, 2012.).

Yet, whichever approach is more suitable depending on case (Seravalli, 2015), the inclusion of the spatial dimension in the entrepreneurial discovery process, indeed, highlights 1) economic agglomerations where innovation may occur, 2) the concentration of resources (physical, social, financial) for knowledge convergence.

The concentration of cluster organization can be considered an indicator of the entrepreneurial discovery stage: the higher level of convergence Knowledge, the higher level of cluster organization.

At the same time, the main reason of why lagging behind regions in Europe remain at same development stage despite long-term structural funds in research, innovation and technological development remains not deeply explored. The principal cause/effect relationship of the different regional responses to European innovation policy during the last decades seems to lie in the existence of a market asymmetry because of a chronic mismatch of supply-demand for innovation. This is partly due to a persistent lack of investigation of local characteristics about territorial capital, innovation networks and their level of carrying capacity to foster innovation (EC, 2011). In this sense, contexts conditions, especially in cities located in lagging regions, can significantly affect the implementation of complex policies such as S3.

Notwithstanding, the findings emerged by the literature review activities carried out by PAU Unit, unveils that the implementation guidelines concerning Smart Specialisation Strategies are poor or missing. Further, the S3's feature mostly debated concerns economic aspects rather than "spatial dimension" or "social context".

Based on these assumption, the need to develop a multidisciplinary approach to plan smart specialisation strategies emerges as crucial to properly pursue the local economic development's targets. Hence, the MAPS-LED project appears at forefront into this unexplored new research domain. Furthermore, the main objective of the MAPS-LED program is to build and test an evidence- based methodology for recognizing and

assessing emerging and potential of S3. The methodology will be developed by drawing insights from existing successful US Clusters.

With this regard, both PAU Unit and FOCUS Unit conducted an extensive literature in order to deepen the knowledge concerning US Clusters drawing from the Porter's definition: "Clusters are geographic concentrations of interconnected companies, specialised suppliers, service producers, firms in related industries, and associated institutions (for example, universities, standard agencies, and trade associations) in particular fields that compete but also cooperate. Critical masses of unusual competitive success in particular business areas, clusters are a striking feature of virtually every national, state, and even metropolitan economy, especially those of more economically advanced nations" (Porter 1996, p. 197)

On the basis of the literature review was possible to conclude that the definition of Cluster does not emphasize its spatial dimension, since it is based on related industry sectors filed together on the basis of the geographical correlation of employment across traded industries. Such assumption consolidated the need to map the economic clusters in US likewise the WP1 pursues.

The third section examines the innovative methodology conceived and tested by the PAU Unit and tested in Cambridge. It aimed at spatialize the clusters according to the definitions given by the website [www.clustermapping.us](http://www.clustermapping.us).

The process of spatialization of the economic cluster started from scaling down the cluster labelling method designed by prof. Porter. In this way it has been possible to define which economic activities (belonging to a specific NAICS) operate in a selected Zip Codes. Further, each land use code belongs to a category with a land use description to which is possible to connect an economic activity classified within the NAICS codes.

The procedure relies on the use of the ESRI's ArcGIS software both as a visualisation and analytical tool and has been tested for the ZIP code 02138 of the Cambridge Municipality, MA.

Along with this innovative cluster spatialization process, the third section recalls the procedure to select case studies among the 102 clusters initially taken into account. In order to better investigate the impact of any cluster at urban local, it has been chosen to restrict both the study areas and the clusters to investigate. Otherwise, the massive amount of data and the size of the area would not have matched the objective of the Research project. Considering economic data, the number of clusters taken into account for further studies has been narrowed to the number of "strong clusters", which likely have a higher scientific significance in terms of impacts at urban level.

The investigation of those clusters at urban level will be carried out in the further Working Package No.2 "Cluster Policies and Spatial Planning".

The Report is organized in four Parts. The first Part introduces the Conceptual Framework, in which the Research Activities have been carried out. In particular, the territorial and spatial dimension in innovation regional policies are explained with respect to the role they play in the Cohesion Policy, during different Programming Period.

The second part introduces the Italian experience implementation of S3 through RIS3 in a wider theoretical context about the linkage between S3 and Clusters.

The third part focuses on the Cluster theory applied in US aiming at developing a methodology for clusters spatialisation. The objective is to define the "space" of



research in which the spatial/territorial dimension of S3 could find evidences from cluster spatialisation.

The fourth part explore the role of S3 in the Sustainable Urban Development as a particular section of further research activity finalised to the comparison between US and EU.

Part I -  
Conceptual Framework

## S3: The Territorial Dimension of Research and Innovation Regional Policies

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The European Union is trying to come out of the recent and severe economic crisis that has had serious consequences from the socio-economic perspective at the macro and micro level. Measures set by the European Commission have been inspired by the so called "austerity principles" pushing the academic and political debate toward the impacts and the effectiveness of regional development policies.

National and Regional governments are called to set up innovative solutions in order to boost economic growth and development aiming at empower Cohesion Policy and reduce disparities among European regions. The interest generated by the debate has made thinking about the special role that the regional government place in pushing development towards innovation by being more aware that no change is possible without choices relevant for the context. In this sense a "new" approach based on Smart Specialisation Strategies drives toward this direction, no more a perspective designed within the Operational Programmes just in responding to the general requirement of European Commission. This kind of approach could be an interesting way to reach the goal of "Territorial Cohesion" by overcoming the conflict that a European strategy could generate in the implementation of territorial transformations due to the Public-Private investment allocated within Operational Programmes of Structural Funds. Within this approach the enrichment of a Social Perspective as a mainstream of expected change of the context toward a local resources empowerment within the global vision.

If we consider the theoretical background on S3 (Foray, 2000) as "a process addressing the missing or weak relations between R&D and innovation resources and activities on the one hand and the sectorial structure of the economy on the other" the link between S3 and place-based approach envisaged is twofold: the former is based on their characterization of a development policy, the latter is based on the value of the different geographical, social, economic features that each territory can express. The transformation of these two theoretical approaches in a policy, within the cohesion policy reform, is recognizable in two drivers for programming the new Agenda 2020. The first is the Theory of Change as a fundamental approach to be followed in building the programming process (why those output/results are necessary to reach the "change"). This implies the use of "indicators" as expression of the policy and related to the value of different territories can express to control and measure the expected change. The second is more related to stimulate at regional level an integrated approach to reach a critical mass of the investment effects/impacts. In the first part we traced the pathway of territorial dimension incorporated in European Policies starting from the European Spatial Development Perspective (ESDP, 1999) till the Place-based concept (2009). Since the 80s the territorial dimension has been taken into account by the European Union and from the 90s the "spatial approach" came into the

debate thanks to the European Spatial Development Perspective (ESDP) and its “polycentric” view for the spatial development of European Regions. The second part is focused on the definition of the concepts that changed the settings of the Cohesion Policy for the current programming period (2014-2020). The Smart Specialisation concept introduced by Foray (2009) and the Place-based approach introduced by Barca (2009) that became the paradigm of the Cohesion Policy.

Smart Specialisation Strategies represent a turning point for the European Cohesion Policy. The increased attention toward regional “specialisations” not just internal, as in the past, but toward the external dimension represent a key point in mitigating negative economic effects deriving from globalisation processes. In this perspective the territorial dimension become crucial in RIS3 plans implementation. As highlighted by the Barca Report (2009) it is necessary the shift from a “space-blind” to “place-based” approach. This renovated attention to the “place” if well implemented by regions could reach its main aim to satisfy efficiency (the capacity of a region to exploit its territorial potential) and equity principles (capacity of each region to provide equal opportunities to their citizens). However, difficulties can arise. Especially the so called “me too effect” i.e. the intention of underdeveloped regions to adopt smart specialisation strategies to ambitious for their potentials deriving from regions more developed. Many regions decided to invest in sectors such as ICT, biotech, nanotech etc not considering the existence or not of a potential in this sector in their territory to reach the objective. This effect could be dangerous because is the opposite of smart specialisation that is based on the existing potential of the territorial context and on the capacity to act on thanks to the strategies. The results could be the opposite of that expected increasing the gap and differences among regions. Even in this case the territorial dimension is crucial and it could be investigated if and how RIS3 already proposed took into account the place-based approach.

#### Territorial Dimension and Cohesion Policy: from polycentrism to place-based approach

Since the 80s the main aim of the Cohesion Policy has been to strengthen the economic and social cohesion in order to reduce disparities between more developed and underdeveloped regions. Although the term “territorial” is not the main word emerging from the Cohesion concept, it is (and it was) embedded and implicit and it is crucial in order to reduce the disparities (also territorial not only socio-economic) among European regions (it has been inserted in EC Treaty in 1997, art. 3 of TEU and art. 2 of TFEU). Territorial Cohesion principle is about ensuring the harmonious development of all these places and about making sure that their citizens are able to make the most of inherent features of these territories (EC, 2008) and as stressed by D. Hübner (Böhme et al 2011) *“it is a fundamental objective of regional planning in the Union and provides the raison d’etre for regional development policy”*. As a matter of fact, the European Union is characterised by a huge territorial diversity among regions that makes necessary the inclusion of territorial aspects in implementing the European Policies. “Territorial Cohesion, if taken seriously and on

condition that is given a broader interpretation than simply the provision of services of general economic interest, will feed into existing EU Policies by adding a territorial dimension to them, thereby making them more effective and efficient" (Zonneveld and Waterhout, 2005 quoted in Waterhout 2008: 83).

According with Waterhout (2008) when referring to policies it is more appropriate to use term "spatial" rather than "territorial" assuming that "territory refers to socially constructed places, whereas spatial refers to less clearly defined areas, which seem to be of a larger scale encompassing territories" (Waterhout 2008: 14). This conceptual issue has been the core of the scientific debate that have brought to consider the spatial dimension in EU policies and to take into account the spatial impacts of their implementation. Arguably, the key challenge for integrating a territorial dimension in EU policies is to develop convincing storylines about the added value of a spatial approach and to create a sense of urgency in order to get the players mobilised (Waterhout 2008: 49). Thanks to the European Spatial Development Perspective (ESDP), in 1999 European Union Member States have defined the relevance of the spatial dimension in order to achieve a more balanced and sustainable development of the European Territory. "Polycentric development is the only substantive spatial planning concept in the European Spatial Development Perspective (ESDP) with the potential to integrate the interests of the many parties involved" (Waterhout 2008: 56). The ESDP Document represented the attempt to put spatial planning on the European policy map (Waterhout 2008). One of the main issues at that time, and one of the main that is animating the current debate (see Faludi 2015) is represented by the deep differences among European Member States that go further the simple territorial characteristics of each European regions. The core question of the discussion was (and it is) how is possible to facilitate the introduction of a common spatial view for the Union in the different administrative and legislative system of member states? In this sense the ESDP built a bridge among the perspectives of Member States (Waterhout, 2008: 56).

The main two political options of the ESDP were about:

- "Strengthening of several larger zones of global economic integration in the EU, equipped with high quality, global functions and services, including the peripheral areas, through transnational spatial development strategies";
- "Strengthening a polycentric and more balanced system of metropolitan regions, city clusters and city networks, through closer co-operation between structural policy and the policy on the Trans-European Networks (TENs) and improvement of the links between international/national and regional/local transport networks (CEC, 1999: 21 quoted in Waterhout 2008: 60).

In 2007 the Territorial Agenda of the European Union (Towards a more competitive and Sustainable Europe of Diverse Region) confirmed the will to "promote a polycentric territorial development of EU" aiming at the territorial integration and securing a better quality of life with respect of the regional and local potentials. As reported in the official document, the EU Cohesion Policy has to take into account

the territorial needs and characteristics in responding more effectively to the specific geographical challenges and opportunities of the regions and cities (Territorial Agenda of the Union 2007).

The Territorial Agenda (2007) was integrated by the Leipzig Charter on Sustainable European Cities, that highlighted the relevance of the urban dimension and the need of an integrated urban development policy making possible the integration between (urban) development policy and territorial cohesion policy in order to achieve a sustainable development. In this perspective cities acquired a central role. They have been assumed as "parts of a polycentric pattern to ensure their added value for other cities in rural and peripheral areas" (Territorial Agenda of the Union 2007). As defined in the Leipzig Charter (2007) the integrated urban development policy is a process in which the spatial, sectorial and temporal aspects of key areas of urban policy are coordinated. With the Charter, cities and regions arise as key elements for a long-term sustainable development. The Charter recommended: "the use of integrated urban development policy approaches" and to pay attention "to deprived neighbourhoods within the context of the city as a whole". This new approach has paid attention to crucial cities' issues of the last decades: the need to ensure high-quality public spaces, the need to modernise the infrastructure networks, innovative educational policies, set up new strategies for upgrading the physical environment, strengthen local economy and labour market policy, efficient and affordable urban transportation. In order to apply an integrated urban development policy the role played by Member States and National government is important for the setting of national urban development policies and for stimulating innovative solutions at all territorial levels. In this perspective the Member State, but also regional governments, have to take into account the European Structural Funds that can represent a leverage if focused on potentials and opportunities for territories.

Integrated Urban Development is not just an urban policy focused on spatial planning declined by each member state according with its own administrative structure, it is a policy opened to the integration with other European policies and Funds. In 2010 the European Commission launched the Europe 2020 strategy, that can be seen as the general Road Map of EU policy targets within this decade in regards to central policy fields (Schmitt, 2011). Just one year later the Ministers of Spatial Planning and Territorial Development have reviewed the Territorial Agenda drawn up in 2007 adapting it to the Europe 2020 Strategy. The first part reinforces the relevance of the Territorial Cohesion for the Union because "it enables equal opportunities for citizens and enterprises, wherever they are located, to make the most of their territorial potentials" (Territorial Agenda 2020: 4).

Within the debate around the territorial dimension and the territorial cohesion the role of cities in development policies increased during the last decades. Since the end of the 80s urban dimension has been taken into account in the European Structural Funds as a result of the recognition of cities' role in economic growth and competitiveness (Atkinson, 2014). During the middle of 90s European Commission launched the URBAN Programme an initiative of the European Regional Development

Fund (ERDF) to achieve sustainable development in distressed urban districts characterised by socio-economic and environmental decay. During the programming period 2000-2006, within the second part of the URBAN II programme was introduced the URBACT network which aim was to support and continue the exchange of information on sustainable urban development across Europe. In 2007-2013 programming period the ERDF includes a "stronger urban element" (Atkison, 2014: 4) providing through the integration of Structural Funds (European Social Fund and Cohesion Fund) a range of initiatives to implement urban development project.

Accordingly, one of the recommendations of the Charter was to "coordinate and spatially focus the use of funds by public and private sectors players". Thanks to the cooperation with The European Central Bank (ECB), the European Commission developed in 2000s a set of financial engineering mechanisms aiming at contributing to the implementation of the integrated urban development approaches and strategies.

This is the case of the JESSICA (Joint European Support for Sustainable Investment in City Areas) and JEREMIE Funds (Joint European Resources for Micro to medium Enterprises) that will be relevant in the 2007-2013 programming period. These are two financial engineering mechanisms set by the European Central Bank (ECB) and European Commission for leveraging private capitals into the implementation of integrated urban development strategies (Lipzig Charter, 2007).

Along this overview on the territorial dimension in implementing EU Policies two main key aspects arise: the "territorial potentials" and the "equal opportunities" principles that represent the basis of the Place-based approach introduced by Barca (2009) considered the core of the European regional development policy for the programming period 2014-2020 together with the concept of Smart Specialisation Strategy.

This new "regional-economic thinking", as defined by Faludi (2015), is a new paradigm arising thanks to the Barca Report (2009) that highlights the importance of local contexts on grounds of both efficiency and equity (Faludi 2015). The need to rethink economic development strategies, both on national and regional/local level, highlights the importance of factors "such as human capital and innovation (endogenous growth theory), agglomeration and distance (new economic geography), and institutions (institutional economics) (Barca et al. 2012: 136). These factors are the results of a period of radical political, institutional and economic change started in the late 80s that brought to the revision of regional economic development policies. Within this context "innovation" acquired an increasing importance as a cross-cutting process able to empower the potentials of places in achieving a more balanced and sustainable development. This is the new paradigm at the core of the new Cohesion Policy for the programming period 2014-2020.

Globalisation processes brought to the deep rethinking of development processes and strategies as emerged from a series of influential reports between 2009 and 2010. These reports have highlighted a sort of contrast between spatially blind policies versus spatially oriented (place-based) policies.

One of the more influential has been the World Economic Bank Report (2009) World Development Report Reshaping Economic Geography. It emphasises the relevance of new economic geography theory which advocates the advantages associated with the agglomeration effects of large cities: development and growth will be unbalanced and attempts to spread economic activity will not only reduce poverty, they will also undermine growth and prosperity (World Bank, 2009 quoted in Barca et Al. 2012: 138). The synthesis of this report is a development model based on “spatially blind” strategies, meaning that “space” is not taking into account based on the concept that the lives of individuals are more important than the “place” of where the live and work. It is the so called people oriented policy that aims at creating development starting from people needs with sub sequential spatial consequences. Following this line, the Sapir Report (2004 quoted in Barca et Al. 2012), An Agenda for a Growing Europe, an independent report promotes space-neutral intervention primarily focusing on institutional reforms to empower European Cohesion Policy not taking into account at all spatial dimension or urban growth issues.

Conversely, “In contrast to the space neutrality of these two reports, other reports adopt a fundamentally different position: space matters and shapes the potential for development not only of territories, but, through externalities, of the individuals who live in them” (Barca et al. 2012: 139). The most important reports that envisage the importance of a place-based approach are the Barca Report (2009) An Agenda for a Reformed Cohesion Policy, and the OECD Report (2009a) How Regions grow.

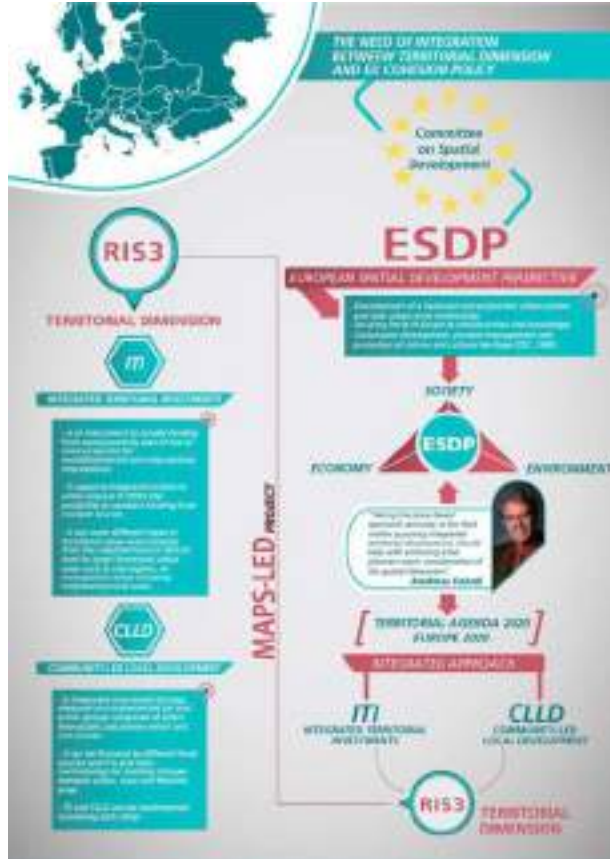
The first, is built on strong theoretical arguments highlighting the importance of place-based approach in reducing “persistent underutilization of potential and reducing social exclusion” (Barca 2009 quoted in Barca et al. 2012: 139). The second, arrived at similar conclusions of Barca’s Report, is built on strong empirical analyses and concludes that place-based interventions are defines as “integrated regional policies (see also Pike et al., 2006)—co-ordinating infrastructure provision, with schooling, business development, and the promotion of innovation, as a means to achieve both greater local development and, through geographical spill-overs, greater aggregate growth” (OECD, 2009<sup>o</sup> quoted in Barca et al. 2012:139).

The contrast that emerged during last decade about regional economic development policies and strategies occurred between these two different perspectives on what these policies have to be focused on: spatially blind (people based) versus spatially oriented (place based) approach. Spatially blind approaches, stemming from the World Bank Report (2009) sees in the individual boost of incomes, productivity, and knowledge the main drivers for regional economic development considering “space” as an “effect” of these policies. In this case is “mobility”, of people, capitals, goods, ideas that are able to enable and spread the development across territories Place-based approach stem from a different perspective arguing that the interaction between institutions and spatial dimension is crucial for development. In this scenario, regions and cities have the potentials to contribute to regional economic growth independently by their size or density “because it is the



performance of the urban and regional system as a whole which is critical, rather than just the cities at the top of the urban hierarchy” (Barca et al. 2012:140).

Figure 1 - The Territorial Dimension in European Cohesion Policy. MAPS-LED Research Project, (Horizon 2020)



### Smart Specialisation Strategy: from a theoretical concept to European policy

The Lisbon Strategy (2000) aimed at leading the European economy from a traditional production consumption based economy to the so-called Knowledge economy. Beyond the economic reasons and the European macroeconomic situation at that time, the term “knowledge” seems to be the key for change for the future policies. “knowledge” is a triangle composed by Research, Innovation and Education.

In 2005 with the aim to reinvigorate the Lisbon Strategy, the European Commission appoints the “Knowledge for Growth Group”, a group of economists specialised in Innovation economy with the task to address the shift toward the knowledge economy for the Union. One of the outputs of this group was the so-called concept of Smart Specialisation elaborated by Dominique Foray et al. (2009,2011). The passage from the academic (maybe abstract) concept into policy arena has been defined by European Commission Official Documents that recognises the relevance of S3 concept as new paradigm for the programming period 2014-2020 to achieve the goal of a “smart, sustainable and inclusive growth” (Europe 2020 Strategy),

reducing disparities among regions and empowering “Cohesion” (social, economic, territorial). The effective shift from concept into policy came with the new Rules for the European Structural Funds, the Union’s financial tools in achieving European Cohesion Policy. Thus, now European Regions are called to draw up National/Regional Research and Innovation Smart Specialisation Strategies (RIS3). The European Commission, on defining the contribution of Regional Policy for Smart Growth (COM....), identified as a key issue the creation of a common “Platform” for S3. The year after its establishment, the Platform, composed by academics, regional authorities and stakeholders, provided the “RIS3 Guide”, a document in which was explained a step-by-step procedure in order to design an effective regional smart specialisation strategy. However, two questions seem to be less investigated within RIS3 plan: the spatial perspective, in physical, economic and social dimension, and the social perspective, in terms of expression of continuously changing behaviours, which sometimes is not captured from the governance structures. Place-based approach (Barca, 2009) could extrapolate some peculiarities of territories and Social Innovation could represent a sort of S3 institutional framework.

#### The Smart Specialisation Concept

Although “innovation” and “smart” seem to be the keywords of the new European-area public policies design process, the introduction of the concept occurred after the European Council of Lisbon (2000) where the Union arises the clear objective to develop a knowledge-based economy for the future. In a certain way the Lisbon Strategy represents the starting point of a process that will bring towards the Smart Specialisation Strategies. The ambitious aim was conceived in a macroeconomic situation different from the current one, in which globalization was a challenge and political-institutional changes of the 1990s were introducing structural socioeconomic and territorial changes.

The key point of the Strategy was to prepare the shift “toward a competitive, dynamic knowledge-based economy”. Starting from the idea that for the European Union the concept of “knowledge” is a triangle composed by Research, Innovation and Education, it can be considered an essential engine for productivity growth contributing to European competitiveness in a globalised system in which competitors can take advantage such as a lower labour cost or natural resources availability.

In 2005, the revised Lisbon Strategy set out the “Lisbon Action Plan” focused on three main priorities:

1. Stimulate Growth;
2. Jobs;
3. Governance.

In the same year the European Commission, Janez Potočnik, with the aim to reinvigorate the Lisbon Strategy, appointed a group of economists specialised in “innovation economy” (Knowledge for Growth Group) in order to provide advices (or addresses) on some key aspects:

- The contribution of knowledge for a sustainable growth;

- The policy-mix necessary in order to create, spread-out and use knowledge;
- The role of different actors in order to stimulate knowledge-based society and reinforce their linkages.

In these three key concepts some differences arise with the Lisbon Strategy. Firstly, now the term knowledge-based society is used instead of knowledge-based economy. Secondly the need of a policy-mix (integrated approach) seems to be essential in order to reach European Goals. Thanks to the “Knowledge for Growth Group” in 2009 the “Smart Specialisation Concept” came out (Foray et al. 2009, 2011). However, it has to be said the spatial analysis (regional) of innovation policies was already at the core of the scientific and policy-makers’ community attracting the attention of regional economic development specialists. One of the main arguments discussed by the “Group” was the territorial attractiveness based on the scarcity of a specific resource: agglomeration economy. A scarce resource can be depleted quickly if in the same site the competitors increase. This simple concept described well the European situation in research and innovation that was the result of two linked factors (Foray, 2009):

1. The fragmentation of the European public research system that limited the agglomeration processes hampering the creation of world-class centres (crucial to compete in a globalised economy);
2. The so-called “me too effect” i.e. the will of National and Regional Authorities to invest in “fashion” sectors without any vision of the future and not taking into account territorial specificities

This was the starting point from which emerged the idea that a possible solution for regions suffering location factors and global competition was the capacity to build an attitude to “self particularisation” in stimulating new research activities linked to the existing productive structures able to transform themselves (Foray, 2009).

According to Dominique Foray (2015), smart specialisation is ‘the capacity of an economic system (a region for example) to generate new specialities through the discovery of new domains of opportunity and the local concentration and agglomeration of resources and competences in these domains’. The core of the “Smart Specialisation” concept is represented by the “entrepreneurial discovery” that can be considered a sort of pre-condition in materialising innovation. Foray (2009) defines it as an essential phase, the crucial link for reorienting and renewing a system. In this phase the entrepreneurial knowledge is the main driver because it is composed by a different concept of both “vision” and “knowledge”, combining science and technique potential with the potential growth of the market. Foray (2009), in proposing a design process in order to build a Smart Specialisation Strategy, set out five key points:

1. Problem identification and creation of the structural conditions to increase the possibility of entrepreneurial discovery;
2. Build and inclusive strategy;
3. Implementation and evaluation process in order to select emerging activities and evaluate ex-post effects;

4. Set up an “exit-strategy” after a period and opportune mechanisms to continuously support the discovery and prioritization processes;
5. Select the coordination problems that can become drivers for the regional economic growth.

Thus, the entrepreneurial discovery phase is crucial for several factors. First of all, it lies on the fact that a policy based on the entrepreneurial discovery process as priorities identification is not a policy that says “what to do” but “how to do”, underlying the relevance of the process than the product. The entrepreneurial discoveries effects can be maximised if considered in the potential policy actions, that Foray (2009) identified as follows:

- Information externalities;
- Aligning incentives through intelligent policy design;
- Funding experiments and discoveries;
- Capabilities;
- Guiding discoveries.

This principle outlines the unawareness of governments in defining “a priori” priorities that can occur in the future. Thus entrepreneurial discovery become an important part of policy actions. It’s a necessary process able to generate information on future Research and Innovation Fields.

According to these information, governments have to choose new activities according with their potential impacts, feasibility, proximity to market, relevance for the regional economy, number of actors involved etc. In Smart Specialisation Strategy process sectors are not a key area of intervention.

The reason is that the relevant action concerns activities that enable being aware of regional knowledge economy, which can be considered as basis for Smart Specialisation Strategies. The monitoring and evaluation process in RIS3 is crucial. Ex-ante and Ex-post evaluation are necessary to evaluate the success or the failure of the chosen actions.

National and regional authorities across Europe shall design smart specialisation strategies in entrepreneurial discovery process, so that the European Structural Investment Funds (ESIF) can be used more efficiently and synergies between different EU, national and regional policies, as well as public and private investments can be increased (Guide to Research and Innovation Strategies for Smart Specialization (RIS3, 2012).

Figure 2. S3 from concept to policy. MAPS-LED Research Project (Horizon 2020)



### S3 in the Cohesion Policy for the period 2014-2020

The transformation of these two theoretical approaches in a policy, within the cohesion policy reform, is recognizable in two drivers for programming the new Agenda 2020. The first is the Theory of Change as a fundamental approach to be followed in building the programming process (why those output/results are necessary to reach the “change”). This implies the use of “indicators” as expression of the policy and related to the value of different territories can express to control and measure the expected change. The second is more related to stimulate at regional level an integrated approach to reach a critical mass of the investment effects/impacts.

The historical and economic context in which the Smart Specialisation concept has been conceived was completely different from the one in which the Lisbon Strategy has been approved. That context seemed stable even though its structural weaknesses, compared to current macroeconomic context (2007 till today), was characterised by an economic crisis that has widened divergences among European regions. In this scenario the European Union and national governments reacted with a set of measures oriented to the macroeconomic stabilisation and the reduction of the public debt. These measures were not enough and were not supported by

measures to boost growth through innovation. In this sense a Smart Specialisation Strategy can be considered a general framework and a powerful tool for regional administrations and stakeholders to deal with the abovementioned macroeconomic context. S3 allow the setting-up of a strategy focused on innovation, giving a valid answer to problems of regions characterised by structural weaknesses such as unemployment and low growth rate. Policy-makers and stakeholders are encouraged to investigate crucial regional policy aspects for the future: Where do we want to position our region in a knowledge-based economy? How do we implement the necessary policies for the strategic vision set up? Foray (2009) selected four key points that confer to Smart Specialisation policy relevance:

1. Stimulate regions to think on “how” and “where” they want to place themselves in a knowledge-based economy. What are the “activities” they want to develop and which structural changes they want to deal with. This exercise can stimulate regional actors toward innovation;
2. The “entrepreneurial discovery process” and “inclusive strategy” concepts can appear too academic and abstract but they need to demonstrate that this kind of policy is not just a technocratic exercise or just an innovation-oriented policy, but a wide and open strategy;
3. Smart Specialisation framework concerns particularly underdeveloped regions. It is not a strategy set up for economic solid regions rather than a strategy for underdeveloped regions to improve their capabilities in some sector;
4. Smart Specialisation Strategy has not been conceived just as a “local” strategy but as a useful tool to increase the efficiency of financial resources and the activities coordination.

One year after the Foray’s Smart Specialisation concept definition, the European Union (2010) defined its “Europe 2020 Strategy”, a “strategy for a Smart, Sustainable and Inclusive Growth”. In the meantime, (2000- 2011), the European macroeconomic context was deeply changed from the context in which has been approved the Lisbon Strategy (2000): “the economic crisis has frustrated years of economic and social advances and highlight the weaknesses of the European economy” (EC, 2011). The European Commission with the Europe 2020 Strategy selected seven “Flagships” in order to deal with the negative factors affecting the European economy. The first initiative selected is relevant for Smart Specialisation Strategies: “Smart Growth: develop a knowledge and innovation-based economy”, that was clearly the main aim of Lisbon Strategy.

The “Innovation Union” (first flagship) is based on a wide concept of innovation not focused just on products and processes but also on services, placing innovation as an open system in which actors cooperate and interact. The objective is to address R&D and Innovation Policy toward the current challenges of our society such as climate changes, efficient use of resources and energy, health and demographic changes. It is necessary to reinforce each ring of the chain from “blue sky” research to the commercialization. Smart Specialisation Strategy becomes effective policy with the Commission’s communication COM (2010) 553 – Regional Policy contributing to smart growth in Europe 2020 (EC 2010).

However, Europe still presents deep differences: regions more competitive and able to compete in the globalised market and regions with unsolved structural weaknesses, highlighting an “innovation gap” among them. Therefore, it is necessary to activate the regional innovation potential: more developed regions need to consolidate their capabilities and more underdeveloped have to make an effort to reduce the gap. Despite the context conditions have got worse for the economic crisis, the European Union allocate a remarkable amount of financial resources for the “smart Growth”: nearly 86 billion of euro have been allocated for these policies of which the 75% funded by the European Regional Development fund (ERDF) (EU Regulation 1303/2013). These funds have to be coordinated and integrated with other European tools supporting innovation and research, particularly the Community Innovation Program (CIP) and Horizon 2020 (The European Research Program for the period 2014-2020).

In this perspective, the concept of “strategic intelligence”, i.e. the capability to develop a responsive mode to change complexity, is necessary in selecting high added value activities offering the opportunity to reinforce regions competitiveness. In order to maximise the regional policy impact, jointly with other European policies, national and regional governments should develop “Smart Specialisation Strategies” which have the potential to:

- Pledge a more effective use of public investments and stimulate private ones;
- Concentrate resources on a limited number of priorities;
- Interact with other sectorial policies and favour transnational and interregional cooperation.

The transition from academic concept to public policy is defined with the new Structural Funds Regulation. Particularly, Article 2 of the General European Structural Funds Regulation No. 1303/2013 defines the “Smart Specialisation Strategy” as “national or regional innovation strategies which set priorities in order to build competitive advantage by developing and matching research and innovation own strengths to business needs in order to address emerging opportunities and market developments in a coherent manner, while avoiding duplication and fragmentation of efforts; a smart specialisation strategy may take the form of, or be included in, a national or regional research and innovation (R&I) strategic policy framework” (EU Regulation 1303/2013);

The Annex 1 of the above mentioned Regulation, refers to the need of:

- Policy coordination with other European policies such as Horizon 2020: The Horizon 2020 authorities are strictly connected with this process (S3) and include all the actions and tools to exploit and spread the results of R&I obtained with Horizon 2020 with particular attention to the creation of an entrepreneurial and industrial environment auspicious for innovation and for SME and consistent with the priorities selected by regions in their smart specialisation strategy (EU Regulation 1303/2013);
- Cooperation: Member States have to make in place transnational and interregional cooperation within Operative Programs framework aiming at the investments for growth and employment, included measures in the R&I field deriving from Smart Specialisation Strategies (EU Regulation 1303/2013);

- Transnational Cooperation: Member States and Regions have to cooperate especially in the field of R&I and ICT boosting the development of common approaches in respect of the smart specialisation. Particularly regional cooperation envisages the impulse to clusters cooperation characterised by a higher level of research and innovation intensity, taking into account the potentials (in R&I) of underdeveloped regions (EU Regulation 1303/2013).

### The territorial dimension in Research and Innovation Policies: the RIS3 plans

The European Commission requested to each European region to enlighten in an action plan for RIS3 (Research Innovation Smart Specialization Strategies) the regional strategies for the programming period 2014-2020 in order to respond the local demand of innovation and to stimulate new sources for a self steady development. In this context the role of cities, the horizontal perspective sustainable urban development and "metropolitan areas", for the Italian context, could play a synergic role, in supporting the construction and the implementation of regional RIS3 in cooperation with the European Structural Funds. The current phase allows outlining the level of completeness, relevance and consistence of the selected actions by each European region to drive economic change through smart specialization strategies/RIS3. On the other hand, the role of the city, the horizontal perspective of sustainable urban development, and in particular the "metropolitan areas" in the Italian context could be better drive an effective implementation and adjustment of RIS3 regional plans. National/regional research and innovation strategies for smart specialisation (RIS3) are integrated, place-based economic transformation agendas "that do five important things:

- They focus policy support and investments on key national/regional priorities, challenges and needs for knowledge-based development, including ICT-related measures.
  - They build on each country's/region's strengths, competitive advantages and potential for excellence.
  - They support technological as well as practice-based innovation and aim to stimulate private sector investment.
  - They get stakeholders fully involved and encourage innovation and experimentation.
  - They are evidence-based and include sound monitoring and evaluation systems." (RIS3 Guide 2012).

"The Barca Report contributed to the development of the concept through recommendations for the post- 2013 regional development programmes. It emphasised the need to focus on fewer priorities, to be more transparent, to make sure that programme success is verifiable and to better coordinate place-based policies (Barca, 2009). This transformed smart specialisation from a technology and research concept to a place-based concept attuned to regional policy (McCann and Ortega-Argilés, 2011). The innate message of this report was that, if regions opt for similar types of innovation priorities, the outcome will be fragmentation and lack of critical mass, which will prevent regions from developing economies of



agglomeration and positive spill-overs. In order to overcome these problems of fragmentation, mimesis and lack of critical mass, great importance has been given to urging regions to foster new activity sectors or industries, by investing in R&I in a limited number of areas with the greatest strategic potential" (Sörvik and Kleibrink. (2015: 4).

Among the expected actions reported in the abovementioned Commission's communication (EC 2010) in order to maximise the impact of Regional Policy contribution to smart growth, it was expected the creation of "a smart specialisation strategy Platform up to 2012 aiming at join academics, research centres, regional authorities, businesses and commission services in order to contribute in defining needs, strengths and opportunities".

In the design and implementation phase of RIS3 process, monitoring and evaluation activities play a central role. In 2011, observing the above mentioned Commission's Communication; the S3 Platform has been established with the aim to support regions in the preliminary phase of their Smart Specialisation Strategies, particularly for "Research and Innovation Strategies for Smart Specialisation" (RIS3). Further, the Platform has the peer review task of proposed RIS3 and to facilitate RIS3 knowledge and experiences exchange. The Platform has been established in the "Institute for Prospective Technological Studies (IPTS) of Seville, Spain, and it is part of one of the European Commissions' Joint Research Centres. The S3 Platform assists EU countries and regions to develop, implement and review their Research and Innovation Strategies for Smart Specialisation (RIS3) the role of the S3 Platform is to provide information, methodologies, expertise and advice to national and regional policy makers, as well as promote mutual learning, trans-national co-operation and contribute to academic debates around the concept of smart specialisation (S3 Platform, 2015). The current phase of monitoring of the RIS3 through the Seville Platform, allows comparing the regional response to the integrated approach envisaged in the link of place-based and smart specialization policies. The S3 platform has set up an evaluation methodology in supporting the construction of regional RIS3 plans and in monitoring those critical factors that represent an obstacle for the plan implementation. This methodology is based on the definition of a relevant set of criteria in order to evaluate the performance of each RIS3 plan elements. The result can be represented by the so-called "wheel", built on a six steps process through the selection of three critical factors for each step. It helps to highlight the scientific and methodological appropriateness of the plan, highlighting the peculiarities of the regional context according with the 3 critical factors selected for each step. The results of the evaluation can be represented through a graph in which is clear both the weak or strong positioning with respect to the criteria set in the RIS3 Guide (2011). The evaluation of this three elements allows to select some focus area to deepen:

- The need to complete or to update the RIS3 plan;
- The needs to deepen some territorial characteristics/peculiarity;
- The need to define better priorities and needs in the multilevel governance process

Table 1 Critical Factors selected for each step in the construction of RIS3 plan

<b>RIS3 Guide Steps</b>	<b>Sections</b>	<b>Marks</b>	<b>RIS3 Guide reference</b>	<b>Short explanatory</b>
STEP 1 Analysis of the Regional context and potential for innovation	Regional Assets (such as technological infrastructures)	0-5	Step 1 (page 18) + Annex I (pages 28-33)	Quality of regional and national assets SWOT analysis Innovation, potentials and competences for the innovation based development
	Linkages with the rest of the world and the position of the region within the European and the global economy	0-5	Step 1 (page 19) + Annex I (pages 28-33)	Linkages, Knowledge, Commerce and Competence flows Positioning in the trans regional and international value chain Trans regional and International collaboration network
	Dynamics of the entrepreneurial environment	0-5	Step 1 (page 20) + Annex I (pages 28-33)	Start-up, cluster, network value chain; FDI New self-employment forms
STEP 2 Governance	Governance Structure	0-5	Step 2 (page 21) + Annex I (pages 34-44)	Dedicated structures and definitions of their roles, responsibilities and tasks
	Collaborative leadership	0-5		Interactive learning approach; Collaborative leadership; Quadruple helix Actors* (productive frontiers involvement)
	Boundary spanners	0-5		Usage of open forums in order to favour discussion with also with citizens; e-governance
STEP 3 Overall vision	Wide view of innovation	0-5	Step 3 (page 22) + Annex I (pages 45-50)	Social and management services are considered connected to market innovation, on the basis of scientific and technological innovation.
	The main challenges	0-5		Inclusive development based on environmental and economic sustainability
	Scenario analysis	0-5		Risk evaluation and definition of a management/control plan for possible future changes
STEP 4 Priorities identification	Review of past programming period priorities	0-5	Step 4 (page 22) + Annex I (pages 51-52)	Critical Review of past programming period experience (from RIS to RIS3) Dynamic identification of current and potential areas with competitive advantages
	Consistency			Significance and alignment with context analysis and entrepreneurial discovery process and DAE
	Critical Mass			Resources concentration on a limited number of priorities
STEP 5 Policy mix	Roadmap		Step 5 (page 23) + Annex I (pages 53-58)	Action plan and Pilot projects
	Coherent policy mix			Mixed measures with horizontal targets
	Coherent multi annual action plan			Support measures for experimentation

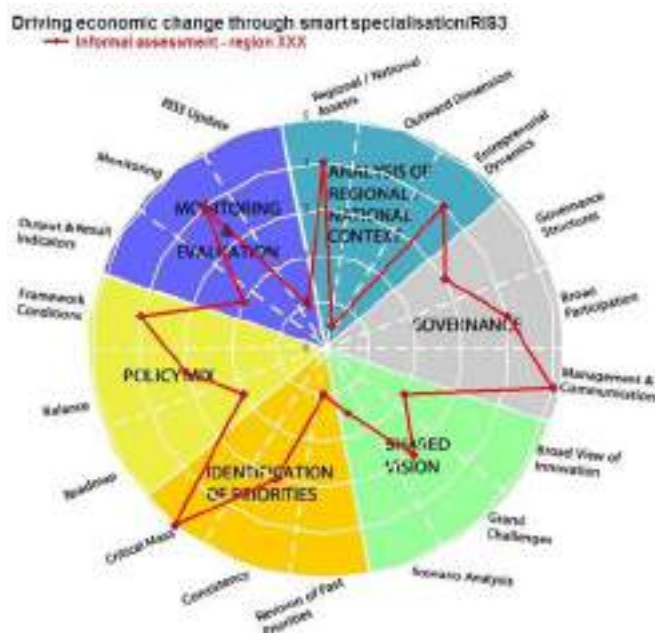
STEP 6 Monitoring and evaluation	Output and results indicators		Step 6 (pages 24-25) + Annex I (pages 59-64)	Selection of a limited number of outputs and results indicators Indicators have to be linked with priorities following a clear definition of baselines and targets;
	Monitoring			Mechanisms supported by proper collection data methods in order to verify how activities are implemented in RIS3 with respect to outputs and expected results
	RIS3 plan updating			Review of priorities and of the policy mix with respect to monitoring and evaluation activities

Source: Elaboration from S3 Seville Platform

The application of the evaluation process based on the evaluation platform set up by the Seville Platform bring towards the so-called "wheel", in which RIS3 strengths and weaknesses are evident and comparable allowing a better sharing of results in orienting changes to produce. Following is reported an example took from the Seville Platform.

The Seville Platform, in order to support and address context analysis in the conceptual framework of S3 in regional plans, has designed a database aiming at the identification of the regions positioning in the European context. This positioning is explained through the "distance index" for each European region with the aim to capture structural similarities in the European context and to guide RIS3 tools toward the so-called competitive advantages. The methodology to obtain the synthetic index has been elaborated by the JRC Technical Support and are reported in the S3 working paper series no. 03/2014 "Regional Benchmarking in the smart specialisation process: Identification of reference regions based on structural similarity" (Navarro et al. 2014). Even though the theoretical basis has shifted from the benchmarking analysis to the performance analysis in order to select factors that can boost competitive advantage of businesses in the global market, it has allowed the inclusion of structural context variables in support policy decision in the difficult linkage between innovation systems and local economic development.

Figure 3. The evaluation "wheel". S3 platform



Source: S3 Seville Platform

### The MAPS-LED Project Perspective

The territorial dimension is a key element of European Cohesion Policy as emerged from the official documents and scientific literature in the field. However, some concerns arose among scholars and practitioners about the real consideration of territorial dimension in RIS3 plans proposed by national and regional authorities. The risk to have the so-called “me-too effect” is high and this means that regions are not taking into account seriously the potentials (economic and social) of their territories combining the “use” of innovation (more than the production of innovation) with a spatial perspective for European regions. The expression of the territorial potential is relevant not only for the local dimension but also for the international openness of local markets. A consequence of the complete RIS3 process could be the possibility that the empowerment of local innovation systems bring toward the entry of SMEs into the Global Value Chain helping the revitalisation of local economic systems.

Faludi (2015) argue that even if the S3 strategy is integrated and effective it could be hard to translate it into a spatially-oriented development policy. This is a turning point into European context and it is necessary a review of EU Cohesion Policy introducing the issue of “Territoriality and Democracy”. Further, the Foray’s perspective, highlights the territorial dimension in terms of “specialisation” of activities that are relevant within a territory (i.e. regional). Regions have to be “aware” of their current assets and their potentials and most of all have to make choices in order to drive the “structural changes”. One of the early benefits reported by Foray (2015) in the implementation of RIS3 is represented by the decentralisation, that he called “democratisation”, that is better than central planning in the perspective of the discovery process.

This is a contact point with Faludi and his perspective that moves toward “Territoriality and Democracy”. Following these perspectives, a possible way to better integrate the territorial dimension into S3 policy, could be represented by the representation of Territorial Capital through defined variables that can help to understand the real national/regional/local potential and subsequently help in designing the RIS3 plans. The joint Exchange programme MAPS-LED is based on a research proposal finalized to examine how smart specialization strategies (S3) to regenerate local economic areas can be implemented, according to the new agenda of Europe 2020. This can be largely achieved by incorporating a place-based dimension.

The main aim is to identify and prescribe the implementation of S3 in terms of spatial, social and environmental factors. The programme will map out local needs and opportunities in a variety of contexts that could drive regional policy interventions. The resulting S3 will not only emphasize “Key Enable Technologies”, but will also empower the local innovation process. Elements gained from the preceding CLUDs project, such as tacit knowledge, embedded social networks and innovative milieu, will ensure that the proposed S3 for each area is successful. The proposal intends to apply a Multidisciplinary Approach to Planning of Smart Specialization Strategies in a prospective to enhance Local Economic Development (MAPS-LED).

The MAPS-LED process starts from a place-based framework and will include two important

drivers: 1. Cluster policy and cluster-based analysis, 2. Innovative milieu in terms of the local value chains based on the urban-rural linkages (drawing from the CLUDs findings <http://www.cluds-7fp.unirc.it/index.php>). The MAPS-LED project will be built in order to connect three important key-factors including:

- Governance – in terms of cluster policy and based cluster analysis;
- Localization – in terms of place-based approach;
- Territorial network – in terms of innovative milieu based on urban-rural link.

Drawing from the cluster concept, the proposal will first build a conceptual framework to assess the potential S3 through a spatial planning-led approach, and then develop it by drawing from existing cluster identification from the Directorate General for Research and Innovation (2013). The existing network of EU and US institutions, set up as a result of the CLUDs IRSES project will investigate (through an exchange knowledge approach), how lessons from the clusters can steer the current challenges on S3 in Europe. Case studies will cover a variety of clusters including food- led, HEI-led, HT-led, agriculture- led, and art- led.

The MAPS-LED project will be conducted over two stages, each of generating inputs for the definition of integrated actions and for building the scenarios to implement the pilot S3 areas in European regional contexts. The first stage will take place over three years and will deal with the theoretical part of the research and training activities. The second stage will take up the final year and will deal with the practice and implementation of the research.

The general framework of the research programme is organised across four main topics:

1. Research and Innovation Strategies: recognizing that the dynamic process due to innovation and research defines different influence areas that can be better explained by the territorial distribution of competitiveness factors.
  - technology transfer based on "business process"
  - business models and partnership research groups and strategic action plan
  - entrepreneurship in the research community and social innovation
  - clustering entrepreneurial
2. Spatial Planning Factors suitable to be mapped in physical terms, such as:
  - Proximity and accessibility (to gateway cities, to infrastructural nodes, to HEI Centres, to broadband facilities...)
3. Spatial pattern ("boundary" of the cluster, network of connections, localisation of place of production and distribution...)
  - Size (dimensional data of the cluster)
  - Critical mass (number of enterprises, size of urban centres involved, number of jobs created....) Cluster Policy Factors related to the governance systems of the clusters:
    - institutional networks, entrepreneurial networks, the global-local nexus between the local and global systems, the organisation of local value chains, a suitability to be mapped through stakeholders analysis.
4. Social Innovation Responses to social needs that are developed in order to deliver better social outcomes:
  - (Spatial) identification and GIS mapping of new/ unmet/ inadequately met social needs, related to vulnerable groups

In order to understand the success factors from the US experience on clusters, the selected case studies will be investigated with a view to the S3 concept through an assessment grid based on the above mentioned elements, integrated throughout the whole first year research. Multi-criteria approach based on correlation matrix, cluster analysis, hierarchical clustering and Hierarchical Decision Model, and Planning Balance Sheet (PBS) will be applied to analyse, assess and compare:

- Factors characterizing USA clusters correlated with the EU ones;
- Indicators of cluster specialization, spatial factors, organization type;
- Success factors with respect to innovation, localization and governance.

The data set, from selected data from USA panel information to EU S3 potential data, will be structured in a GIS of Cluster/S3 information system. The proposed methodology under the MAPS-LED program would apply this concept to the wider territorial network and chains, thus allowing to quantitatively assess the potential of the clusters also in social terms and to pave the way to estimate the wider potential of place-based S3 through a two-steps process:

1. The first step aims to develop and test a methodology for Mapping & Assessing Clusters in place-based and spatial- led perspective.
2. The second step follows the mapping stage. The assessment of the wider impacts of place- based S3 will exploits and moves forward the Sustainable Return On

Investment (SuROI) methodology, applied to urban regeneration, by assessing the clusters' impact in the wider social and environmental perspective, thus leading to discover the extra value generated by the clusters and territorial milieu-nexus.

There have been many predictive tools that define the economic impacts and relative benefits of regeneration and urban renewal. These have been devised primarily to establish the relative costs of development such as materials, construction methods, labour, occupation etc. But the value of development on people and the natural environment has not evolved to the same degree, and rarely features in an integrated prediction or evaluation of projects. Those techniques that do exist tend to be qualitative or survey-based data that record the attitudes of affected parties toward planned or existing development.

Many factors now determine the success of built environment programmes including climate change, the scarcity of important resources, the need to house key workers, the continuing support for the excluded and vulnerable, the effective involvement of interested parties, and the volatile or uncertain performance of the local economy. However, funders and decision-makers are rarely exposed to the full economic returns because environmental and social gains do not feature on the balance sheet.

A predictive or evaluative process that can help to balance and quantify factors that are often hard to measure and compare will be invaluable for those that want to show that developments will offer the best sustainable solution.

## Conclusions

Smart Specialisation Strategies represent a turning point for the European Cohesion Policy. The increased attention toward regional "specialisations" not just internal, as in the past, but toward the external dimension represent a key point in mitigating negative economic effects deriving from globalisation processes. In this perspective the territorial dimension become crucial in RIS3 plans implementation. As highlighted by the Barca Report (2009) it is necessary the shift from a "space-blind" to "place-based" approach. This renovated attention to the "place" if well implemented by regions could reach its main aim to satisfy efficiency (the capacity of a region to exploit its territorial potential) and equity principles (capacity of each region to provide equal opportunities to their citizens).

Even if the territorial dimension has always been part of European Policies (at least since 80s and then since 90s in the European Treaties), it has been emphasised at the end of 90s with the introduction of ESDP that highlighted the need of "spatial" vision for European territories. It is in 2007-2013 Programming Period that is possible to see a more "productive" activity from the European Commission both in terms of Territorial and Innovation Policies. It could be probably due to the first signals of the upcoming economic crisis that pushed toward a "change" of the status quo. In the mean while the European Commission decided to revise its own Research Policy drawing up the "Horizon 2020" Programme.

The contact point between S3 and Territorial dimension seems to be in 2009 with the publication of Barca report. It linked the "spatial" issues introducing the place-based approach in contrast with the "spatially-blind" policies, taking into account the "Territorial" aspect of Smart Specialisation Strategies of Foray's concept, that lies, in our opinion, on the "specialisation" concept, understood as a specific activity in a specific space (region) that has the potentials to contribute to the regional economic growth.

The current challenge for the programming period 2014-2020 lies on the capabilities of National and Regional Authorities in implementing Operational Programmes able to reach the goals of Europe 2020 Strategy through an Integrated approach, linking together Cohesion, Research and Innovation and Territorial Policies.

However, difficulties can arise. Especially the so called "me too effect" i.e. the intention of underdeveloped regions to adopt smart specialisation strategies to ambitious for their potentials deriving from regions more developed. Many regions decided to invest in sectors such as ICT, biotech, nanotech etc. not considering the existence or not of a potential in this sector in their territory to achieve the objective. This effect could be dangerous because is the opposite of smart specialisation that is based on the existing potential of the territorial context and on the capacity to act on thanks to the strategies. The results could be the opposite of that expected increasing the gap and differences among regions.

Even in this case the territorial dimension is crucial and should be investigated if and how RIS3 already proposed took into account the place-based approach.



## MAPS-LED Work Package No. 1

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The MAPS-LED WP1 concerns the background knowledge to build the conceptual framework for gathering data, information from the case studies areas (Boston and San Diego). It is expected to produce, beyond the current state of the art on the cluster theory, a novel concept of cluster more socially and locally oriented, paving the way to pursue ground-breaking objectives, to be achieved through a rigorous and evidence-based empirical work delivered in WP2 and WP3. The work Package is organized in four activities: Research, Training, Dissemination and Management.

### **Research:**

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- Developing the spatial-led and governance-oriented methodology to analyse clusters;
- Building the preliminary set of indicators for analysing the case studies;
- Building the research operational tools;
- Selecting the case studies;
- Knowledge sharing among EU and US Experienced Researchers through networking activities and the web-platforms.

### **Training**

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- Training of the Early Stage Researchers through education on clusters, research and innovation, spatial planning and social innovation delivered at the NEUSEP;
  - Participation of ERs and ESRs – Kick-off meeting at NEUSEP.
- Dissemination:
- Participation of ER and ESR in the Open Day at PAU;
  - Participation of ER and ESR in international conferences to discuss the preliminary findings from the theoretical framework;
- Management:
- Organisation kick-off meeting and the open-day.
  - Organisation of the first mid-term meeting;
  - Preparation of the inception report;
  - Preparation of the 1st WP deliverables.

### **Objectives**

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**O.1.1**\_To build an assessment methodology based on a spatially-led approach and governance-oriented, including qualitative and quantitative indicators, suitable to unveil the hidden potential of regions and sub-regions in terms of S3;

**O.1.2**\_To build a panel of data on clusters, suitable to be gathered on official open sources both in the US and in the EU, thus, suitable to support a comparative analysis of the US and EU case studies through a shared set of indicators;

**O.1.3**\_To allow the knowledge transfer among partners on cluster policy, research and innovation and spatial planning particularly during the kick-off and the 1st mid-term meeting and through the construction of the Web-Platform;

**O.1.4**\_To train Early Stage Researchers on cluster policy, research and innovation and spatial planning by attending lectures at the NEU;

**O.1.5**\_To disseminate the research goals throughout the larger stakeholder's community through the open day, allowing to capture their specific needs.

Part II  
Smart Specialisation & Clusters  
FOCUS Unit

## Smart Specialisation Strategy: From the origin to the recent application in the EU Cohesion Policy

The innovation process and Smart Specialisation are the roots of sustainable growth and employment creation. This concept was widely investigated in the literature on the productivity gap between Europe and United States and passing through the analysis of the Knowledge for Growth group it became the main principle of the Agenda 2020.

### Smart Specialisation Strategy and the Transatlantic Productivity Gap

The Smart Specialisation concept appears originally in the literature examining the so called "*transatlantic productivity gap*". From the beginning these studies focused on the innovation process, perceived as the root of sustainable economic growth and employment creation. Innovation, seen as the key reaction to poor economic performances, became an important pillar of the *Lisbon Agenda*, endorsed in 2000, stating that the EU had to become by 2010 "*the most dynamic and competitive knowledge based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion, and respect for environment*" (High Level Group chaired by Wim Kok, 2004, p.7).

A first analysis discovered that new technologies boosted the US productivity growth more than in Europe where the production of innovation and communication technologies (ICT) was scarce. The worse European performances in comparison with the US could be explained by a lower level of R&D investments (Falk, 2006), causing the focus to be moved to the differences on R&D intensity as reason of the growth differentials. A first explanation relied on the differences in the industrial structure between Europe, characterised by middle and low-tech sectors, and US, where a high number of firms joined high-tech sectors especially in the production of information and communication technologies. These "structural effects" favoured the latter, whose industrial structure was more suitable to promote and achieve R&D results (van Pottelsberghe de la Potterie, 2010).

A second explanation focused on the differences in the dissemination of new technologies across the economy, an effect (McCann and Oertega-Argilès, 2011) related to the number of firms that took advantages in the use of ICT in their own production system (O'Mahony and Vecchi, 2005). This approach claims that R&D gap between Europe and US could not be only due to their structural differences, because European firms exhibit a lower ability to translate R&D into productivity results even within the same sectors. This "intrinsic effect" was caused by institutional factors that played the major role in explaining the difficulties and the productivity gap (Erken & van Es, 2007).

The analysis examined first the different financial and labour markets, in a market-based view, and then investigated the public-private partnership showing how in the US "*the role of federal government in the defence and health systems, through procurements, R&D subsidies and other mechanisms, has been a major factor in the success of the IT, biotechnology and other dynamic, high-technology sectors*" (O'Sullivan, 2009, p.11).

### The Knowledge for Growth Group experience

Following the statements of the Lisbon Agenda about the objective to build a “dynamic and competitive knowledge based economy” Janez Potocnik, in 2005, established the “Knowledge for growth” (K4G) group, asking to a number of prominent economists to analyse the innovation process with the aim to understand how knowledge can contribute to sustainable growth and prosperity.

The work covered a wide range of issues: from globalization of R&D to the European R&D deficit, passing through the role of Universities and Knowledge organizations to the governance of the factors and drivers of the knowledge economy. The different contributions are based on the leading idea that the Smart Specialization “is expected to create more diversity among Regions than a regime in which each Region tries to create more or less the same in an imitative manner”(Foray et al., 2009, p.10). In this framework each Region has to activate a learning process to determine the research and innovation domains in which it can excel, applying the technologies to their core sectors.

The Knowledge for growth group exposed several guide lines for the implementation of the productive system using key enabling technologies. Even if the final goal of this strategy is the same for all Europe, the complexity of the scenario led them to indicate different strategies for different Regions: A) Strategies for technological leadership; B) Catching-up strategies for followers, for example technology diffusion policies that “benefit in particular to the catching-up countries that lack resources to reach the target and need to develop absorptive capacities to adopt advanced technologies faster” (Licht, 2009, p.31); C) Preventive strategies to address global risk: in case of expected global risks it is inherently difficult to have an ex ante measure of what is success or failure. “The risk of inaction or of delay in the support of advancing critical technologies could be larger than the cost of action” (Giannitsis, 2009, p.28).

### Smart Specialisation Strategies in a Regional Scenario

In the Smart Specialization framework, public policy is the key instrument for promoting knowledge and innovation as the principal features for Regional growth (Capello, 2014). The main concept is that Regions have their own specific industrial and institutional history, and that the local stakeholders – entrepreneurial agents, policy makers and the society – should be made part of the implementation of Regional development (Coffano and Foray, 2014). Obviously this requires an effective localized policy-making oriented to the specific needs and available resources.

The key factor moving the Smart Specialization is the process of entrepreneurial discovery (Foray et al., 2011). Smart Specialization takes into consideration the policy process to select and prioritise fields and sectors where a cluster of activities should be developed, and where the entrepreneurial activity discovers new domains for the future specialization. This concept refuses a top-down planning strategy of “picking the winners” that imposes specializations on Regions. On the contrary, it is its bottom-up policy that characterizes this process for the promotion of the research activity by entrepreneurs and identifies the potential advantages of general purpose technologies

in their own economic field. According to the Smart Specialization approach the entrepreneurs are in the best condition to determine the domains of R&D and innovation in which a Region could excel given its existing capabilities and productive assets.

According to the EU Cohesion Policy, which focus the need for Regions to analyse their economic environment, identify and select their own potential innovation patterns, and make a self-assessment of their knowledge assets, competences and the key actors that share this knowledge (McCann and Ortega-Argilès, 2013), the Smart Specialization concept, despite being based on sectors and technologies, has also begun to achieve importance in Regional fields.

The Smart Specialization concept tends to have an open policy approach: potential and priorities emerge out of the discovery process without having been initially identified. This concept is based on different principles. First, economic development is driven by knowledge and innovation, and that economic development in the long-run is about true economic regeneration which is not possible to plan *ex ante*. For this reason it refuses the “picking-the-winner policy”. Second, history matters, meaning that Regions have different potentials, institutional effectiveness, industrial specialization and knowledge level and an analysis of the Region environment is indispensable. Third, defying a top-down approach, this framework uses a bottom-up policy for economic growth. Fourth, this policy is demand-driven, as it is derived from local potentials and local needs.

Policy maker and private entrepreneurship are the key actors of this agenda, where governments perform a strategic and coordinating role in the productive sphere, giving great importance to the involvement of local stakeholders and public-private coordination (Iacobucci, 2014). It is important to underline that a broader definition of stakeholders is used in this approach: they consist of a wide range of individuals and organizations including inventors, firms, higher education institutes, that have technical and scientific knowledge, market knowledge and institutional knowledge. It is left to them to analyse technological and market opportunities, to find possible strategies and articulate a pattern of economic growth. In this approach local stakeholders have a great role in defining the main strengths, weakness, potentials and bottlenecks in a Region, and the policy process should be inclusive and allow for a large number of stakeholders to participate.

Smart Specialization concept adopts the entrepreneurial discovery process (Rodrik, 2004) to determine the potentials for future specialization. In the self-discovery process (Hausmann and Rodrik, 2003) public and private sector have to collaborate strategically, evaluating costs and opportunities and reducing the impact of the imperfect information. In this framework governments have a prominent role, more important than safeguard property right, avoid corruption and guarantee economic stability. According to Foray, the policy maker has “to allow and help economic agents to find their own ways in a decentralized and bottom-up process and then carefully observe what is happening. He has to aggregate the decentralized information generated by entrepreneurial experiments and discoveries, assess the outcome and

help the promising project to grow” (Foray et al., 2011). In the Smart Specialization approach it is possible to identify three different phases in the policy process: 1) identification and reinforcement of entrepreneurial discovery; 2) monitoring and assessment; 3) coordination and complementing investment. This entrepreneurial discover process refuses a technocratic model to identify beforehand the future specialization. It is more an open process in which accompanying emerging trends and improving coordination by providing the necessary public goods and creating additional incentives at certain critical bottlenecks to help the new activity to grow.

#### BOX 1 Smart Specialisation concept

- The literature on the transatlantic productivity gap focused on the innovation process and R&D investments as the key factors for the productivity differentials between Europe and United States.
- The Knowledge for Growth group developed several guide lines to implement the productive system using key enabling technologies:
  - i. Strategies for technological leadership;
  - ii. Catching-up strategies for followers;
  - iii. Preventive strategies to avoid global risk.

Local stakeholders cover a crucial role in the entrepreneurial discovery process, selecting and prioritising fields and sectors

#### Development Potentiality in Relation to the Cultural Specificities of the Regional Innovation System

Since the Smart Specialization framework is based on the specificities of each Region, it is worthwhile to focus the crucial role of their territorial dimension and explore the 'place-based' factors that Regions should develop in order to foster innovation.

#### The Potential of Regional Development/Innovation Systems

The concept of Region has evolved in the 1980s, it has changed from the outcome of political and economic interaction and it has become the basis for the economic and social activity (Storper, 1997). This change in the role of the Region emerged when the post-Fordist economies started to localize in certain Regions and not in others because there were conditions and specificities for success. In this way firms created their specific competencies and learning processes based on the Regional competitive advantages (Doloreux and Parto, 2005). The latter are a combination of specialized resources, institutional context, knowledge, skills and social and cultural values of the territorial dimension, which generate Regional development. Moreover, the competitive advantage of a Region attracts firms to co-locate in that Region and to benefit further from the agglomeration advantages (Marshall, 1920).

The attempts to explain the key factors for the economic development of a particular Region has developed the concept of “Regional development system”. There is not a generally accepted definition of the Regional development system, in fact, sometimes, it is used as a synonym of “local productive system” or “industrial district”, however it

consists of a set of firms, institutions and public and private organisations in strong relationship with each other and the territorial assets (Vinci and Dematteis, 2005) in order to produce economic development for the Region. The concept of system regards the complexity of the interactions between actors and the capacity it has to plan a successful system (Fabbro et al., 2007) for the future.

However, in an international competitive environment caused by the globalizing economy the concept of "Regional development systems" has evolved in "Regional innovation systems". The focus on innovation is related to the emergence of successful industrial clusters (Maskell and Malmberg, 1999) with a high innovative capacity and specialized skills which benefit from the competitive advantage of the Region consisting of the local learning process (Porter, 1998b) and the knowledge transfer between actors of the Regional system. In this way it is established a territorial platform of local stakeholders, firms, institutions, public and private organisations, universities, technology transfer offices, civil society, who interact together according to formal and informal relationships in order to create, use and disseminate knowledge (Doloreux, 2003, pg. 67-94).

In this framework, the European Union Regional policy concerning 'Regional innovation smart specialization strategy' (RIS3) [EC, COM(2010)553] aims to promote local innovation processes in particular sectors and technological domains through a bottom-up identification of specific "innovation patterns" (Capello et al., 2012). Therefore, since it is difficult to pass from knowledge to innovation we will try to draft the key factors that encourage innovation in some Regions transforming them in leading innovators.

#### Identification of Key Factors for the success of the Regional Innovation Systems

Innovation is considered as a territorially-embedded process (Lundvall, 1992; Asheim et al., 1999), accordingly, on one hand it depends on the local institutional and structural characteristics (Iammarino, 2005) and on the other hand the territory cannot rely only on the endogenous capacity to produce innovation but also on its capacity to attract exogenous innovation. This interaction generates 'spill overs' transmission which are boosted by the characteristics of the Marshallian agglomeration economies, i.e. linkages between firms, labour market mobility and interactions and knowledge spill overs. In order to understand the relevance of these characteristics this study is grounded on a series of fundamental approaches.

One of the most important factors for innovation is knowledge creation because it can reduce transaction costs if it is codifiable (Storper and Scott, 1995). Knowledge concerns local learning processes, human capital, specialized labour force and labour market. As a consequence, formal and informal communication between specialized workers generate knowledge, makes knowledge sharing more flowing and is essential for innovation. While codified knowledge can be transmitted in large distances and in culturally different Regions, the tacit knowledge, which is also the cornerstone of knowledge creation, is (geographically) bounded and is a result of historical evolution, incorporated in the people (Becattini, 1998).



A reason why Boschma (2005) explains that proximity is a key issue for learning and sharing to take place. There are five dimensions of proximity and each of them should have a correct extent in order to maintain its role in interactive learning, therefore not to cause problems of lock-in. The concept of proximity encourage the relations and networking between firms and other actors. It facilitates coordination and trust, thus sharing of information, knowledge and values. Geographical proximity, which according to Boschma is not the most important level of proximity, is defined as the spatial and physical distance between economic actors. This form of proximity brings actors together and facilitate the spill over advantages. In this context it becomes of great interest to explain the other forms of proximity. Cognitive proximity concerns knowledge, which is not a public good produced outside the economic context, as neoclassical theory argues. This implies that knowledge is created within the firms and their proximity is a condition to share information and consequently improve the innovation process. An additional proximity Boschma refers to is organizational proximity, which regards the capacity to coordinate actors within and between organizations. Therefore, organizational proximity includes sharing of relations which determine the level of autonomy and control of firms within and between organizations. In particular, it is a stable condition for the innovation process because it expresses the network between research departments of the universities, R&D in institutions and firms and technology transfer offices, which is the first step of creation and transfer of knowledge. Moreover, social proximity is defined in terms of economic relations embedded in the social context. This relations are grounded on trust between actors which facilitate communication and exchange of tacit knowledge in order to reduce the opportunistic behaviours. The fifth level of proximity is the institutional one which refers to the regulation of collective action.

Figure 1. Five forms of Proximity

	Key dimension	Too little proximity	Too much proximity	Possible solution
1. Cognitive	Knowledge gap	Misunderstanding	Lack of sources of novelty	Common knowledge base with diverse but complementary capabilities
2. Organizational	Control	Opportunism	Bureaucracy	Loosely coupled system
3. Social	Trust (based on social relations)	Opportunism	No economic rationale	Mixture of embedded and market relations
4. Institutional	Trust (based on common institutions)	Opportunism	Lock-in and inertia	Institutional checks and balances
5. Geographical	Distance	No spatial externalities	Lack of geographical openness	Mix of local 'buzz' and extra-local linkages

The institutional proximity can be introduced in the broader institutional asset of a Regional system. The informal institutions regard common and written laws and habits which rule the interaction between actors in the Regional system. They are specific of the society in a Region. The formal institutions are collective and public organisations which govern the economic agents. We expect the formal institutions to have a crucial role in implementing policies which encourage innovation in a specific socio-economic and cultural context. At this regard Crescenzi, Rodriguez-Pose and Storper (2007) argue that the transatlantic productivity gap between the EU and the US can be explained

by the “institutional-building efforts” (Crescenzi et al., 2007, pg. 676). Whereas in the US a “national system of innovation” was founded before the Cold War and the innovation policies has been implemented by federally funded projects contributing to private firms and basic research, in the EU there is not an integrated supranational system but fragmented, small scale projects.

In order to change this trend and launch a model of knowledge-intensive growth (Camagni and Capello, 2013) the EU designed, within its Europe 2020 Agenda, the flagship initiative called “Innovation Union”, which will be further explained in the paragraph 1.3. In this context, the European Regional policy will be embedded in the territorial reality of the European Regions for the development of the Regional innovation strategies. Therefore, the new European development policy has tried to adopt the ‘place-based’ approach (Barca, 2009) in order to identify the specificities that each Region can utilize for a successful innovation process. This approach implies collaboration and sharing of information between local actors and all levels of government in order to enhance the ‘place-based’ factors which create knowledge and transform it in sustainable innovation. According to the most important literature in innovative systems, the territorial specificities, thus the so-called place-based approach, create the competitive advantages (Saxenian, 1994) of the Regional system. In particular in the European context there are different actors that need to be organized, from the Union that designed the Europe 2020 Agenda to the Member States which drafted the Partnership Agreements and finally the Regions which implement the RIS3 strategies within a local framework, as we will see further on the paragraph 1.3. Hence, the factor that determines the success of this innovation “macro” system is a good multi-level governance which can put these pieces together and work for the achievement of the innovation goals.

### Operation Programs of the Italian Regions within the RIS3 Scenario: Specificities and Innovative Cases

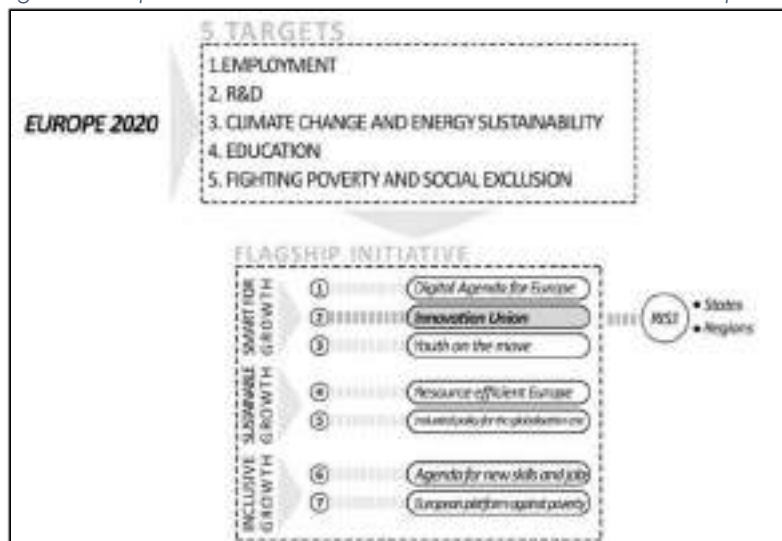
According to the regulatory framework given by the European Commission in 2010, any Member States and all European Regions have developed their Research and Innovation Strategies for Smart Specialisations (Ris3). In this part we focus on the reconstruction of this regulatory framework as well as the international and national initiatives taken to assist Regional government and local policy-makers in implementing the Ris3. Moreover, it is traced the development process of Regional Ris3 for all the Italian Regions and autonomous provinces

#### Normative European References

In 2010 the European Union has set a new growth strategy to handle the recent economic crisis and to strengthen the European economy by 2020. This strategy aims to promote smart, sustainable and inclusive growth (European Commission, 2010), and it involves all the Member States. The strategy has set five main objectives to achieve regarding different fields: improvement of employment, development of R&D, deal with climate change through the production of sustainable energy, rise of educational level and fight against poverty and social exclusion. Moreover, the European Commission

(EC) has identified seven areas called flagship initiatives that should support European and national administration for implementing their policy agendas.

Figure 2. Europe 2020 Structure. Source: Authors' elaboration from European Commission Data



The main fields addressed by the flagship initiatives concern: national economic performance, achievement of new opportunities for economic growth, innovation and competitiveness, limitation of environmental impacts of resource use and implementation of strategy to handle the climate change. Within the seven flagships initiative, the Innovation Union (IU) is the policy instrument regarding the area of Smart Growth that aims to accomplish research, technological development and innovation goals. Specifically, the initiative wants to pursue R&D and innovation policies focused on forthcoming issues such as climate change, efficient use of resources and energy, health and demographic change. However, the concept of innovation is more widely addressed as a vast concept encompassing not only new or improved products and processes, but also services, new marketing, branding and design methods and new forms of business organization and collaborative arrangements (COM (2010) 553). It is basically considered as an open structure that should include as many territorial actors as possible.

Figure 3. Regional Innovation Scoreboard. Source: Authors' elaboration from "Regional Innovation



Furthermore, IU is the main reference policy for the development of 'place-based' smart specializations, which identifies Regions as the main institutions capable to achieve these objectives by creating positive outlook for innovation, education and research. As a matter of fact, the (COM (2010) 553) "Regional Policy contributing to smart growth in Europe 2020"(1) shows Regional policy role in implementation of smart growth and innovation thanks to their closeness to Universities, Research and Technological centres, enterprises and other territorial stakeholders, intended as the most important subject of innovation process. At this regard, the EC had presented a preliminary study to introduce the Regional innovation performance level. Each European Region has been ranked depending on its innovation rate, in order to have a clear innovation scoreboard at the beginning of the Regional innovation process. In the Italian case, only three out of twenty Regions have been recognized as innovation followers, while the remaining Regions are identified as moderate innovators.

This is why, in 2010 the EC has invited states and Regions to make their own contribution to achieve the smart growth through the development of Research and Innovation Strategies for Smart Specialisation (RIS3), as an ex ante condition to access to the European Regional Development Fund (ERDF) and European Agricultural Fund for Rural Development (EAFRD), within the 2014-2020 European funds.

On one hand, the development of Smart Specialisation Strategies (S3) was designed to handle the resources in the most promising areas of each Regions, and to strengthen the existing Regional innovation systems, while on the other, it was conceived to exploit Regional diversity based on a place-based approach. However, both guidelines stress the "entrepreneurial discovery process" concept (Foray, David, Hall, 2009), as explained in the paragraph 1.1, that represents a crucial role in the implementation of S3 as a platform for dialogue between Regions, European Commission and local stakeholders in order to encourage a multi-level governance for integrated innovation policy.

In order to assist the development of RIS3, in 2011 the EC launched an online platform called "Smart Specialisation Platform" (S3P). According to the EC, one of the main tasks of the platform was to organize international workshops and meetings between Regions, exchanging knowledge and best practices during the implementation period. Furthermore, in March 2012, the EC released a "Guide to Research and Innovation Strategies for Smart Specialisation" in order to achieve a more successful implementation process, which highlights the importance of including representatives of industry, education and research institutions, and government, as well as the civic society (quadruple helix model)(2).

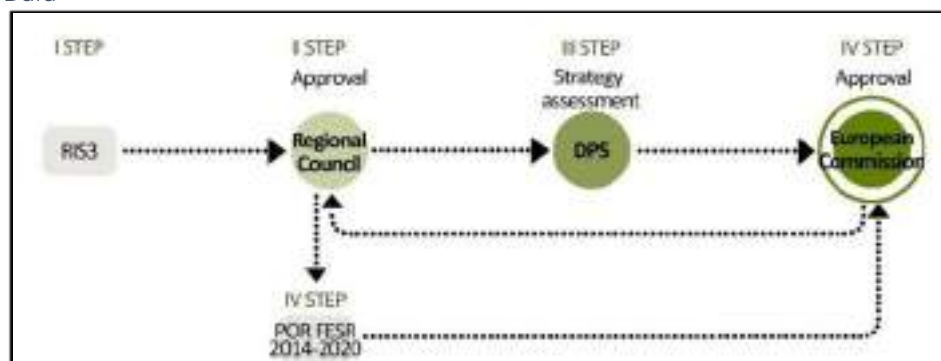
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(1) COM(2010)553 is European communication from the Commission to the European Parliament, the Council, the European economic and social Committee and the committee of the Regions

(2) European Commission, Guide to Research and Innovation Strategies for Smart Specialisation (RIS3), May 2012.

Regarding the strategy assessment and approval procedures by the EC, it is noteworthy to mention that the development of the Regional strategies has to respect a specific procedure. First of all, each RIS3 must have been approved by the Regional Council, consequently RIS3 should be sent to the national Department for Development and Economic Cohesion (DPS) which will provide an assessment of the completeness and coherence of the strategies, and lastly the same DPS will send the final paper of RIS3 directly to the European Commission. Once the European Commission approves the Regional strategy, the requirements are achieved to arrange Regional Operational Program and consequently handle structural EU Funds (Fig 4).

Figure 4. RIS3 Approval Process. Source: Authors' elaboration from "Regional Innovation Scoreboard 2014" Data



### The Cohesion Policy 2014-2020

The Cohesion Policy established 11 objectives to achieve through investments of European structural funding ERDF. Nevertheless, the most important issues concern the development of the field of research, technological development and innovation, ITC, SMEs competitiveness and lastly the transition towards a low emissions carbon economy.

In Italy these strategies have been implemented through the "Partnership Agreement" (PA) that was approved by the European Union in October 2014. This allowed the opening of the new cycle of European funding for the whole Italian Regions, with a specific priority to those that are less developed. Within the PA, Italy presented 11 national programs co-financed by ERDF and/or FSE, 2 national programs related specifically to rural development co-financed by **EAFRD** and 1 national program for the maritime sector co-financed by EMFF. Moreover, there has presented 21 Regional programs concerning specifically for rural development and 39 Regional programs for each Regional and autonomous province [C(2014) 8021 final]. Subsequently in this study we will discuss how many Regions have been able to get approved their operational programs within the ERDF funds.

Furthermore, the Department for Development Policies and Economic Cohesion (DPS), in accordance with the Ministry of Economic Development (MISE) and the Ministry of Education, University and Research (MIUR) has defined a project to help the Regional governments developing their own strategies, called 'Support to the definition and implementation of Regional research policies and innovation (Smart Specialisation

Strategy Regional)'. This project, regarding inward investments and enterprises' development, was carried out by a national agency called Invitalia, which has promoted workshops and meetings throughout the national territory. In 2014, Invitalia also drafted a document mapping the Regional specialisations based on qualitative and quantitative territorial surveys, which aim was to highlight the well-structured specialized area and their most promising development paths.

Overall, European Commission asked Member States and Regions to develop shared and participated strategies for research and innovation, based on concentration of resources in specific areas of specialisation. EC provided methodological framework through the Guide implementation, in order to facilitate policy-makers' work.

In the next paragraph we will seek to illustrate the state of the art of RIS3 implemented by the Regions on the basis of systematic collection and study of related documentation as provided by the institutional websites of each Region and by the European S3 online Platform

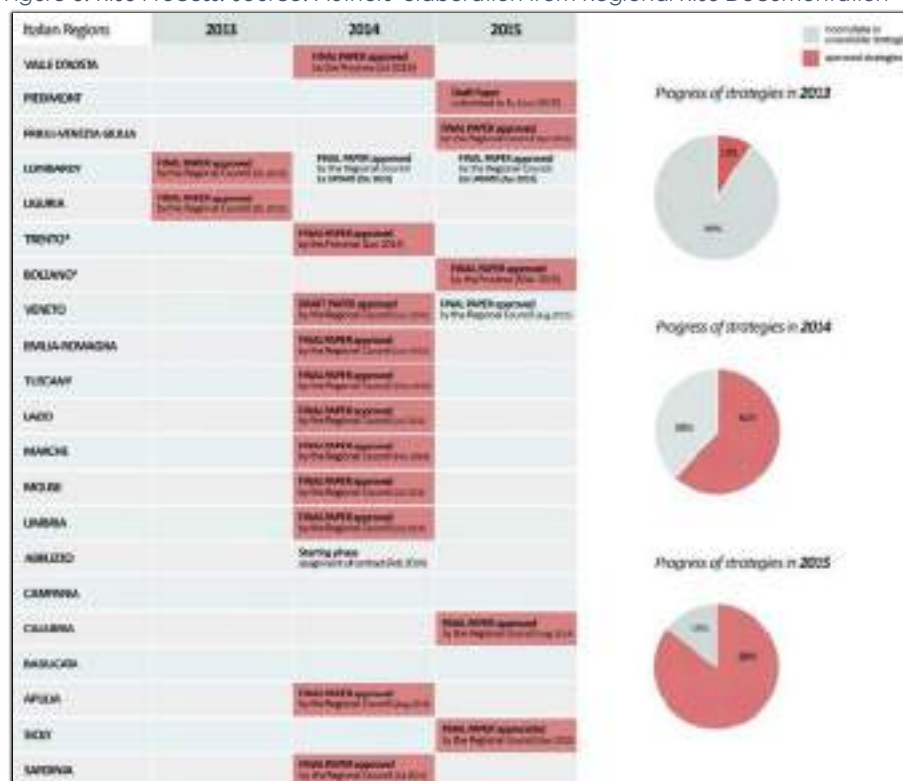
#### Regional Research and Innovation Strategies for Smart Specialisation (RIS3)

The analysis focuses firstly on monitoring the completion of RIS3 Regional strategies, which occurred during the first months of 2016, and their coherence with the European Guidelines. It was expected that all the Regions had already developed their own RIS3 strategies and that they had submitted their own Regional Operational Program (OP) to the EC in order to take advantage from the European Structural Funds. Nevertheless, what emerges from the study is that not all Regions have started on time the process of strategy development, and at the end of 2014, expiring date settled by the European Commission, only thirteen out of twenty-one Regions and autonomous provinces approved their RIS3 strategy<sup>(3)</sup>. It is noteworthy that all Regions and autonomous provinces, except for Abruzzo Region, have proceeded in joining the S3 Platform reporting their Regional specialisation areas (SA), even if only a few Regions participated actively in workshops and international meetings organized by the Platform. Further, the analysis was focused as well on highlighting different Regional SA catalogued by Regions in order to identify relevance and innovative case studies and to understand how Regions have received issues of Key Enabling Technologies (KETs) and Information and Communication Technologies (ICT).

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<sup>(3)</sup> Regions that were excluded from the qualitative analysis of documents were Campania, Abruzzo and Basilicata. Although the EC has adopted the ROP ERDF 2014-2020 for these three Regions, it has not been possible to find out their RIS3 documentation.

Figure 5. RIS3 Process. Source: Authors' elaboration from Regional RIS3 Documentation



As discussed above, in the points 1.3.1 and 1.3.2, the EC in collaboration with the national level has disclosed the operational framework, since 2010, in order to encourage Regions advancing in the implementation of RIS3. Therefore, it is important to stress that in 2013 only two Regions have been able to get approved their RIS3 by Regional Council (respectively Lombardy and Liguria), while in 2014 other eleven Regions and autonomous provinces completed and got approved by Regional Council their own strategy (Valle d'Aosta, Autonomous Province of Trento, Emilia Romagna, Tuscany, Lazio, Marche, Molise, Umbria, Apulia, Veneto, Sardinia) for a total of thirteen out of twenty Regions.

After all, in 2015 other five Regions completed the RIS3 (Piedmont, Friuli-Venezia Giulia, Autonomous Province of Bolzano, Calabria, Sicily) whereas three Regions still remain without an approval of a final document by Regional Council (Campania, Basilicata and Abruzzo) (fig.6). As evidenced by the graph, Lombardy and Veneto Regions have continued to develop their RIS3 even after the Regional Council approval because both intended the strategy as an evolving structure in which to implement possible changes due to Regional economic and social condition. However, Veneto approved firstly the draft version of the document to be sent to the European Commission and then it proceeded to draw up a final paper. Whereas, Lombardy has completed the final drafting of the document and after the EU approval it proceeded with the updates.

Furthermore, according to the graph, Abruzzo Region has started the drafting phase only in February 2014 through the assignment of a contract for the analysis of the

Regional context. Until now it has not been possible to find other documents attesting the state of the strategy.

The success in the RIS3 development has been also due to the participation of the Regions in the S3P, established in 2011. As shown by the graph below (fig. 6), all the Italian Regions and autonomous Provinces are registered to the platform (although some of them much later than others), while only eight out of twenty-one took part actively in organized events. These Regions have been involved in the general peer-review process taking part in international workshops and sharing knowledge about good practices.

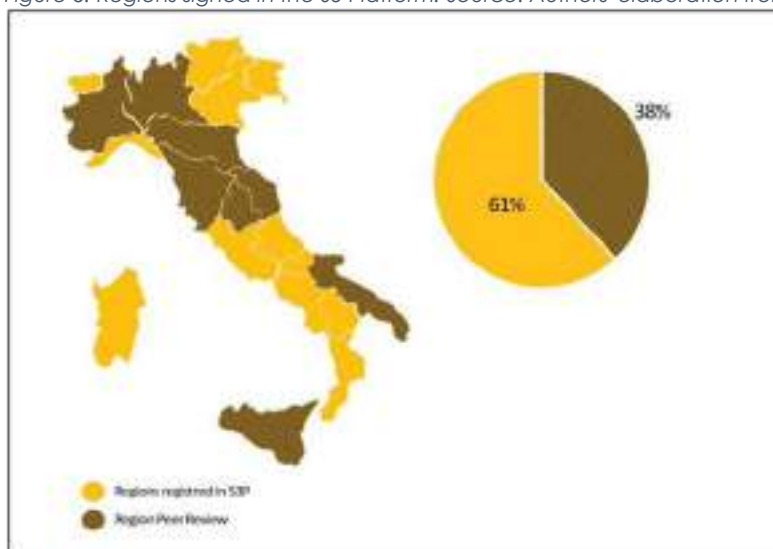
Moreover, in 2012 EU has elaborated and shared through the S3P the Guide to Research and Innovation Strategies for Smart Specialisations. The third part of the Guide shows six operating steps required to draw up the strategy, that are respectively:

1. Analysis of the Regional context and potential for innovation
2. Governance: ensuring participation and ownership
3. Elaboration of an overall vision for the future of the Region
4. Identification of priorities
5. Definition of coherent policy mix, roadmaps and action plan
6. Integration of monitoring and evaluation mechanisms.

Overall, analysing RIS3 documents as provided by Regions and autonomous provinces, almost all of them have followed the given structure and furthermore most of them have used the SWOT analysis to approach the study of the Regional context, as suggested by the guide.

According to the latter, the identification of Regional specialisation areas (SAs) would have been subject to the entrepreneurial discovery process, considered as a tool capable to reveal the best sectors of innovation thanks to the involvement of local actors. However, it has been difficult to trace the different phases of entrepreneurial discovery path within RIS3 documentations. Nevertheless, one of the most popular criteria used to involve enterprises related with innovation was to search among those who had previously taken part to calls concerning areas of research and innovation.

Figure 6. Regions signed in the S3 Platform. Source: Authors' elaboration from S3 Platform Data





Some other Regions used open meetings to attract new territorial businesses, while many others have benefited from the national process of technology clusters identification established by MIUR(4). The cluster identification initiative was launched by the Ministry with the purpose to provide a guidance for Regional the vision of the governments.

Figure 7. National Technological Clusters

National Technological Clusters	
1.	Intelligent Factories
2.	Green Chemistry
3.	Life Sciences
4.	Surface and Marine Mobility and Transport
5.	Agri-food
6.	Aerospace
7.	Smart Communities Technology
8.	Life Environment Technology

Therefore, were recognized eight Clusters as a **wide and inclusive network of Italian excellence** operating everywhere in Italy in technological areas, which are strategic for the national economic system (MIUR, 2013).

In the figure 8 is illustrated an overall view of SAs identified by each Region. Some Regions developed a greater number of SAs due to a more specific cataloguing of territorial potentialities. Some others have chosen to focus in less specialisation areas. However, European Commission doesn't specify how many areas had to be identified for each Region, neither a homogenous standard to name them in order to take into account each geographical, economic and social specificity.

In order to achieve a comparison between specialisation areas, we have merged specialisations of the same sector, with the same meaning but different name, by choosing the sector nomenclature with broader meaning as a reference to include all the others. Instead, sector nomenclatures with different nuances in meaning have been left individually. Acting in this way It was possible identify main fields of interest and specificities within Italian Regions. The table below shows the sector nomenclature selection (fig.8).

Analysing the Regional specialisation areas it is noteworthy that Italian Regions consider Agrifood, Culture, Creativity and Tourism, Life science and Green economy as sectors with high value for smart specialisation.

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(4) In 2012 the Ministry of Education, University and Research (MIUR) began the process of technology clusters identification in national territory.

Other specialisation areas with high relevance in the Italian Regions are the ICT, Mechatronic, Aerospace and Smart Manufacturing and related services. Moreover, there are several specialisation areas that are particularly related to Regional territorial characteristics, such as alpine activities in autonomous province of Bolzano and monitoring and prevention of natural risks in Calabria Region. This attitude could be interpreted as a way of better exploiting unique assets and capabilities based on the Region's distinctive industry structures and knowledge (RIS3 Guide, 2012).

Lastly, this study analyses the coherence between the implementation of the specialization areas with the Key Enabling Technologies (KETs). The concepts of Information and Communication Technology (ICT) and Key Enabling Technologies (KETs) have been prioritized linking with RIS3, because both represents powerful drivers for economic growth, innovation and increased productivity (RIS3 Guide, 2012). About ICT, Europe 2020 has sets up a dedicated initiative within the seven flagships, called Digital Agenda for Europe. However, at Regional level ICT was one of the most highlighted sectors within SAs. A total of seven Regions: Valle d'Aosta, Bolzano, Molise, Calabria, Basilicata and Sardinia have defined one or more specialized areas related to ITC. However, only Calabria has better specified the effective fields of these technological domains, defining the latter as ICT for cultural heritage and ICT for tourism.

Regarding the KETs, is important to mention that EC has defined six specific items for classified them:

- Micro/nanoelectronics
- Photonics
- Nanotechnology
- Industrial Biotechnology
- Advanced materials
- Advanced manufacturing systems

EC considers these six items as fundamental tools crucial for ensuring the competitiveness of European industries in the knowledge economy (EC, 2012). Nevertheless, most of them seem to be influenced by the endemic characteristics of Italian territories, historically characterized by small and medium-sized enterprises (SMEs) based on Made in Italy and Industrial districts as cornerstones of economic development (Becattini, 2000). Higher concentrations within specialized sectors such as Agrifood and Culture Creativity and Tourism seem to be an admonition of this trend. However, if we compare the SAs identified by Regions and their correspondence with KETs, as identified by S3P, we can note that sixteen out of twenty-one within Regions and autonomous provinces have determined one or more items related to European KETs (fig.10).

It is also noteworthy that within European KET, "Advanced manufacturing system" and "Advanced materials" have been mostly selected by Italian Regions. Only Tuscany Region focused on "Nanotechnology", "Photonics", while Sicily presented "Micro/nanoelectronics" as one of its specialisation areas. Furthermore, KETs that don't have a specific classification concern Marche Region for the item "Mechatronics" and Umbria and Molise Regions, both for the item Agrifood, sub-sector "Manufacture&industry" (fig.12).

Figure 8. Regional Specialisation Areas. Source: Authors' elaboration from S3 Platform Data and RIS3 Documentation

Regions	Specialisation Areas	European Priorities
<b>VALLE D'AOSTA</b>	<ol style="list-style-type: none"> <li>Public Wi-Fi networks, 5G/6G, broadband, public digital services, smart-grid technology for monitoring and safety, software (big) systems, smart cities, smart tourism, digital education</li> <li>Sector technologies relative to:                     <ol style="list-style-type: none"> <li>ICT</li> <li>Specialised production for excellence in tourism, such as equipment, clothing and accessories</li> <li>Energy (innovations of processes, applications and systems of sustainable energy management) and other, early-warning systems.</li> </ol> </li> </ol>	DIGITAL AGENDA, INTELLIGENT INFRASTRUCTURE & SUSTAINABLE URBAN AREAS, PUBLIC ADMINISTRATION, GREEN AGENDA, OPEN ACCESS & INNOVATION OF PUBLIC SECTOR INFORMATION, ICT, ADVANCED MATERIALS, SUSTAINABLE INNOVATION, SUSTAINABLE ENERGY & RESOURCES
<b>PIEMONTE</b>	<ol style="list-style-type: none"> <li>Made in</li> <li>Aerospace</li> <li>Green chemistry</li> <li>Mechatronic</li> <li>Biotechnology</li> <li>Automotive</li> </ol>	ICT, ADVANCED MATERIALS, AERONAUTICS/SPACE, ICT, ADVANCED MATERIALS, ICT, ADVANCED MATERIALS, PUBLIC HEALTH & SECURITY, ICT, ADVANCED MATERIALS, SUSTAINABLE INNOVATION
<b>FRIULI-VENEZIA GIULIA</b>	<ol style="list-style-type: none"> <li>Agri-food</li> <li>Maritime technologies</li> <li>Culture, creativity and tourism</li> <li>Smart health</li> <li>Smart manufacturing and related services</li> </ol>	BLUE ECONOMY, INFRASTRUCTURE & SMART GROWTH, DEVELOPMENT OF REGIONAL CULTURAL & CREATIVE INDUSTRIES, ICT, INDUSTRIAL INNOVATION/ICT, ADVANCED MATERIALS
<b>LIGURIA</b>	<ol style="list-style-type: none"> <li>Aeronautics and Space</li> <li>Sustainable Mobility</li> <li>Advanced Manufacturing</li> <li>Healthcare industry</li> <li>Cultural and Creative Industries</li> <li>Eco-industry</li> <li>Agriculture and food production</li> </ol>	AERONAUTICS/SPACE, AERONAUTICS & ENVIRONMENT, SUSTAINABLE INNOVATION, SMART GREEN & INTEGRATED TRANSPORT SYSTEMS, ICT, ADVANCED MANUFACTURING SYSTEMS, SOCIAL INNOVATION WITH REGARD TO HEALTH, WELL-BEING & LONGCARE, DEVELOPMENT OF REGIONAL CULTURAL & CREATIVE INDUSTRIES, SUSTAINABLE INNOVATION, SCI-INNOVATIONS
<b>EMILIA-ROMAGNA</b>	<ol style="list-style-type: none"> <li>Maritime technologies</li> <li>Health and life science</li> <li>Security and quality of life</li> </ol>	BLUE ECONOMY, PUBLIC HEALTH & SECURITY, PUBLIC HEALTH & SECURITY
<b>TRENTINO</b>	<ol style="list-style-type: none"> <li>Agri-food</li> <li>Quality of life: tourism, culture, green communities, education and well-being, digital transformation</li> <li>Mechatronics</li> <li>Green &amp; Ocean energy</li> </ol>	SUSTAINABLE INNOVATION, SUSTAINABLE URBAN AREA, PUBLIC HEALTH & SECURITY, PUBLIC HEALTH & WELL-BEING, ICT, ADVANCED MANUFACTURING SYSTEMS
<b>BOLZANO</b>	<ol style="list-style-type: none"> <li>Alpine activities: outdoor sport activities, technologies for mountain agriculture security in mountains, construction and mobility in mountains</li> <li>Agri-food processing</li> <li>Open data: (including 5G, IoT, e-learning, Digital marketing, e-tourism) smart mobility systems</li> <li>Creative industry: design, advertising, publishing, software and videogames</li> <li>Tourism, well-being, wellness</li> </ol>	DIGITAL AGENDA, CLEANER ENVIRONMENT & EFFICIENT ENERGY NETWORKS, SUSTAINABLE INNOVATION, BLUE ECONOMY, INFRASTRUCTURE & SMART GROWTH, DEVELOPMENT OF REGIONAL CULTURAL & CREATIVE INDUSTRIES
<b>VENETO</b>	<ol style="list-style-type: none"> <li>Sustainable Living</li> <li>Creative industries</li> <li>Smart Manufacturing</li> <li>Smart Agri-food</li> </ol>	ICT, INDUSTRIAL INNOVATION/ICT, ADVANCED MATERIALS, SUSTAINABLE INNOVATION, SCI-INNOVATIONS
<b>EMILIA-ROMAGNA</b>	<ol style="list-style-type: none"> <li>Agriculture/food production</li> <li>Energy efficient buildings</li> <li>Mechatronic</li> <li>Health &amp; well-being</li> <li>Creative sector</li> <li>Creative sector &amp; new-tech ecological</li> <li>Construction</li> </ol>	SUSTAINABLE INNOVATION, SUSTAINABLE ENERGY & RESOURCES, ICT, ADVANCED MANUFACTURING SYSTEMS, PUBLIC HEALTH & SECURITY, PUBLIC HEALTH & WELL-BEING, CULTURE & CREATIVE INDUSTRIES
<b>TOSCANY</b>	<ol style="list-style-type: none"> <li>Physics</li> <li>Advanced manufacturing</li> <li>Nanotechnology</li> </ol>	CULTURE & CREATIVE INDUSTRIES, CULTURE & CREATIVE INDUSTRIES, ICT, PHOTONICS, ICT, ADVANCED MANUFACTURING SYSTEMS
<b>LAZIO</b>	<ol style="list-style-type: none"> <li>Creative industry</li> <li>Green Economy: green is a sector important for several aspects, ranging from tourism to energy generation</li> <li>Life sciences</li> <li>Aerospace</li> <li>Safety &amp; Security: transport is a very important part of citizens security, especially in the context of public security, fire</li> <li>Agri-food: it is a sector with high-tech (e.g. biotechnology) and low-tech industries (e.g. tourism)</li> <li>Cultural heritage and technologies for culture</li> </ol>	SUSTAINABLE INNOVATION, ICT-INNOVATIONS, PUBLIC HEALTH & SECURITY, PUBLIC HEALTH & WELL-BEING, AERONAUTICS & SPACE, AERONAUTICS, AERONAUTICS & SPACE, SAFETY & SECURITY, CULTURE & CREATIVE INDUSTRIES
<b>MARCHE</b>	<ol style="list-style-type: none"> <li>ICT</li> <li>Mechatronic</li> <li>Health &amp; well-being</li> <li>Technical for non-appliance/biotech/home automation</li> <li>Sustainable manufacturing new materials (new polymers, ceramics, etc.)</li> </ol>	DIGITAL AGENDA, ICT, AERONAUTICS, PUBLIC HEALTH & SECURITY, PUBLIC HEALTH & WELL-BEING, DIGITAL AGENDA, ICT, ADVANCED MATERIALS

<b>MOLISE</b>	<ol style="list-style-type: none"> <li>1. Agrifood</li> <li>2. Construction</li> <li>3. Cultural, creative and fashion industries</li> <li>4. Information and communication technologies</li> <li>5. Life sciences</li> <li>6. Sustainable tourism</li> </ol>	<p>ITEL, INDUSTRIAL BIOTECHNOLOGY</p> <p>SUSTAINABLE INNOVATION, ECO-INNOVATIONS</p> <p>CULTURAL &amp; CREATIVE INDUSTRIES SUPPORT TOURISM, CULTURAL &amp; CREATIVE TOURISM, RURAL TOURISM, RURAL INDUSTRIES</p> <p>DRUGS, MEDICAL DEVICES, BIOTECHNOLOGY, COOPERATIVE RURAL AGRI-FOOD</p> <p>PUBLIC HEALTH &amp; SECURITY, PUBLIC HEALTH &amp; WELL-BEING</p> <p>SUSTAINABLE INNOVATION, ECO-INNOVATIONS</p>
<b>UMBRIA</b>	<ol style="list-style-type: none"> <li>1. Green chemistry</li> <li>2. Solar energy</li> <li>3. Agrifood</li> <li>4. Aerospace</li> </ol>	<p>SUSTAINABLE INNOVATION</p> <p>SUSTAINABLE INNOVATION, SUSTAINABLE ENERGY &amp; RENEWABLES</p> <p>ITEL, INDUSTRIAL BIOTECHNOLOGY</p> <p>AERONAUTICS &amp; SPACE</p>
<b>ABRUZZO</b>	NOT AVAILABLE	NOT AVAILABLE
<b>CAMPANIA</b>	<ol style="list-style-type: none"> <li>1. Aerospace</li> <li>2. Smart Communities</li> <li>3. Sustainable energy</li> <li>4. Nanotechnology &amp; new materials</li> <li>5. Agriculture/food production</li> <li>6. Transport &amp; logistic</li> </ol>	<p>AERONAUTICS</p> <p>SMART INNOVATION, NEW ORGANIZATIONAL MODELS, ORGANIZATIONAL MODELS</p> <p>SUSTAINABLE INNOVATION, SUSTAINABLE ENERGY &amp; RENEWABLES</p> <p>ITEL, ADVANCED MANUFACTURING SYSTEMS</p> <p>PUBLIC HEALTH &amp; SECURITY, FOOD SECURITY &amp; SAFETY</p> <p>SPRING LOCAL POLICY PRIORITY</p>
<b>CALABRIA</b>	<ol style="list-style-type: none"> <li>1. Green building, energy saving, new construction materials</li> <li>2. Life science, diagnostics, bio-fermentation</li> <li>3. Monitoring and prevention of natural risks</li> <li>4. ICT for cultural heritage</li> <li>5. ICT for tourism</li> <li>6. Food security, environmental sustainability of agro-food products</li> <li>7. Trans-shipment and inter-modality logistics</li> </ol>	<p>SUSTAINABLE INNOVATION, ECO-INNOVATIONS</p> <p>PUBLIC HEALTH &amp; SECURITY, PUBLIC HEALTH &amp; WELL-BEING</p> <p>PUBLIC HEALTH &amp; SECURITY</p> <p>CULTURAL &amp; CREATIVE INDUSTRIES</p> <p>SMART INNOVATION</p> <p>PUBLIC HEALTH &amp; SECURITY, FOOD SECURITY &amp; SAFETY</p> <p>BLUE GROWTH, TRANSPORT &amp; LOGISTICS (INCL. HIGHWAYS OF THE SEA)</p>
<b>BASILICATA</b>	<ol style="list-style-type: none"> <li>1. Aerospace</li> <li>2. Automotive</li> <li>3. Bio Economic</li> <li>4. Energy</li> <li>5. Cultural and creative industries</li> <li>6. Digital agenda and ET</li> </ol>	<p>SUSTAINABLE INNOVATION, SUSTAINABLE ENERGY &amp; RENEWABLES</p> <p>ITEL, ADVANCED MANUFACTURING SYSTEMS</p> <p>CULTURAL &amp; CREATIVE INDUSTRIES</p> <p>SUSTAINABLE INNOVATION</p> <p>SPRING LOCAL POLICY PRIORITY</p>
<b>APULIA</b>	<ol style="list-style-type: none"> <li>1. Blue and green economy</li> <li>2. Sustainable energy</li> <li>3. Tourism and heritage</li> <li>4. Mechatronics</li> <li>5. Advanced manufacturing</li> <li>6. New materials</li> <li>7. Life science and biotechnology</li> <li>8. Biomedicine</li> <li>9. Aerospace</li> <li>10. Agriculture and food production</li> <li>11. Cultural &amp; creative industries</li> </ol>	<p>BLUE GROWTH, FISHERIES</p> <p>SUSTAINABLE INNOVATION, SUSTAINABLE ENERGY &amp; RENEWABLES</p> <p>DEVELOPMENT OF REGIONAL CULTURAL &amp; CREATIVE INDUSTRIES</p> <p>ITEL, ADVANCED MANUFACTURING SYSTEMS</p> <p>ITEL, ADVANCED MANUFACTURING SYSTEMS</p> <p>ITEL, ADVANCED MANUFACTURING SYSTEMS</p> <p>ITEL, ADVANCED MANUFACTURING SYSTEMS</p> <p>PUBLIC HEALTH &amp; SECURITY, PUBLIC HEALTH &amp; WELL-BEING</p> <p>AERONAUTICS &amp; SPACE</p> <p>DEVELOPMENT OF REGIONAL CULTURAL &amp; CREATIVE INDUSTRIES</p>
<b>SICILY</b>	<ol style="list-style-type: none"> <li>1. Nano &amp; micro systems/electronics</li> <li>2. Biotechnology &amp; Health sciences</li> <li>3. Sustainable energy systems</li> <li>4. Tourism</li> <li>5. Agri-food</li> <li>6. Sea (bio resources and market technologies)</li> </ol>	<p>ITEL, MICRO/NANO-ELECTRONICS</p> <p>ITEL, INDUSTRIAL BIOTECHNOLOGY</p> <p>SUSTAINABLE INNOVATION, SUSTAINABLE ENERGY &amp; RENEWABLES</p> <p>CULTURAL &amp; CREATIVE INDUSTRIES</p> <p>ITEL, INDUSTRIAL BIOTECHNOLOGY</p> <p>BLUE GROWTH</p> <p>SMART INNOVATION</p>
<b>SARDEGNA</b>	<ol style="list-style-type: none"> <li>1. ICT (Smart Communities)</li> <li>2. Tourism and environmental and cultural heritage</li> <li>3. Energy</li> <li>4. Agrifood</li> <li>5. Biomedicine/ Life Sciences</li> <li>6. Aerospace</li> <li>7. Bio economy</li> </ol>	<p>ITEL, ADVANCED MANUFACTURING SYSTEMS</p> <p>CULTURAL &amp; CREATIVE INDUSTRIES</p> <p>PUBLIC HEALTH &amp; SECURITY, PUBLIC HEALTH &amp; WELL-BEING</p> <p>AERONAUTICS &amp; SPACE</p>

Figure 9. Items merging from Regional Specialisation Areas. Source: Authors' Elaboration from S3 Platform Data and RIS3 Documentation

Electronics							
Green economy	Low energy	Sustainable energy	Resource efficiency	Energy	Environment	Ecology	Smart economy
Intelligent Mobility	Autonomous mobility	Smart & Safe	Intelligent and low mobility				
Ecosystems, Environment and Urban	Environmental sustainability						
Made in	Advanced Areas						
Green chemistry							
Automotive							
AgriFood	Agriculture and food production	Applied processing	Smart agriFood	Agricultural food and innovation	Multi-dimensional agricultural systems	Agripreneur	
Maritime Technologies	Highly innovative activities						
Culture, creativity and tourism	EU Fund, Creative Industries	Regional Area	Health and well-being	Smart health	Connectivity and New Technologies	EU Fund, Creative Industries	Sustainable Tourism
Life Science	Health and well-being	Health and well-being	Health and well-being	Smart health	Connectivity and New Technologies	EU Fund, Creative Industries	Sustainable Tourism
Smart manufacturing and related services	Technical manufacturing	Technical manufacturing	High technology				
Security and quality of life	Safety & security						
Made in							
Sustainable living							
Energy efficient building							
Construction	Building						
Artistic							
Nanotechnology							
ICT	Applied digital and ICT	Information and communication technologies	Information and communication technologies	Specialised	Micro and nanotechnology		
Electrical home appliance							
Monitoring and prevention of natural risk							

Figure 10. Main Regional Specialisation Areas. Source: Authors' elaboration from S3 Platform Data and RIS3 Documentation

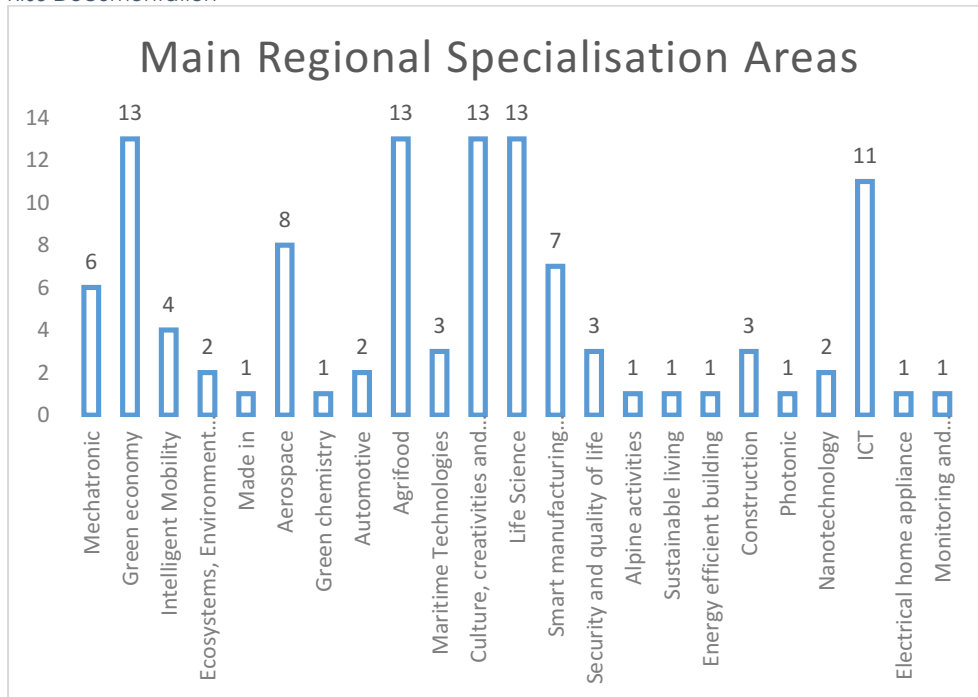
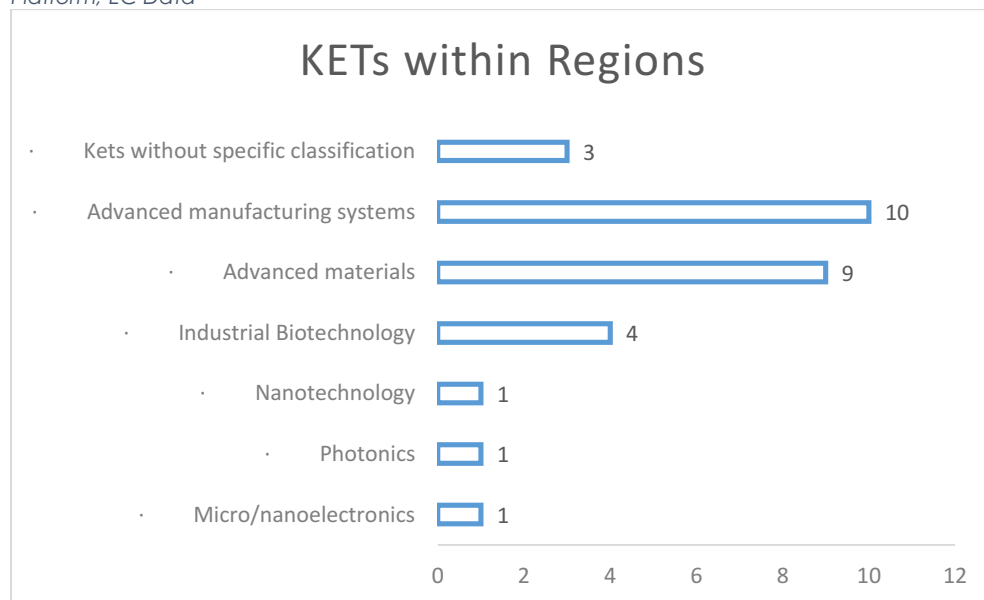


Figure 11. Main Regional Specialisation Areas. Source: Authors' elaboration from S3 Platform Data and RIS3 Documentation

Regions	Specialisation Areas related with KETs	European KETs
VALLE D'AOSSA	Specialised production for an excellent mountain, such as equipment, clothing and new materials	KE1, ADVANCED MATERIALS
PIEMONTE	Made in Green chemistry Mechatronic Automotive	KE1, ADVANCED MATERIALS KE1, ADVANCED MATERIALS KE1, ADVANCED MATERIALS KE1, ADVANCED MATERIALS
FRIULI-VENEZIA GIULIA	Smart health Smart manufacturing and related services	KE1, INDUSTRIAL BIOTECHNOLOGY KE1, ADVANCED MATERIALS
LOMBARDY	Advanced Manufacturing	KE1, ADVANCED MANUFACTURING SYSTEMS
LOMBARDY		
TRENTO*	Mechatronics	KE1, ADVANCED MANUFACTURING SYSTEMS
BOZIANO*	Creative industry: design, advertising, publishing, software and videogames Tourism, well-being, wellness	KE1, INDUSTRIAL BIOTECHNOLOGY KE1, ADVANCED MATERIALS
VENETO	Smart Manufacturing	KE1, ADVANCED MANUFACTURING SYSTEMS
EMILIA-ROMAGNA	Mechatronics	KE1, ADVANCED MANUFACTURING SYSTEMS
TUSCANY	Photonics Advanced manufacturing Nanotechnology	KE1, PHOTONICS KE1, ADVANCED MANUFACTURING SYSTEMS KE1, NANOTECHNOLOGY
LAZIO		
MARCHE	Medatronics Sustainable manufacturing (new materials, new industry/business etc.)	KE1 KE1, ADVANCED MATERIALS
MOISE	Agri-food Sub sector: Manufacturing & industry	KE1
LIGURIA	Agri-food Sub sector: Manufacturing & industry	KE1
ABRUZZO		
CAMPANIA	Nanotechnology & new materials	KE1, ADVANCED MATERIALS
CALABRIA		
BASILICATA	Bio-Economic	KE1, ADVANCED MANUFACTURING SYSTEMS
APULIA	Mechatronics Advanced manufacturing New materials	KE1, ADVANCED MANUFACTURING SYSTEMS KE1, ADVANCED MANUFACTURING SYSTEMS KE1, ADVANCED MANUFACTURING SYSTEMS
SICILY	Life science and biotechnology Nano & microsystems/electronics Biotechnologies & Health Sciences Agri-food Sub sector: Manufacturing & industry	KE1, ADVANCED MANUFACTURING SYSTEMS KE1, MICRO/NANO-ELECTRONICS KE1, INDUSTRIAL BIOTECHNOLOGY KE1, INDUSTRIAL BIOTECHNOLOGY
SARDEGNA		

\* Autonomous provinces

Figure 12. KETs within Regions. Source: Authors' elaboration from Regional RIS3 Documentation, S3 Platform, EC Data



### Clusters in the Economic Geography: some Milestones

Clusters have become a key concept in a variety of research fields and policy-makers have long made their way to seize on this notion as a tool for promoting Regional growth and competitiveness. After a brief outline of the development of the concept of cluster in economic geography, along with some methodological cautions (§ 2.1.1), the work will survey some of the main contributions made by the Evolutionary Economic Geography in cluster theory.

#### The theoretical and Methodological Framework of "cluster": an undergoing process

Early theorisations of the concept of "cluster" date back to Marshall's seminal contribution *Principles of Economics* (1920) and massively derive from his notion of external economies of scale, i.e. those micro-economic benefits arising from the location in an area that is home to many similar or interconnected firms, and provided by a local pool of specialised knowledge, labour and suppliers (cf. Box 2).

#### **BOX 2 - MARSHALL'S LOCALIZATION ECONOMIES**

They mainly refer to four elements (Marshall, 1920):

- Development of a pool of skilled workers (*labour pooling*);
- Development of firms specializing in the provision of certain services or specific products (*specialization*);
- Development of interdependencies among firms (*social division of labour*);
- "Industrial atmosphere"

Challenging the dominant narrative of *internal economies of scale* as main sources of specialisation advantages, the later-known "Marshallian economies" basically entail

that a firm can remain small and still capable to be highly specialised and competitive, as far as it interweaves with other firms an extensive network of direct and indirect intra-industry relationships, this condition representing a first baseline for the identification of the *functional* structure of a cluster (Bathelt et al, 2004).

Despite their potential, Marshall's speculations have long struggled to find their way within the mainstream economic theory. A resurgence of the idea of *industrial district*, originally formulated by Marshall with reference to the metals industry in Sheffield and South Yorkshire in the UK (Potter and Watts, 2011), occurred on a pervasive scale only many decades later, when scholars started taking a renewed interest in the dynamics occurring within Regional agglomerations of SMEs and (re)discovered the "flexible specialisation" as a promising alternative of the declining Fordist organisation of work (Brusco and Sabel, 1981; Piore and Sabel, 1984). Nevertheless, the flourishing of industrial districts, as repeatedly stressed in the literature (*ibidem*; Schmitz, 1989), was not a residual phenomenon stemming from the crisis of large corporations but, rather, the result of an emergent model of production that was more responsive to the market uncertainty and the social backlashes charactering the post-Fordism transition in the 70's (Bignante et al., 2014). Indeed, many Regions in central-northern Italy, the so-called "Third Italy" (Bagnasco, 1977), were traditionally home to a large variety of local socio-economic systems characterised by "the active presence of both a community of people and a population of firms in one naturally and historically bounded area" (Becattini, 1989).

And, specifically, the identification of a local community of actors prone to "channel the competitive pressure towards permanent innovation" (Schmitz, 1989, p. 18) was undoubtedly one of the most relevant features of the industrial districts, especially for the Italian case, and substantially contributed in paving the way for a more systemic and policy-friendly definition of cluster (Das and Panayiotopoulos, 1996).

Particularly thanks to Porter's works in the early 90's (Porter, 1990), cluster theory went through a more structured systematisation. Porter mapped the clusters of successful industries in several leading industrial economies, examining the dynamic process by which their competitive advantage was created. His analysis delivered the well-known "diamond model", that ascribes competitiveness to four principal factors: (1) firm strategy, structure and rivalry, (2) factors conditions, (3) demand conditions and (4) related industries (cf. Fig. 14).

Figure 13. Porter's Diamond Model. Source: Porter: 1990





While further considerations about Porter's theoretical and methodological framework can be found in Chapter 3 (§ 3.1.1), some of the Porter's undoubted contributions to agglomeration and cluster theory will be outlined here.

### **BOX 3**

#### **DEFINITION OF CLUSTER BY PORTER (1996)**

*“Clusters are geographic concentrations of interconnected companies, specialised suppliers, service producers, firms in related industries, and associated institutions (for example, universities, standard agencies, and trade associations) in particular fields that compete but also cooperate. Critical masses of unusual competitive success in particular business areas, clusters are a striking feature of virtually every national, state, and even metropolitan economy, especially those of more economically advanced nations” (Porter 1996, p. 197)*

Firstly, he emphasised the critical duality between *collaboration and rivalry*, which concurrently create pressure to innovate and upgrade competitiveness in the system. Secondly, his general definition of cluster (cf. Box 3) allows encompassing a broader range of Regional agglomerations, beyond the traditional Marshallian industrial district (Markusen, 1996, cf. Box 4). Finally, and most notably, Porter has “not only promoted the idea of ‘clusters’ as an analytical concept, but also as a key policy tool” (Martin and Sunley, 2003), by explicitly including policy-makers as key actors in fostering local economies.

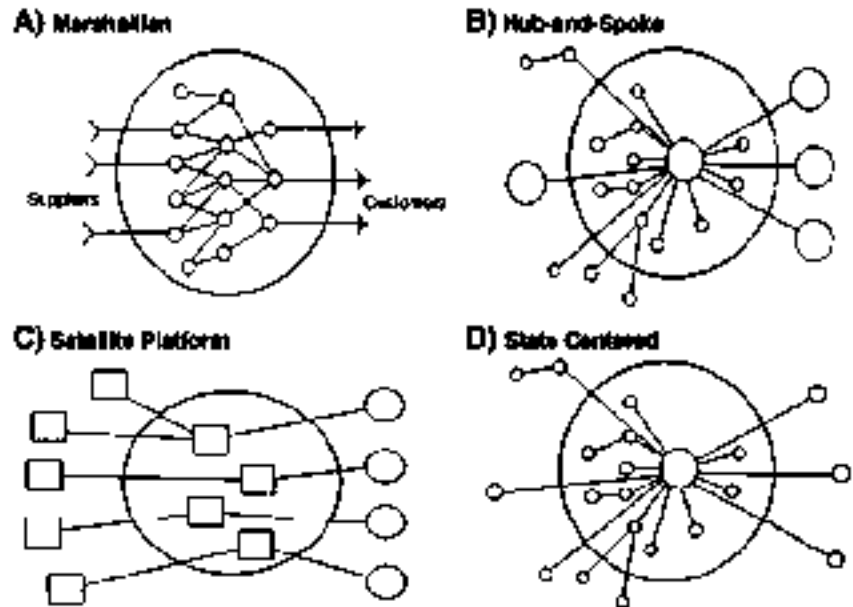
Eventually, in a first attempt to draw some regularities about the rationales of clusters spotted in the literature, two core elements can be identified:

- 1) Clusters are characterised by the interconnection of firms and associated institutions, linked by commonalities and complementarities (ibidem). These links are both vertical (supply chain) and horizontal (pooling of material and immaterial resources), as well as they involve the creation of social and knowledge networks that produce micro-economic (though hardly quantifiable) benefits for the firms involved.

## BOX 4

Figure 14. Markusen (2005)

### TYPOLOGIES OF CLUSTERS (MARKUSEN, 1996)



A) **Marshallian district** is formed of small, locally owned firms that make investment and production decisions locally. Within the district, substantial trade is transacted between buyers and sellers, often based on long-term contracts, whereas linkages with firm outside the district are assumed to be minimal. Available to each firm form its special conjunction with other firms in the same area.

B) **Hub-and-spoke district** emerges when a number of key firms acts as hubs to the Regional economy, with suppliers and related activities spread out around them. It may exhibit either a strongly linked form, where smaller firms are quite dependent upon the larger ones, or a weaker form, in which small firms enjoy the external economies of the larger organizations' presence.

C) **Satellite platform district** is a congregation of branch facilities of firms whose headquarters are situated outside the Region. Often these branches are assembled in peripheral areas by national government as a way of stimulating Regional development. In satellite platforms, large firms, situated outside the area, dominate business structure and make the key investment decision; there's minimal intradistrict trade or even conversation.

D) **State-centered district** emerges where a public or non-profit organization (military base, university, etc.) is the key anchor in the district. The local business structure is dominated by the presence of such facilities, which have been located by central government or local institutions.

2) Clusters are geographically and spatially defined entities, constituted by groups of interlinked companies. Location economies arise from co-location and the interactions occurring between proximate firms.

However, clear boundaries, both industrial and geographical, are still lacking in cluster definitions (§ 3.1.1). As remarked by Martin and Sunley (2003, p. 20), "there is no agreed method for identifying and mapping clusters, either in terms of the key variables that

should be measured or the procedure by which the geographical boundaries of clusters should be determined". These procedures vary considerably, in consideration of four elements:

- I. Conceptual/definitional depth;
- II. Empirical methodology;
- III. Ease of measurement
- IV. Empirical support.

As summarised in Fig. 14, the Cluster Measurement Problem involves an irreducible gap between, on one hand, top-down and easily measurable methods based on co-location data and technological proximity of firms, and, on the other hand, bottom-up approaches that investigate informal knowledge spillovers and collaboration patterns among firms mostly employing qualitative and hardly comparable methodologies. Indeed, one of the most relevant shortcomings of cluster analyses is find a proper way to measure inter-firms knowledge exchanges, thus leading to a systematic neglecting of their role in the mainstream economic theory ("Knowledge flows are invisible, they leave no paper trail by which they may be measured and tracked" Krugman, 1991, p. 53). Therefore, a mixed methodology that associates quantitative, large scale analyses and a narrower, qualitative assessments of clusters is probably the most viable approach to correctly identify clusters' industrial and geographical boundaries and to set up a systematic empirical framework

Figure 15. The Cluster Measurement Problem. Source: MArtin and Sunley (2003: 19) adapted by Swann (2002)

Cluster concept:	Conceptual/ definitional depth	Empirical methodology	Ease of measurement	Empirical support
Co-location	Shallow	Top-down	Easy to measure (quantitative)	Indirect evidence
Co-location and technological proximity	↓	↓	↓	↓
Input-output table and complementarities				
Co-location and superior performance				
Marshallian externalities				
Network firms				
Explicit collaboration				
Informal knowledge spillovers				

### The Evolutionary turn in cluster theory

The Evolutionary Economic Geography (hereinafter, EEG), from its start, has substantially contributed to the understanding of industrial clusters, by challenging the dominant Marshallian thinking about the role of localisation economies for the emergence and the evolution of clusters. Indeed, as repeatedly stress in this literature (Sorenson and Audia, 2000; Aldrich and Fiol, 1994; Maggioni, 2002; Wenting and Frenken, 2011), clusters can emerge *despite* the absence of localisation economies. Starting from the assumption that firms differ from each other due to firm-specific routines (Nelson and Winter, 1982), "spinoff firms inherit superior capabilities from successful parents from the same or related industries and, therefore, tend to outperform other types of entrants"

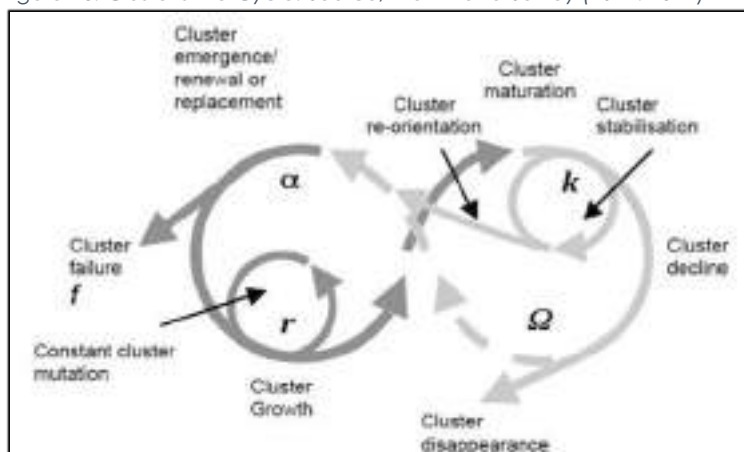
(Boschma and Frenken, 2015). Since spinoff firms usually locate close to founder's home Region and do not easily relocate (Stam, 2007; Dahl and Sorenson, 2012), a cluster could emerge as the outcome of a self-reinforcing process of industrial branching and local entry, rather than emerging from the attraction of outsiders in the Region thanks to the presence of localisation economies. On a brighter note, Marshallian externalities (by means of intra-industries linkages), as well as not playing a decisive role in the creation of clusters, can also determine a negative effect on the survival of firms within a cluster. More specifically, they are likely to harm well-performing firms, whose knowledge-based competitive advantage can be jeopardised by the interaction with other firms, while small and young firms can benefit from intra-industry exchanges as a mean to compensate for their weak internal capabilities (Rigby and Brown, 2015).

Moreover, two other main contributions to cluster theory provided by EEG deserve to be mentioned here:

1. The cluster-life cycle;
2. The dynamics of knowledge and innovation networks.

The "cluster life cycle" is a major branch in the EEG literature that studies the evolution of clusters over time, in particular "the endogenous dynamics that may turn successful clusters into declining ones" (Boschma and Frenken, 2015, p. 4; see also Pouder and St. John, 1996; Brenner, 2004; Iammarino and McCann, 2006; Belussi and Sedita, 2009). As summarised in Fig. 15, as the cluster evolves, the heterogeneity of firms' capabilities initially increase but subsequently decreases, due to processes of competition and assimilation (Rigby and Essletzbichler 1997; Vicente and Suire 2007), thus leading to a progressive loss of recombinant potential and incumbent cognitive lock-ins (Grabher, 1993). However, declining clusters can overcome lock-ins "by upgrading its knowledge base through inflow of new knowledge from outside the cluster ('adaptation'), by integrating various local knowledge bases ('renewal'), or by diversifying into new activities while building on the local knowledge base ('transformation')" (Boschma and Frenken, 2015, p. 4).

Figure 16. Cluster's Life Cycle. Source; Martin and Sunley (2011: 1312)



Eventually, the implementation of network theory within the EEG theoretical framework allowed addressing how ties between firms are created or disrupted in a cluster and which variables can interfere in network dynamics. First, knowledge is not "in the air", as theorised by Marshall (1920), but is actually channelled in specific networks and it is not freely available to any firm locating in the cluster (Giuliani and Bell, 2005).

Secondly, different kinds of “proximities” (Boschma, 2005, cf. § 1.2.2) actually catalyse the potential interaction between the actors involved. Finally, network relations tend to become more inward-looking over time, whereas non-local linkages are pivotal to foster the competitiveness of cluster firms by bridging together different sources of knowledge and competitive advantages (Ter Wal and Boschma, 2011).

## New Trends: The Revolution of “Industry 4.0” and the Smart Land concept

Territorially interconnected clusters and their acclaimed capacity in becoming always innovative by utilizing advanced technologies have evolved in new types of embedded systems highly interconnected with each other in global networks. This is the reason why it is of great interest in this second part to analyse the highly interconnected smart systems, the so called “*Industrie 4.0*”, and the territorial approach within the evolution of the *smart city* to *smart land*.

### The Interconnection of Smart Systems: “Industry 4.0”

In order to support the goals of the “Europe 2020” Strategy the German government approved, in 2012, the “High-Tech Strategy 2020 Action Plan” with the aim to achieve the innovation policy targets. The Strategy identifies 10 projects with a focus on academia, research institutions and industry. One of the projects is “*Industrie 4.0*”, an innovation initiative whose goal is to foster the competitiveness, in a wider European context, of the high-tech manufacturing sector, concentrating in particular on small and medium enterprises (EC, 2013).

*Industrie 4.0* is considered the fourth industrial revolution because it is grounded on the Cyber-Physical Systems (CPS) technologies, developed by the research and evolution of the so called Internet of Things. The latter concerns a technological evolution toward a smarter world where devices will be able to communicate and exchange information on online networks thanks to “increased programmability, memory storage capacity, and sensor-based capabilities”<sup>(5)</sup> (GTAI). Indeed, at this point the digital level, as well as the data processing, and the physical objects become difficult to separate because they will be interconnected, virtually integrated and simulated (Drath and Horch, 2014). Therefore, the industrial production of the future is organized in smart factories equipped with new technologies, digitalized production and automaton systems which can be autonomously controlled. This new style of factory is based on embedded systems technologies for production, which integrate production facilities, logistics, and even social organisation to establish “the global value creation networks” (Wang et al., 2015)

This transformation of the production system is realized as a consequence of the need to strengthen the manufacturing industry and maintain the dominance in the global supply chain by the most developed countries. Moreover, in an international and competitive business environment, firms face different challenges regarding the improvement of their productivity, the production organisation, the decision-making process and the management of big quantities of data due to the lack of smart

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<sup>(5)</sup> GTAI, *Germany Trade & Invest* is the economic development agency of the Federal Republic of Germany. The agency promotes Germany as a business and technology location and supports companies based in the country with global market information ([www.gtai.de](http://www.gtai.de))

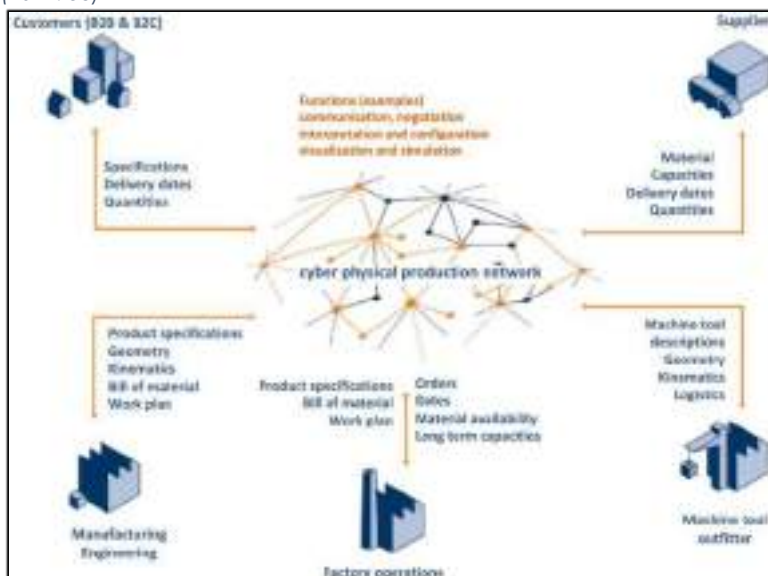
analytical tools (Lee et al., 2014). Accordingly, Industrie 4.0 is characterized by a change in conditions of the operative framework (Lasi et al., 2014).

As far as productivity improvement is concerned, the key element for the fourth industrial revolution is the high innovation capability of firms in order to increase mechanization and automation of the production process in support of physical work (Schuh et al., 2015). The computerization of production is related to high-tech dispositive, analytical components and versatile operational automaton which constitute autonomous units, controlled independently optimizing the manufacturing process.

With regard to production organisation and decision-making process, they are crucial in order to shorten the development periods of products. In order to reach the purpose, data have to be collected in real time, on one hand Industrie 4.0 is affected by an increase in flexibility of the production system while on the other hand it consists in decentralizing the centre of power, reducing the organizational hierarchies and encouraging self-organization so that the decision-making process can become faster. Nevertheless, increasing collaboration between departments at all levels leads to an increase in firms' competitiveness (Lee et al., 2014).

The key of sustainable innovation within the Industrie 4.0 factory is the processing of big data into useful information. Digitalization is the real revolution in terms of innovative technologies because it is the key element in supporting the function of control and analysis relying on the process of registration of an increasing amount of data. We are experiencing now a completely digitalized environment because the increased networking of technical devices produces progressively digitalized goods and services, consequently generating extended digitalization and stimulating continuously for new technologies. As a result, firms will produce smart and innovative services and products which will have individual characteristics in order to fulfil different human needs. This will, as it has already, contribute in the creation of new forms of work and work organisation. "It is likely that, over time, companies, political parties and other established institutions will increasingly be complemented by projects as a more flexible form of organization" (Helbing, 2014, pg. 14).

Figure 17. Interdependencies of Supply Chain in the context of "Industrie 4.0". Source: Geisberg and Bray (2012: 56)



Hence, vertical and horizontal integration are essential in the production organisation of the smart factory system. On one hand, vertical integration of smart technology and digitalized subsystems constitutes a self-organised system that can be dynamically adapted, as a matter of fact it gave birth to the smart factory (Brettel et al., 2014). As follows, the latter is fundamental for the development of collaborations with consumers, manufacturing, logistic, design departments and universities in order to create the global network.

On the other hand, since *Industrie 4.0* is grounded on Small and Medium Enterprises, which have limited resources to spend in R&D, thus innovation and new technologies, collaboration between firms and creation of a network is worthy in order to reduce the risks derived by market volatility and the shortened product lifecycle in a context where production is a brand new process, based on “*horizontally connected dispersed value networks*” (Hermann et al., 2015).

### Territorial Approaches to Smart Application: The Smart Land

The concept of Smart Land evolved from the meaning of Smart City by broadening its physical and theoretical fields of application from a digital dimension related to urban context to a wider inclusive aspects linked to territorial characteristics. In this part it is discussed the extension of this concept in order to clarify the smart land application and its potentiality.

The concept of Smart City, as it has been recognised in the last decade, concerns the capability of urban areas to deal with digital infrastructures and e-services in order to increase citizen's benefits and to boost urban economy (Schaffers, Ratti, Komninos, 2012). Therefore, the main field of application has always been focused on smart computing technologies and their applications in urban areas, such as self-monitoring and self-response systems. This attitude was also confirmed within European official papers since 2009 (Armondi, 2014), where the technological aspects were legitimate into the earliest efforts of political strategies, strictly focused on improving information and communication technologies into urban environment.

However, even if the ICT aspects still remain dominant, nowadays there are many other elements that have been included in the Smart City concept, such as human factors (intellectual and social capital), institutional aspects (e-governance and smart community) and environmental components (natural capital). These concepts have contributed to translate the Smart concept from a strictly digital and technological dimension related to an urban context to a broader and inclusive one linked to territorial aspects. This is also confirmed by the “Europe 2020” Strategy, which has evolved the concept of Smart City by introducing three strategical priorities based on the concepts of Smart, Sustainable and Inclusive growth, intended as cornerstones able to foster employment, productivity and social cohesion through new policies, strategies and programs [COM(2010) 2020 final]. Therefore, the expansion of the meaning and the application fields of the Smart rhetoric, has led to the Smart Land concept, which is detached from the strict idea of technological city by embracing issues such as sustainable environment, inclusive policies for social cohesion, territorial competitiveness.

Smart Land is a linking definition that aims to re-establish a dialogue within urban and rural areas, local and global contexts, community and institutional levels. In other words, Smart Land concept acts at local level to encourage endogenous capacity of territories thanks to the right compound of territorial capital and technological

innovation. While the Smart City finds its strength within the urban and economic agglomeration, that lead to higher rate of innovation, productivities and development of technological infrastructure, the Smart Land completely flips the scenario and it focuses on local dimension and identity based on values such as environment, culture, landscape and community, which become the structuring elements of economic growth. Hence, the interplay between technology and specific territorial values such as the local cultural heritage (Magnaghi, 2000), the networking between small and medium-sized enterprises and knowledge centers, may have the potentiality to stimulate local economies and to increase territorial competitiveness. Thus, the technological paradigm within the Smart Land loses its strength and becomes one of the means able to reconstruct the chains of spatial relationships within territories and communities.

Overall, a representation of Smart Land can be enclosed by the development of cultural tourism, the enhancement of agricultural value chain or the implementation of logistic and knowledge network (Bonomi, 2014). Therefore, to apply the smart rhetoric within territorial contexts it seems necessary to subject the economic growth to the enhancement of natural, human and social resources, in order to turn the territorial identity into a crucial role for the dissemination of innovative services.

### Mobility Networks and Cohesion Principles

The idea of highlighting the synergy between 'clusters' and 'networks' is almost redundant, as it is physiological that, since its inception and following evolution, the "cluster concept" has been strictly related to the network paradigm. Physical, economic or social connections, as well as digital ones (Castells 2000), are essential for giving life and recognizing the existing concentrations of related entities, or enhancing the evolution of innovative clusters as well.

Contemporary settlements, as many schools of urban studies argue, are marked by kaleidoscopic communities: the network paradigm represents a powerful opportunity for embracing a holistic approach, managing together attractive centres and hubs, deprived neighbourhoods, distressed peripheries, fragmented social groups.

As the best practice landscape in OECD countries can show, the outstanding action of transit networks pursuing the so called 'right to the city' (Lefebvre 1968), can give sense to the implementation of the 'community led approach' and 'place-based' policies within local and territorial regeneration strategies.

Contemporary communities in conurbations of western countries are already - and will become - more and more fragmented and self-referential; so, the network approach can introduce new forms of interactions, fostering and allowing the "talk among diversities", words in which it is embedded the etymological meaning of the term dialogue.

### Mobility Networks and Cohesion Principles

These short notes are intended only to hint at the issue of the importance of mobility networks - and in particular transit systems - for fostering the principles of urban settlement cohesion, with a specific lens on its territorial, economic and social dimension.

The concept of cohesion, referred to territorial domains, is a central issue because of its complex, polysemous nature. The Cohesion policy in Europe is embedded in core documents, starting from the original milestone of the 'Treaty of Rome' (1957) and criss-



crossing all European Union history until the 'Treaty of Lisbon' (2010) and the recent delivery of "Europe 2020" strategy, marked by three well known keywords for a virtuous growth ('Smart', 'Sustainable', 'Inclusive').

So, why should we reflect on mobility and in particular on transportation networks dealing with cohesion policies? The relationships look like physiological. The network paradigm applied to mobility represents a multidimensional entity, sort of synecdoche, fractal, significant part representing the whole of contemporary urban complexity.

Since the very beginning of modernity, mobility infrastructures and transportation systems have been assuming and increasing their polysemous dimension. Besides the traditional dimensions like the 'techno-functional' classic mission for identifying and serving the "space of movement" or the 'economic' one, dealing with the resource management and the impact on the real estate and land values, in the last decades the environmental dimension achieved a crucial role due to the rising importance of the 'right to health' issue and the ecologic quality of the city within the general context of new studies on the 'climate change' impact on human environment. Moreover, within the competitive approach for investment attraction in a more and more globalized world, the 'symbolic' dimension evoked by transit networks with 'high tech' and refined design has been growing its importance for fostering the new contemporary identity of cities. Last, but of increasing importance, the 'social dimension' which is related to the capability of conceiving and implement urban policies through the transit networks, in order to pursue the 'right to mobility', 'right to transportation' and 'accessibility' principles, fostering cohesion horizons and inclusionary community strategies.

However, it is not enough to reflect and consider the polysemy of mobility networks for investigating on the implementation of S3 principles in the European settlement context. In order to reconstruct a more balanced vision, it is crucial to go back to the 'ontological' relationship between the mobility system and the network paradigm.

### The Mobility Systems within the Network Paradigm

The modern codification of the network paradigm dates back to Leonhard Euler's studies about the Graph Theory (XVIII century) and the 'problem of the seven bridges' in the city of Königsberg,

however the contribution to the contemporary interpretation of its features belongs to the French school, in particular to the research group "Réseaux", animated by Gabriel Dupuy and Jean Marc Offner whose studies since the 1980s have been investigating and clarifying the interpretation and use of the term 'network' in the social science context, exploring its application palette. In particular, a multi-disciplinary task force has been involved in relating the meanings of 'network' with those of 'territory', in order to analyse interactions, complementarities and specificities (Dupuy 1985, 1988, 1991) (Offner 1994, 1996). The dialogic (often dialectic) debate among economists, geographers, urban planners, historians, sociologists, mathematicians and other specialists, also through the foundation of the journal "Flux", has helped to clarify ideas, meanings and positions corresponding to the different pictures that every approach tended to build because of its cultural base (Offner, Pumain 1996) (Musso 2003) (Dupuy, Offner 2005).

Referring to the mobility networks it is possible to shortly recall at least three important principles and lessons that the 'Réseaux' research task force pointed out.

The first underlines that the complex network morphogenesis and development is related to the virtuous cycle of two main sequential phases: the densification of connections within the original core domain and the expansion towards external territories through strategic new links.

Second, the network effects are dichotomous: virtuous and perverse. Due to the principles of selection and hierarchy, they create connections between hubs and other nodes, solidarity in the served territorial domain, space-time shrinking; however, at the same time, networking effects can lead to the birth of barriers, separation, segregation of the less connected or neglected realities.

Finally, according to the studies developed by a specific group of scholars (Curien 2000), in the so called 'technical networks', three layers can be distinguished:

- a) the 'support-network' (i.e. in physical mobility infrastructures: roadways, railways, tramways, people movers, bike paths, pedestrian systems, etc.);
- b) the 'service-network' (i.e. the set of services offered by a given network and enabling different operators/providers);
- c) the 'control-network' (i.e. the digital info-systems for optimizing the use of infrastructures and the performance of services as traffic management systems, flow control & monitoring systems, car sharing and parking facilities, reservation systems, etc.).

So, how the network paradigm can foster the principles of social and territorial cohesion within balanced and virtuous urban development strategies?

What is the most significant nexus of the network domain with our core issues as Smart Specialization Strategies, Clusters and Community led local economic development?

Our assumption is that mobility strategies and, in particular, transportation systems can provide an essential contribution: hints, suggestions and possible answers are inside the network principles, as mentioned before.

Smart Specialization Strategies (in a comprehensive sense) can be pursued through an effective integration of the 'Three Layers Theory'; in the present time of crisis and relating to the Key Enable Technologies (KET) issue, it is crucial to focus in particular on the third layer ('control-network'), which is able to radically turn upside down the life and development of the related territorial contexts with new connections, allowing as well significant levels of incremental efficiency in the existing networks and services, with rather limited resources.

## Districts and Clusters: Concept and Evaluation

From Industrial District to new socio-economic models. A Review of the studies concerning Industrial Districts in Italy: Industrial Districts and Clusters origin and main differences

Although closely linked to economics, the conceptualization and the exploration of industrial districts in Italy was a main issue of urban studies and planning. Especially during the 90's, by virtue of the relationship between districts and territories, the idea of industrial district became a key concept in that field as regards to territorial organization and productive structures, the impacts on land, planning and local development policies.

The need of integrating economics and territorial planning in Italy emerged in the second half of the '60s through the so called 'reformist season' represented by the 'Project 80' studies, where national economic planning is supplemented by scenarios and territorial arrangements which take account of the potential of the Italian territory. The new role of territories and cities in particular, towards the economic and industrial development of the Country, was also highlighted by studies addressed to 'the Southern question' (Cafiero, 1976). This new role led to an evolution of the classical economic studies, which assigned an exclusive or predominant role for the economic development to big industrial centers, while considering smaller companies as 'setback places' (Brusco and Paba, 2010).

Thanks to an economist particularly attentive to its own territory, Giacomo Becattini, a fundamental change of perspective happened, first of all as regards to the objects of investigation: no longer individual companies, their products, the productive apparatus and their turnover. Instead, the focus was on networks of enterprises, and their relationship with the specific local context in which they are established and where they acted (Sforzi, 2008). The groundbreaking studies of Becattini (1966, 1979) conceptualized what an 'industrial district' is, while describing a territorial and productive phenomenon that would become increasingly important at national and international level. From the '70s, moreover, they brought to opening the field of the economic analysis of productive systems towards a multidisciplinary contribution, which link together economics, urban geography and urban-territorial studies.

The interest for the phenomenon of geographical concentration of small industrial activities, as defined in the twenties by Marshall, is also resumed in the '90s by some American economists (Porter, 1990; Krugman, 1991). Stemming from Italian case studies, they focused their attention on clusters, defining their features and role in the American production system, as well as emphasizing their scope in terms of innovation and competitiveness.

In the American and international literature, the concept of cluster includes that of district (Sforzi, 2008) and the latter is a special case of the former (Porter, 1998b), particularly when some specialized productions (such as household and personal goods) are concerned. Nevertheless, both concepts basically indicate the same phenomenon, which is the tendency of economic activities towards spatial concentration. This condition provides major advantages, if compared with that of isolated companies. Differently, the substantial difference between cluster and district far less emerged. It can be described as the shared culture, but also the family or friendship ties, as well as the endogenous development dynamics, and the close cooperation between local communities and enterprises, which characterize the districts (Datar, 2002, in Sforzi, 2008).

Where American scholars looked at agglomeration of enterprises and technological spillovers, Becattini, saw 'a local community together with their industry'. In his view, it is not the production technology to prevail, but the community and its way of organizing (Sforzi, 2008), which provides the social climate, and the 'human factor', constituted by values and knowledge, as well as by cooperation potential for coordinating neighboring businesses (Becattini and Coltorti, 2004).

As regards to the role of local communities Arnaldo Bagnasco studies (1977) and those of Carlo Trigilia (1985) are worth remembering, for their contribution in analyzing the close relationship between economic and political system characterizing the districts. From their studies, the role of government and of local politics resulted as fundamental

conditions for determining a favorable local context, and for the development of district realities.

Furthermore, it is the following conceptualization of milieu, which has been originated from the territorialist approach developed at the Technical University in Turin (Dematteis, 1994; Dematteis and Governa, 1999), to give better account of the overall importance of territory, including the physical substrate and its stratifications, and the settled community, which includes public and private actors. The 'district codified by Becattini and the Italian school is, first of all, a local community, the socio-cultural and institutional milieu in which each company operates, and which marks their life conditions' (Sforzi, 2008) (6).

#### *History, evolution and features of Industrial district in Italy*

After WWII Italy was subjected to a profound territorial reorganization. The industrial development process around major urban centers in the North-West of the country, and the resulting migratory flows and territorial imbalances (particularly between North and South), overshadowed the development process that was occurring in the rest of Northern and Central Italy. The industrialization and urbanization of this 'Terza Italia' [lit.:Third Italy] (Bagnasco, 1977), presented very different modalities and patterns. It started to consolidate itself from the '70s onwards, becoming the model of industrial district conceptualization.

As already mentioned, the industrial districts reality in Italy emerges from the end of the '60s. It has been investigated by Becattini in the Tuscan territories, when the crisis of big industries started to emerge.

Networks of smaller manufacturing firms rooted in specific territories, described as 'Terza Italia' by Bagnasco (1977), emerged in the Central and Northern regions (in particular, Veneto, Emilia Romagna, Tuscany, Marche). These regions were not affected by large industrial plants, as in the Northern Italy, or by State-led development policies and subsidies, as in the South. They were (and still are) characterized by medium and small industrial cities where, from the '50's, networks of small and medium enterprises turned to manufacture and industry from handcraft (Calafati, 2009), attracting population. Despite they do not have the size of the big industrial centers, they increasingly became the context of important economic and productive development, as well as an example of spatial organization.

The affirmation and the spreading of industrial districts in Italy depend on specific *milieu*, whose territorial and social features are key factors. Those features are historically and socially rooted: a social-productive history of sharecropping, the prevalence of small productions, where the direct relations between people prevail, as well as networks of trust, and social and family ties; moreover, in those regions public administrations traditionally are considered as solid, virtuous, and supported by broad and long-lasting consent.

In the '90s, districts spread on regions where the productive model had not yet established itself, interesting the national productive system<sup>(7)</sup>, and generating a substantial increase of exports (Fratesi and Pellegrini, 2013). Precisely in the years of their

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(6) This shift reversed the traditional economic research approach. Instead of proceeding by the industry to its location, the concept of district imply to proceed from the place (where people lives) towards its industrialization features, Sforzi (2008).

(7) Centro Studi Sintesi (2015), *La mappa dell'economia e le nuove direttrici dello sviluppo*. Milano: F. Angeli

greatest success, districts started to be analyzed as 'Sistemi Locali del Lavoro' [Local Labour Systems (LLS)], becoming also a statistical analytical category at national level. In this approach, geographical-territorial location prevails on 'production technology' (which previously accounted for the traditional areas of statistical data). Rather understandably, in the 'immaterial' or 'intangible' features that support economy within a particular socio-cultural context do not emerge, for example, the capacity of a community to recognize and to share particular specializations and enterprise projects (Brusco and Paba, 2010). 199 industrial districts have been counted. They have an average of more than a thousand small businesses, with less than 10 employees each. Their production result is almost exclusively manufacturing: it is a long-lasting feature of Italian districts, which is perceived as a risk for the evolution of the economic-productive system in the global market, in terms of innovation and, above all, for immaterial production (service and goods), as well as of the ecological and cultural production<sup>(8)</sup>.

*From Industrial districts to new socio-economic models. New performance indicators for urban and territorial systems.*

The continuous growth that characterized the economy of the districts from the '70s to the first decade of the 2000s was followed by a shutdown due to the economic crisis and, more generally, to the main changes imposed by globalized economy.

What -from the '70s to the end of the '90s- enabled district economy to increase (manufacture, low investment, short networks of sales and distribution, practical knowledge and personal ties), slows down its development nowadays (Rullani, 2008). The network paradigm, a fundamental concept of globalized economy, on the one hand enhances the districts and the way they work; but at the same time considers non-contiguous territories, thanks to the reduction of costs and time for communication and exchange. A main change seems compulsory today, addressed to internationalization (transforming the districts into nodes of multi-localized global networks, with increasingly larger basins of spreading and re-use<sup>[9]</sup>) and to innovation (transforming the material production chains into culture and knowledge industries), deeply changing the relationships with the territory, but without deleting it.

In this view, territories and their specificities still play a strategic role, as local differences in the global market become more valuable, revealing particular and also original vocations that hardly can be reproduced elsewhere (Rullani, 2008).

But beyond the role of territories, in terms of the specificity and uniqueness of the milieu, the ability to implement the new production sectors (smart industries, business services, new welfare) into actual development is not obvious nor immediate. Similarly, it is not obvious for cities and territories to translate into actual development the challenges of European policy agendas. Because of these challenges, and because of the social and economic change at global scale, for cities and territories new performance indicators are needed (Calafati, 2014). These indicators need to be based on different evaluation criteria from classical economics, including, for instance, well-being, ecosystemic

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<sup>(8)</sup> Industrial districts correspond to SLL with a predominant manufacturing production where production units are small-medium in size.

<sup>(9)</sup> The more recent concept of 'Reti di Imprese' [Network of enterprises] can be considered as an example of new network organization, introduced with a national level law (L. 33/ 2009) to provide an answer to the crisis of industrial districts. Cf. R. Imbruglia, A. Quarto, *Reti di impresa e distretti industriali*, Rivista di Scienze del Turismo 2/2014

services<sup>(10)</sup>, culture and creativity. We will focus here on cultural and creative districts in particular. This sector is, to some extent, paradigmatic of the evolution of a productive system deeply rooted on territories, and of the need to take into account both the factors of crisis, and the challenges and major opportunities provided by globalization.

### Cultural Districts and Culture-Driven Development

For a long time, the need of a shift towards internationalization was recognized mainly for commerce and material production. More recently, the opening of new markets, the liberalization of financial flows, and the development of technologies, give to knowledge and culture a central role for addressing international competitiveness and development, particularly in the Global-North countries.

The idea that the cultural sector can generate profits is developed from the '80s already. Examples are that of London (with Southbank Centre and the new Tate Gallery), and of North American cities (with the recovery of former industrial cities, and the development of creative industries, related to film production). Those initiatives gave way to processes of economic development strictly linked to urban regeneration processes; they have been defined as cultural districts, and have essentially an urban character (Frost, Kumpf, 1998). Many other similar experiences started in the second half of the '90s in the US (St. Louis, Denver, Baltimore) and in Europe, also related to the European Capitals of Culture programme (e.g. Glasgow, Linz, Liverpool, Bilbao). The culture-driven experiences developed in Italy as well as in other Mediterranean countries have different characters. They are mainly based on the recognition of a diffuse heritage of supra-local scale, which is artistic, archaeological, historical and cultural, spreading over the territory, often not including large cities. Several studies dedicated to this phenomenon led to the definition of cultural districts, which in this case means and refers to the close connection between culture and territory. 'Cultural and creative districts are a space of proximity where cultural product is strictly linked and influenced by the 'milieu', where communities are engaged in consumption and production of cultural goods, where a cultural entrepreneurship is able to involve specific venues and financial resources, and where is a strong and long-term partnership of artistic, creative and cultural sectors (enterprise and non profit association, public sector)' – OECD 2005<sup>(11)</sup>.

The relationship between culture and territory is fundamental. Cultural resources can determine significant impacts, both directly and indirectly, on goods and services productivity of a certain territory (Valentino, 2001). Culture is constituted not only by the cultural heritage, but also by the cultural chains that is to say, by all the productive sectors contributing to the exploitation of the cultural resources of a certain territory. (Valentino 2001). Moreover, the cultural sector regards cultural activities in general, or creative initiatives; it deals with the historical and artistic heritage, or with the production of performing arts (Symbola, 2012; 2015). The potential of the cultural sector in

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<sup>(10)</sup> Ecosystem services are the benefits that people obtain from ecosystems, including food, natural fibers, a steady supply of clean water, regulation of pests and diseases, medicinal substances, recreation, and protection from natural hazards such as floods. Human well-being consists of security, the basic materials for a viable livelihood (food, shelter, clothing, energy, etc., or the income necessary to purchase them), freedom and choice, good health, and good social-cultural relations. Cf Millennium Ecosystem Assessment, 2005. *Ecosystems and Human Well-being: Synthesis* Island Press, Washington, DC.

<sup>(11)</sup> For other definitions similar to this ones, see: Valentino, 2001; Sacco and Pedrini, 2003; Santagata, 2002; Lazzeretti, 2008.

generating added value and employment is recognized not only when implementing cultural heritage policies (material and intangible) of a territory, but also when the cultural sector is recognized in its capacity of stimulating the growth of other productive sectors, generating processes of innovation and creative processes. In this sense, the key-change resides in the transition from the conception of culture linked to free time to that of culture linked to the production and to its ability to trigger new activities and resources. According to some studies, cultural districts can be articulated in the following types, according to the different forms they can assume: industrial cultural districts (where the industrial production of audiovisual, applied arts, design and fashion prevails), institutional districts (with recognized - established brands and special rights over local products, such as the DOC areas), museum districts (territories where cultural activities such as museums, galleries, theaters, are concentrated in specific areas), and metropolitan districts (cities or neighborhoods where museums, cultural services along with creative industries, trade, and also catering related to them, are concentrated and also integrated) (Santagata, 2002).

Cultural districts can be distinguished also according to their stage: the first stage is that of 'cultural initiative', then we have that of 'cultural system', where the cultural goods show a network organization and cultural chains are activated, then cultural districts in the more proper sense, where culture becomes the backbone for the socioeconomic development of an area. They can lead to the so-called 'advanced' cultural districts (Dossena, 2013), with the higher level of integration between actors from different cultural sectors and chains, permanently and systematically involved. As regards to this last point, the predominance of public or private actors in activating or promoting culture-driven development is another important element of evaluation. Moreover, differently from industrial districts, the common feature of cultural districts resides in concentrating places of production and places of consumption in the same territory. In Italy, two main types of cultural districts emerge (Sacco and Pedrini, 2003), both related to the heritage and to the historical traditions of territories. A first typology includes the districts related to handicraft and artistic production (e.g. Murano glass, ceramics in Faenza and in Caltagirone) and to the restoration of works of art (Florence and museums). A second typology includes the districts related to the promotion of a vast and diffuse cultural heritage, which include also the landscape as well as food and wine productions, often assumed as the driving force for the development of marginal or 'internal' areas with low industrialization and urbanization (South-Eastern Sicily district of Val di Noto; districts of Val Camonica and Valtellina, agribusiness or food and wine districts as the Langhe in Piedmont). In Italy, the delay in the activation of processes addressed to the economic enhancement of cultural product at urban level is partly attributed to the State, its almost exclusive management of cultural policies, and its weak capacity of innovation and investment in systematic and long-lasting cultural programmes. Just recently, an increasing mingling between the production and the cultural world emerged. It is due partly to the cutting of public finances, partly to the growing role played by the Foundations (banks and other companies) in the promotion of initiatives and forms of sponsorship, also related to their growing awareness of the importance, in terms of reputations and profits, to be recognized as promoters of cultural initiatives.

## Cluster Spatialisation Methodology and Case Studies Analysis

The following paragraphs identify the main pluses and minuses related to the application of the Cluster Mapping's strategy, along with some methodological proposals for the forthcoming case-studies analysis .

### Advantages and Drawbacks of Implementing HBS's Analytical Framework into Cluster Spatialisation Methodology

The lack of a specific spatial dimension, both in the main cluster literature reviewed so far and in the HBS's web platform "Cluster Mapping", has been the main driver for the development of the Cluster Spatialisation Methodology so far discussed. This new methodological framework rests upon the integration of three sets of data:

- Economic activities, in terms of number of establishments and size, by NAICS 2008 code and ZIP code (Source: Census Bureau website, Zip Code Business Statistics);
- Land Use codes, provided with code's description and category, by ZIP code (Source: City of Cambridge GIS system)
- Cluster/Subcluster compositions as derived by Porter's clustering methodology (Source: US Cluster Mapping project).
- A three-step process has been carried out for this purpose, as summarised in Fig. 17 (cf. First Scientific Report, MAPS-LED 2015):
- The identification and the NAICS codification of the industries composing each subcluster/cluster by tracing back the clustering processes developed by Porter;
- The linkage between NAICS and Land Use codes, which delivers the location of each industry within a specific area;
- The labelling of each area according to the corresponding Cluster/Subcluster present on the ground.

The procedure relies on the use of the ESRI's ArcGIS software both as a visualisation and analytical tool and has been tested for the ZIP code 02138 of the Cambridge Municipality, MA.

While the full potential of the methodology has still to be exploited, the preliminary findings provided in this Report convincingly prove the usefulness of the clusters' spatialisation procedure, particularly with reference to the linkage between Land Use codes and the economic activities identified by NAICS and ZIP codes (steps sub a. and b.). Notwithstanding, the transferability of this process to the European clusters is intrinsically dependent on data availability and comparability (§ 4.2.2).

On a brighter note, a few relevant concerns should be addressed with regard to the utilization of the HBS's methodology, which is functional for the step sub a. of the procedure. Indeed, the adoption of Porter's clustering strategy, i.e. the grouping of industries within a specific cluster, involves sharing many of its strengths and shortcomings.

Among the main pluses related to Porter's methodology, comparability is by all means one of the most relevant. Porter's definition of clusters is based upon the measurement of average inter-industry linkages at national level, thus "providing a benchmark for clusters to be compared across locations" (Delgado et al., 2015, p. 7). By scaling down the general definition into any Regional unit, the approach basically provides a comparison tool both across and within Regions. This feature substantially distinguishes Porter's "benchmark cluster" definition from other, narrower "Region-specific" ones, which can only account for "observed linkages" and inevitably overlook activities that



are not present in the Region (*ibidem*). Secondly, the methodology relies upon the utilisation of multiple sources of inter-industry linkages' data (co-location of employment or establishments, input-output linkages and occupational correlation).

This methodological comprehensiveness is pivotal to capture “many types of externalities present across industries” (*ibidem*). Moreover, this allows the model to encompass the well-known notion of related variety (Frenken et al., 2007) insofar as the strength of a specific Regional cluster is not built upon narrow specialization in a specific industry, but it is dependent on the presence of complementarities among industries in terms of shared competences (Porter, 1998a, 2003, Porter and Ramirez-Vallejo, 2013; Feldman and Audretsch, 1999; Delgado, et al., 2014b; Frenken et al., 2007). Furthermore, the clustering algorithm developed by Porter can be applied to other countries and to individual Regions, depending on data availability (§ 4.2.1). Eventually, as repeatedly stressed in the literature (Scott et al., 2001; Keeble and Wilkinson, 2000; Martin and Sunley, 2003), Porter's focus on competitiveness of Regions and the framing of his ideas in terms of economics of “business strategy” undoubtedly provide a policy-friendly research agenda readily to be translated into practical strategies (Martin and Sunley, 2003).

The underlined features of Porter's methodology confirm its potential for the comparative analysis to be carried out in the forthcoming WPs of the project. Nevertheless, some relevant weaknesses inherent to Porter's approach might pose a threat to a proper utilization of the methodology for the choice and the assessment of the case studies. As earlier mentioned in this report (cf. Fig. 14 “Cluster Measurement Problem”), a top-down approach of this kind cannot but bring along inevitable shortcomings related to the empirical methodology and the conceptual/definitional depth adopted.

With respect to the former, a major concern related to Porter's definition of cluster is “the lack of clear boundaries, both industrial and geographical” (*ibidem*, p. 10) and the absence of any specific reference to the presence of Marshallian externalities (Marshall, 1920). Indeed, top-down measures can only provide indirect evidence of the presence of explicit collaboration and informal knowledge spillovers between firms, since they cannot establish “the precise boundaries and composition of clusters” (Martin and Sunley, 2001, p. 20). Moreover, the use of the Location Quotient (hereinafter, LQ) to discriminate between “traded” and “local” clusters, which is the first step of Porter's methodology, cannot allow to “differentiate between external and internal economies” (Woodward and Guimares, 2009, p. 19), since “the LQ will be the same whether the industry employment in Region *j* is due to the existence of a single large establishment, or due to the existence of several smaller sized establishments” (*ibidem*).

Most notably, Porter's concept of clusters does not capture “the critical contribution made by soft factors, such as trust and social capital, as well as the organisational dynamics of the cluster” (Wolfe and Gertler, 2004, p. 1081). Despite the claim about the importance of “social embeddedness” for the functioning and upgrading of clusters<sup>(12)</sup>, “the social dimension of cluster formation and cluster dynamics remain something of a black box in Porter's work” (Martin and Sunley, 2001, p. 16). Social and knowledge networks are systematically overlooked in Porter's cluster theory (Cumbers and McKinnon, 2013), notwithstanding the undisputable role played by non-market-

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(12) “Cluster theory helps to isolate the most beneficial forms of networks ... [and] may reveal how network relationships form and how social capital is acquired” (Porter, 1998a, p. 227)

based factors (Wolfe and Gertler, 2004) or “untraded interdependencies” (Storper, 1997).

A few final remarks should be made with regard to the focus of the analysis and the policy implications. Firstly, the empirical approach adopted by Porter tends to overlook the nature of cluster life cycle. As clusters frequently go through specific stages of development, the identification of these stages is pivotal to understand the formation, the dynamics and the evolution of clusters (Breschi and Malerba, 2001). Finally, the emphasis laid on the role of “traded” clusters as driver of Regional growth risks to neglect the role played by local non-tradable activities for local wealth and prosperity, which are not included in a competitiveness-led vision of local economies (Krugman, 1997). Therefore, a narrow approach by policymakers aimed at exclusively promoting the “core” clusters in a specific Region might lead to an unbalanced economic development (Venables, 1996), since a holistic view of Regional development is lacking.

Eventually, the adoption of Porter's methodology is likely to be the most practical and useful approach to concurrently enable future comparisons with the European clusters and pave the way for the choice of US case studies. While amending many of the abovementioned weaknesses of the methodology is beyond the current purpose of this project, some feasible inclusions can be made, as discussed in the following.

#### Case Studies Selection and Analysis: Some Methodological Considerations

The development of the Cluster Spatialisation Methodology goes along the right line for the implementation of a spatially-led approach in the assessment of US clusters, consistently with the rationales of MAPS-LED project and the objectives of the 1st Working Package (cf. Grant Agreement, EC-REA 2014). The forthcoming stages of the research activity firstly involve the selection of the case studies. At this regard, the research strategy may be consolidated as follows:

- Strengthening the categorisation approach, by taking into account other sets of economic data, like exports data, which can provide a more direct evidence of the “traded” or “local” nature of clusters and/or economic areas. Clusters showing clear signs of enhanced tradability might be more likely to exhibit those factors related to a durable competitive advantage. A preliminary application of this methodology for the province of Rome will be presented in section 3.2.2 of this chapter.
- Including local clusters as additional targets, in order to investigate the critical contribution made by local activities for the diffusion and the sustainability of wealth and prosperity among the population residing in leading economic Regions and in the surrounding area. Indeed, the demand for an “inclusive” growth (European Council, 2010) cannot be materialised without promoting a balance between local production and local consumption, as stressed by Professor Christer Bengs in his recent contribution for the MAPS-LED Open Panel Discussion (Bengs, 2015). Although Porter emphasises how outward-oriented clusters are the primary long-run source of economic growth and prosperity (Martin and Sunley, 2001), he also recommends that policy-makers should not try to discriminate between clusters (Porter, 1995, 1996, 1998b).

With reference to the framing of the empirical methodology for the analysis of the selected case studies, some final remarks can be made:

- The role of non-market relationships should be explicitly taken into account by analysing and displaying the network dynamics of clusters. At this purpose several empirical studies adopted secondary data, such as patents' citations or joint-ventured research activities, which are more likely to deliver a deeper definition and identification of clusters based on formal knowledge spillover or explicit collaboration (Kerr and Kominers, 2015; Boschma and Frenken, 2011). The OECD Citations Database provides a major source for innovation networks' data (<http://www.oecd.org/sti/inno/oecdpatentdatabases.htm>). Concurrently, primary data, to be collected by surveys or interviews, can also contribute to a deeper, bottom-up reconstruction of cluster's dynamics, as documented by a well-established literature (Taylor et al., 2003; Dti, 2001; Porter and Ramirez-Vallejo, 2013)
- In preparation for the assessment of the most relevant best practices within US cluster policies, both soft and hard institution factors should be expressly targeted in the analysis; the latter including, most notably, universities, research institutes, Technology Transfer Centres, and venture capitalists, while the former including, among others, the quality of institutions, Federal and National incentives, or entrepreneurial attitudes.

Considerations on the Methodological Model Transferability and Comparability to the EU Context. Highlighting Incompatibilities Related to: Geodetic Data Availability, Cluster Mapping through Open Source Database and Related Items

#### BOX 6

##### ABOUT CLUSTER MAPPINGS:

**2000:** birth of Harvard Professor Michael Porter's cluster mapping project across the U.S. economy. Based on his statistical model, the mapping dealt with identifying clusters codes and measuring their size, specialization, competitiveness and dynamism. A first set of 41 "traded cluster" was highlighted.

**2003:** Professor Örjan Sölvell, Dr Christian Ketels, and Dr Göran Lindqvist from the Center for Strategy and Competitiveness at Stockholm School of Economics (CSC hereinafter) brought the U.S. model to Europe by. A first mapping exercise was done for Sweden, developing a statistical concordance table in order to benchmark European performance with the U.S.

**2004:** extension of the project to ten new EU Member States, under the guidance of Professor Sölvell. Publishing of the EU-10 cluster mapping data and addition of the "star methodology" to cluster mapping.

**2006:** first mapping exercise on all of EU-27 countries (plus Iceland, Norway, Switzerland, Turkey and Israel), funded by European Commission's DG for Enterprise and Industry and led by CSC in Stockholm.

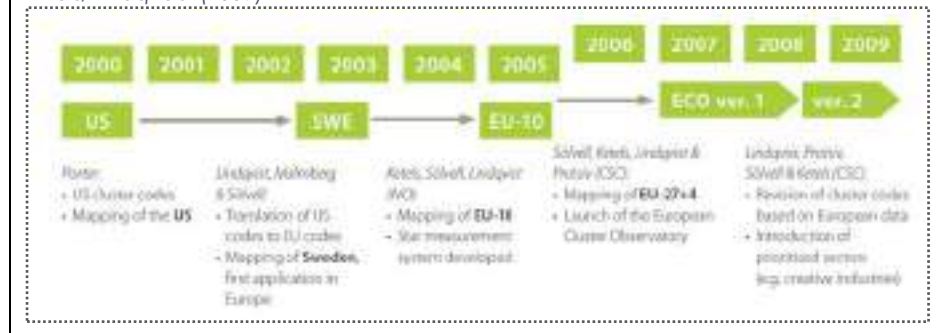
**2007:** the cluster mapping part of the project was renamed "The European Cluster Observatory" and the web site was launched. This web site also offered data on cluster organizations and cluster-related reports.

**2009:** European Commission's DG for Enterprise and Industry awarded a second grant for a mapping update.

**2012:** elaboration of the methodology for the analysis and mapping of Emerging Industries clusters.

the Cluster Observatory was separated from the European Cluster Observatory (hosted at DG Enterprise and Industry), and it is now run privately by CSC in Stockholm.

Figure 18. The establishment of the European Cluster Observatory. Source: Solvell, KEfels, Lindqvist (2009)

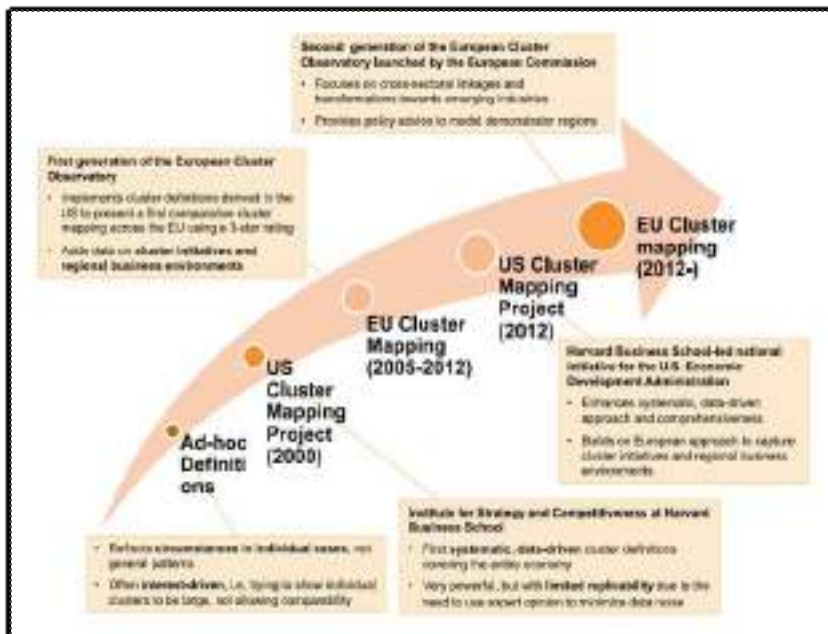


### The Methodological Approach Comparability

The cluster mapping methodology introduced in the EU in the recent years has directly originated from the U.S. approach developed by Harvard Business School (HBS hereinafter) Professor M. Porter, which is the one followed by the MAPS-LED project as well (Porter, 2003; MAPS-LED, 2015).

Therefore, quite an extensive literature has been produced about the comparability of the two of these along with their mutual improvements.

Figure 19. The Evolution of the Cluster Mapping Methodology. Source: Ketels C., Protsiv S. (2014)



As previously seen in this report, the MAPS-LED approach used so far combines the HBS cluster mapping system, as regards the clusters and sub-clusters identification, with an overlapping geodetic land-use analysis. Aiming at comparing U.S. to EU case studies and concerning the cluster mapping methodology itself, the first question deals with the cluster identification systems' comparability.

Then we first had a look at the NAICS codes<sup>(13)</sup> and their transposition into the European NACE codes<sup>(14)</sup>. Referring to the international statistical standards, NACE can always be aggregated into the groups and classes of ISIC<sup>(15)</sup> from which they were derived (UNSD, EUROSTAT 2008).

#### BOX 7

##### "STAR METHODOLOGY" CRITERIA:

*Size*= whether a cluster is in the top 10% of all clusters in Europe within the same cluster category in terms of the number of employees. Those in the top 10% will receive one star.

*Specialisation*= the proportion of employment in a cluster category in a Region over the total employment in the same Region, compared to the proportion of total European employment in that cluster category over total European employment. If a cluster category in a Region has a specialisation quotient of 2 or more it receives a star (that is also well-known in the literature as the Location Quotient).

*Focus*= the extent to which the Regional economy is focused upon the industries comprising the cluster category. This measure relates employment in the cluster to total employment in the Region. The top 10% of clusters accounting for the largest proportion of their Region's total employment receive a star.

Since the U.S. Census of Bureau provides updated concordances tables to convert NAICS into ISIC codes, by consecutive steps it should always be possible to convert NAICS into NACE codes and subsequently into national systems classifications were needed for an in depth analysis<sup>(16)</sup>. Tab. 3, displaying the textiles sector example, may be useful to relate these systems.

Now we know that a U.S. traded cluster, as identified by HBS methodology, can be investigated concurrently both in the U.S. and in the EU sticking to the industrial classification of the sectors it is composed by. But how do we know that what is a *traded* cluster in the U.S. is a *traded* cluster within the EU as well? As explored in the literature and already expanded on in the previous paragraph too (§ 4.1), there are other ways to identify relatedness among industries, productive sectors and sub-clusters of them, as to different manners to categorise clusters actually. Anyway, searching on the European Cluster Observatory (ECO hereinafter) we will not find about *traded* or *local* clusters indeed, as the last updated methodology used there considers 51 *traded*

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(13) North American Industry Classification System. It is the standard used in classifying the business establishments for all purposes in the U.S. It was jointly developed by U.S., Canada and Mexico, and replaced the previous system in 1997. For any further details, please visit the US Census of Bureau website.

(14) Statistical classification of economic activities in the European Community (deriving the abbreviation from the French *Nomenclature statistique des activités économiques dans la Communauté européenne*). Here we always refer to Rev. 2 version (2014). For any further details, please visit the EUROSTAT website.

(15) International Standard Industrial Classification of all economic activities. It is the UN Statistics Division standard. Here we always refer to Rev. 4 version (2008). For any further details, please visit the UNSD website.

(16) I.e. Istat's ATECO regarding Italy.

clusters while treating the rest of the economy as *local* (Ketels, 2015). Moreover we will read here a distinction between *cross-sectoral* and *sectoral* clusters. The first ones are categories of Emerging industries clusters and were identified in the last phase of the ECO funding, on the basis of firm capital raising data and on cross-sector combinations through mergers and acquisitions (Ketels, 2014), complemented by an analysis of patent and sector growth data <sup>(17)</sup>.

Furthermore, a "star methodology" was introduced in the 2004 under the Europe INNOVA phase of the EU cluster mapping. That is about the evaluation of Regional cluster strength by the mean of three distinct indexes, namely *cluster size*, *specialization* and *Regional labour market focus* (Sölvell, 2005).

Whereas a cluster has reached a "specialised critical mass" it will be able to develop positive spill-overs, and each one will be assigned 1, 2 or 3 stars depending on how many of these three criteria are met. Clusters can also obtain no star either they do not meet the criteria at all or their total number of employees is less than 1000 people. Information about stars are summarised by the *hotspot* indicators, accounting for the total number of stars in a Region. The cluster stars system is applicable, and already mapped, to cross-sectoral clusters of ten emerging industries too (Ketels, 2015).

In order to get a sound understanding of capital- or knowledge- intensive cluster categories, it would be preferable the use of information on sector wage, productivity, or added value (Franco et al., 2014). Unfortunately, these statistics are still not available at length for the EU, so the categorisation currently available on the ECO is obtained by the use of employment data. While this characterisation can be useful to draw upon, it has to be born in mind that it can even create a certain bias towards employment-intensive clusters, especially on the metrics for size and focus. Only the measure for specialisation is unaffected by differences of employment intensity across cluster categories.

Finally, it is worth noting that addition of new data from outside the EU will not affect the values of the stars indicators, because all calculations are made based on the corresponding indicator (total employment or share of a certain industry in total employment) of the EU27 countries

### The Geo-Administrative Units' Comparability and Mappings

When it comes to comparability, the choice of territorial unit of analysis acquires even more relevance. This is quite important also because of the policy implications, and their deep differences amongst U.S. and the EU (Sölvell, 2009). Concerning the cluster policy approaches, the first one is generally led by the Regional level and with a bigger involvement of the private sector, while the EU Member States are still those in charge of guiding their sub-national development strategies under government programmes (Ketels, 2005).

On the one hand, the U.S. Cluster Mapping project allows browsing among different functional and geo-administrative level units (and eventually customizing your own selection). On the other hand, both European available mapping tools focus on either NUTS1 or NUTS2 Regional level. It is then quite important to set the more relevant statistical unit of analysis accurately when dealing with international comparison, always keeping in mind its topic that is the smart specialisation strategies and the

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(17) The ones identified so far are ten. Please look at the Emerging industries' website for further details.

innovation clusters. The metropolitan areas level is still not harmoniously recorded across the EU Member States. Even though most of significant European statistics and indicators have the greater level of detail and availability at NUTS2, however there is room to propose a sub-level analysis drawing from National accounts and other EU level survey as already illustrated in the previous section (§3.1.2).

Following the MAPS-LED workflow, it is here worth noting that an accurate postal code - NACE codes correspondence through land-use layout is not available for the EU though. Then the transposition of this research passage may be the most difficult one. We can still rely on the available land use mappings and work on transferring the clusters information we have into them. The land use available information mainly relates to the Corine Land Cover 2012 updates (18) and the pan-European comparable Urban Atlas covering 117 Functional Urban Areas (FUA), whose 30 are in Italy (19). Other available geodetic datasets focus rather on environmental aspects, namely on land cover more than on land use. The information relevant for our purposes, so those exploring the sub-composition of the cluster industrial building sites, are broadly missing or even not so detailed as the U.S. ones are.

Finally, it has to be noted how the available cluster statistics mostly relates to NUTS2 level, while the accessible mappings on land use generally rely on sub-Regional territories with discontinuous levels of detail. Therefore attention should be given also to comparison amongst Regions within the EU, because geographic and functional discrepancies do exist across Regions at the same NUTS level as well, but this is not so easily recognizable and traceable (Aranguren et al., 2010).

#### Data Availability

Concerning the variables of interest already selected by the PAU Unit in the Cluster overview section of the proposed Survey Form, there are several sources providing socioeconomic statistics for the chosen span of time. As already explained, the European Cluster Observatory is the main existent reference, representing a unique access point to these databases. It already includes both sectorial and Regional level of information, but additional statistics can still gathered from Eurostat databases and surveys, as well as from national statistics institutions. The Observatory provides also specific reports on selected country case studies.

Specifically looking at these databases' content, in their public and privately run versions, the following table summarises the current data availability.

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(18) The Corine, "coordination of information on the environment" programme, started in 1985 and its last update is from 2012. For any further details, please visit the related websites.

(19) The Urban Atlas was delivered in 2010 to compare land use patterns amongst major European cities surveyed by the Urban Audit (temporal coverage: 2005-2007). A FUA consists of the city and its commuting zone (EUROSTAT). The Italian available mapped areas include the Province of Rome and the city of Ancona (Macerata excluded).

	THE ECO MAPPING TOOL	CLUSTER OBSERVATORY EU
SPACE	494 Regions, predominantly NUTS2. NUTS1 are used for Ireland, Slovenia, Bosnia and Herzegovina and Croatia, because of data availability, some German and Italian Regions, because of codes changes over time.	307 Regions, predominantly NUTS2. Croatia, Ireland, Israel, Slovenia, consisting of few NUTS2, were considered as single units.
TIME	From 2008 to 2014	From 2000 to 2011
SECTORS WHICH	51 traditional sectoral cluster categories. 10 emerging industries, representing cross-sectoral cluster categories (Advanced Packaging, Biopharmaceuticals, Blue Growth Industries, Creative Industries, Digital Industries, Environmental Industries, Experience Industries, Logistical Services, Medical Devices, Mobility Technologies).  Kotels (2015) provides comparability of the two of these sectors' lists and methodologies.	27 standard sectors, many of those include both manufacturing and service industries related to a particular area. The exhaustive list of considered sectors is available <a href="#">here</a> .
SECTORS HOW	NACE rev 2.0 at 4-digit industry level (or country's equivalent industry classification system)  Data originally available in other NACE 1.0 or 1.1 have been converted into 2.0. In the cases where only 3-digit data was available, 4-digit levels were estimated.	NACE rev 2.0 at 4-digit industry level (or country's equivalent industry classification system) based on SRS Exceptions for Czech Republic, Greece and Netherlands (3-digit data based on LFS), as well as Albania and Liechtenstein (2-digit data only). Data originally available in other NACE 1.0 or 1.1 have been converted into 2.0. In the cases where only 3-digit data was available, 4-digit levels were estimated.
INDICATORS	<ul style="list-style-type: none"> <li>- Cluster sizes indicators: Cluster sizes, Specialisation (location Quotient), etc.</li> <li>- Hotspot indicators</li> <li>- Other sector dependent indicators: numbers of enterprises</li> <li>- Other sector independent indicators: labour cost and productivity, employment, PCT Patents filed, etc.</li> </ul> The exhaustive list of available indicators, along with explanatory notes, is available <a href="#">here</a>	

Concerning the geodetic data, as already said the land use available information mainly relates to the Corine Land Cover and Urban Atlas (§4.2.2). Although significant gaps, several European initiatives, as the Copernicus monitoring, the EIONET consortium the LUCAS land use punctual survey etc., produced various open source materials available online (20). As specifically regards the case of Italy, the national institute for the environment protection (ISPRA) provides databases on soil and land use, along with an interactive tool as well. Unfortunately, the main source of data still relies on Corine materials, but this information can be somehow integrated by detailed local strategic plans, where available as in the case of the great metropolitan areas (i.e. Rome).

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(20) Copernicus is the European Spatial Agency earth observation system, in place since 2012. The European Topic Centre on Urban, Land and Soil systems (EIONET) supports the EEA in territorial studies and launched a specific action group on land use monitoring (called EAGLE) in 2009. LUCAS is an *in situ* data collection exercise conducted by EUROSTAT, first and last ones respectively in 2001 and 2012. For any further details, please visit the related websites.



Figure 20. Classification system Comparison

U.S. CLUSTER MAPPING	NAICS
<b>Textile Manufacturing Cluster</b>	<b>31-33 Manufacturing</b>
<b>Household Textile Products</b>	<b>31...</b>
314110 - Carpet and Rug Mills	<b>313 Textile Mills</b>
314121 - Curtain and Drapery Mills	3131 Fiber, Yarn, and Thread MillsT
314129 - Other Household Textile Product Mills	31311 Fiber, Yarn, and Thread MillsT
<b>Fabric Mills</b>	313110 Fiber, Yarn, and Thread Mills
313210 - Broadwoven Fabric Mills	3132 Fabric MillsT
313221 - Narrow Fabric Mills	31321 Broadwoven Fabric MillsT
313222 - Schiffli Machine Embroidery	313210 Broadwoven Fabric Mills
313230 - Nonwoven Fabric Mills	31322 Narrow Fabric Mills and Schiffli Machine EmbroideryT
313241 - Weft Knit Fabric Mills	313220 Narrow Fabric Mills and Schiffli Machine Embroidery
313249 - Other Knit Fabric and Lace Mills	31323 Nonwoven Fabric MillsT
<b>Textile and Fabric Finishing</b>	313230 Nonwoven Fabric Mills
313311 - Broadwoven Fabric Finishing Mills	31324 Knit Fabric MillsT
313312 - Textile and Fabric Finishing (except broadwoven fabric) Mills	313240 Knit Fabric Mills
313320 - Fabric Coating Mills	3133 Textile and Fabric Finishing and Fabric Coating MillsT
<b>Yarn and Thread Mills</b>	31331 Textile and Fabric Finishing MillsT
313111 - Yarn Spinning Mills	313310 Textile and Fabric Finishing Mills
313112 - Yarn Texturizing, Throwing, and Twisting Mills	31332 Fabric Coating MillsT
313113 - Thread Mills	313320 Fabric Coating Mills
<b>Fibers</b>	<b>314 Textile Product MillsT</b>
325221 - Cellulosic Organic Fiber Manufacturing	3141 Textile Furnishings MillsT
325222 - Noncellulosic Organic Fiber Manufacturing	31411 Carpet and Rug MillsT
<b>Knitting Mills</b>	314110 Carpet and Rug Mills
315111 - Sheer Hosiery Mills	31412 Curtain and Linen MillsT
315119 - Other Hosiery and Sock Mills	314120 Curtain and Linen Mills
315191 - Outerwear Knitting Mills	<b>3140 Other Textile Product MillsT</b>
315192 - Underwear and Nightwear Knitting Mills	31401 Textile Bag and Canvas MillsT
<b>Other Textile Products</b>	314010 Textile Bag and Canvas Mills
314991 - Rope, Cordage, and Twine Mills	31499 All Other Textile Product MillsT
314992 - Tire Cord and Tire Fabric Mills	314994 Rope, Cordage, Twine, Tire Cord, and Tire Fabric Mills
	314999 All Other Miscellaneous Textile Product Mills
	<b>31...</b>

Figure 21. Classification system Comparison

1...	1....	13.10 Preparation and spinning of textile fibres
<b>13 - Manufacture of textiles</b>	<b>13 - Manufacture of textiles</b>	13.20 Weaving of textiles
131 - Spinning, weaving and finishing of textiles	13.1 - Preparation and spinning of textile fibres	13.92 Manufacture of made-up textile articles, except apparel
1311 - Preparation and spinning of textile fibres	13.10 - Preparation and spinning of textile fibres	13.93 Manufacture of carpets and rugs
1312 - Weaving of textiles	13.2 - Weaving of textiles	13.95 Manufacture of non-wovens and articles made from non-wovens, except apparel
1313 - Finishing of textiles	13.20 - Weaving of textiles	13.96 Manufacture of other technical and industrial textiles
<b>139 - Manufacture of other textiles</b>	13.3 - Finishing of textiles	13.99 Manufacture of other textiles n.e.c.
1391 - Manufacture of knitted and crocheted fabrics	13.30 - Finishing of textiles	14.14 Manufacture of underwear
1392 - Manufacture of made-up textile articles, except apparel	13.3 - Manufacture of other textiles	20.80 Manufacture of man-made fibres
1393 - Manufacture of carpets and rugs	13.91 - Manufacture of knitted and crocheted fabrics	26.94 Manufacture of machinery for textile, apparel and leather production
1394 - Manufacture of cordage, rope, twine and netting	13.92 - Manufacture of made-up textile articles, except apparel	
1399 - Manufacture of other textiles n.e.c.	13.93 - Manufacture of carpets and rugs	
1...	13.94 - Manufacture of cordage, rope, twine and netting	
	13.95 - Manufacture of non-wovens and articles made from non-wovens, except apparel	
	13.96 - Manufacture of other technical and industrial textiles	
	13.99 - Manufacture of other textiles n.e.c.	
	<b>1....</b>	

## Preliminary Assessment of Italian Clusters

### The Lazio Region. Deliberate or Unintentional Geographies?

The concepts of territory, territoriality and territorialization have been subject to diverse and dynamic academic mindsets inspired by Francophone and Anglo-Saxon traditions.

Notably, when referring to the alternation of a spatial approach, a cultural paradigm, and more recently a relational turn, "territorialization" sounds fruitful and is likely to lead to interesting results in investigating consecutive development patterns in the long run.

In the case of the Lazio Region, the concept of manufacturing at large is closely intertwined with all other dimensions of living, that is practices, symbolization and institutionalization in multi-scale spatial development. On the whole, these features have been heavily shaping the geographical distribution of assets and facilities over time, whereas the manufacturing sector has shifted from the Fordist factory model towards a post-industrial service economy.

The governance system has little influence over these phenomena, that can rather be read as the result of an array of individual choices. New Regional regulations are being established without delay (the Regional Law "Testo Unico in materia Urbanistica ed Edilizia" is under consideration, and "Roma Città metropolitana" has been recently settled by law), even more so that new global economies are increasingly run by external factors and exogenous interests.

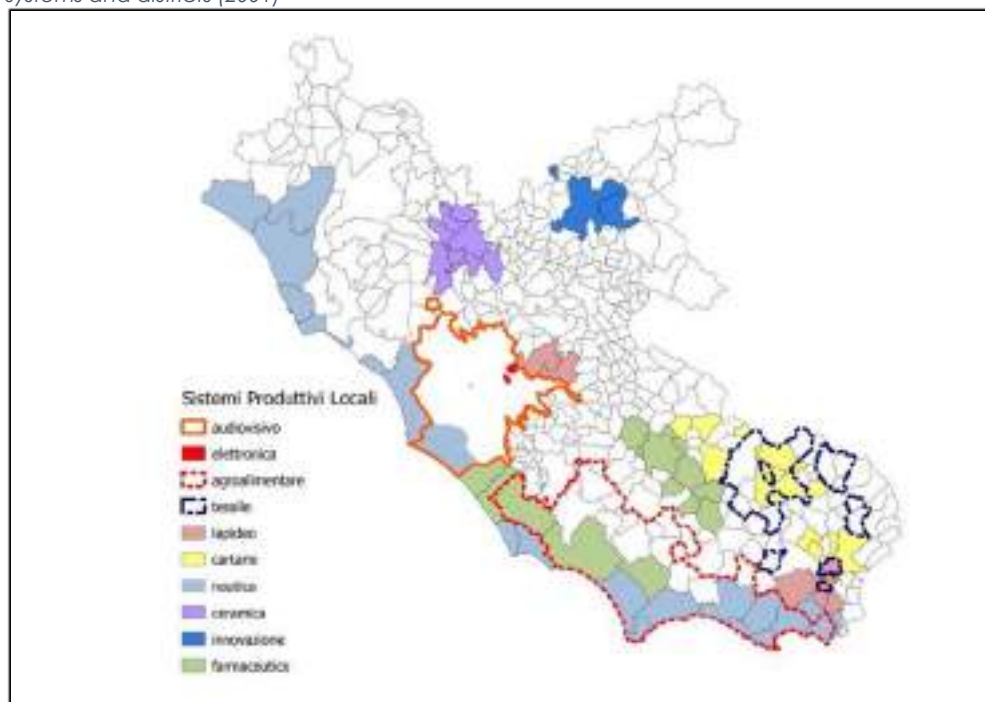
Since the early seventies, the Lazio Region has known remarkable phenomena of diffusion, relocation and reorganization of settlement, production and service activities.

In fact, the pace and scale of urban growth has accelerated and so has the more ubiquitous dynamic of urbanization, involving even larger portions of countryside in which suburbs merge into agricultural land.

These processes gave rise to differing interpretations. The first one points out that increasing "metropolization" dynamics have been called upon insofar as they shape new relationships between the Capital City and its wider hinterland, allowing for a City-Region pattern. The second one stresses that emerging arrangements between sub-Regional areas are likely to reciprocally exchange goods and people and even entering foreign markets in partial or total autonomy from the lure of Rome. The third one shows evidence about a still prevailing centripetal pattern, tied to the strong appeal of a core area slightly wider than the historical center of Rome.

Whatever the case, these interpretations have been muddled by territorial processes recording top-down and bottom-up movements at once. Top-led initiatives are mainly referred to State location strategies for industrial uses after World War II (by means of its authority, the "Cassa per il Mezzogiorno"), whilst the Lazio Region, since its establishment in the seventies, has avoided making commitments apart from issuing weak requirements to specialized clusters eligible for subsidies (Regional Law no. 36, 2001, Fig. 18).

Figure 22. Regional Survey: Manufacturing Characterization differentiates between local production systems and districts (2001)



On their side, provincial planning guidelines have more or less come into force in the 2000s, but they have not been implemented as yet.

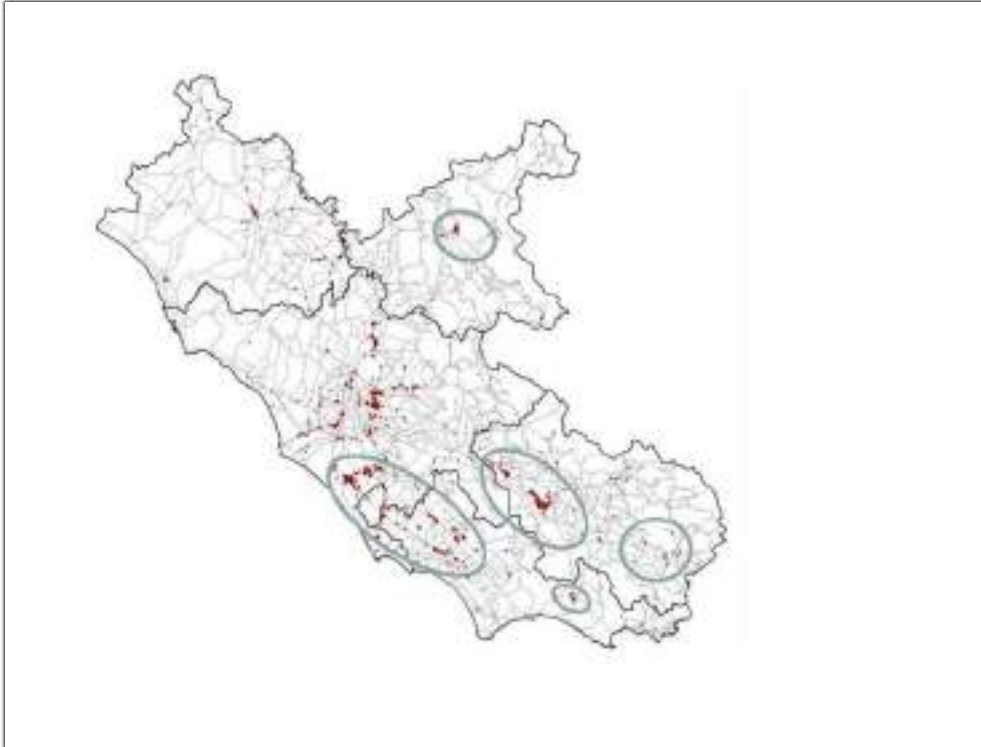
Meantime, at the initiative of single municipalities, bottom-up "territorialization patterns" would be relevant in appealing to small businesses. Still, these behaviors and activities hardly allow themselves to a single storytelling, and altogether produce no critical mass.

Since 2013, a new development cycle was intended to support strategic sectors (Common Strategic Framework 2014-2020 and Guidelines for the efficient use of financial resources for the 2014-2020 development, set forth in April 2014), according to the Europe 2020 Strategy.

The commitment to the RIS3 strategy (the document "Smart Specialisation Strategy" was approved by the Regional Council on July 2014) led to a Call for Proposal (July 2015) set up to encourage a participatory planning exercise able to support the best innovation technicalities in the production system.

12 macro sectors and related production chains are conceived as the main pivots for Regional policies of the forthcoming programming period. Aerospace and safety; Agri-food; Audiovisual and creativity; Automotive; Circular economy; Construction; Sea Economy; ICT, electronics and smart cities; Fashion design, Italian style furniture; Life sciences; Transport and logistics; Tourism and cultural heritage. As a result, during the General States of Industry (February 2016), 173 projects were presented by hundreds of players, such as large enterprises, SMEs, universities, research centers, associations and local authorities subjects, for a total of 2.3 billion potential investments.

Figure 23. Overlap between Industrial Development Consortia identified by the State and Industrial Zoning implemented by the Municipalities (2006)



#### Traded Clusters in the Province of Rome

The preliminary research activity conducted by FOCUS unit aimed to test the methodological proposals suggested in the previous section of this chapter and to compare the clusters of Boston/San Diego MSAs with a commensurate European area, which has been identified in the province of Rome (cf. Box 8 for the criteria). Therefore, the approach initially follows Porter's methodology by deploying:

the employment-based Location Quotient (LQ) index as a measure of specialisation economies, in order to discriminate between Italian "Traded" and "Local" industries; the composition of each "Traded" or "Local" cluster as delivered by the relatedness algorithm elaborated by Porter (cf. Box 5).

#### BOX 8

##### WHY IS IT WORTH FOCUSING ON THE PROVINCE OF ROME?

- The province of Rome is characterised by the presence of **key industrial sectors** that are likely to exhibit a high level of **relatedness**, thus benefiting from a variety of synergies in terms of exchange of information and knowledge and the development of relations between firms.
- The preliminary study undertaken shows the presence of **relevant similarities** between Rome, Boston and San Diego in terms of Traded Clusters, thus allowing a proper comparison between the three areas.

The strengthening of an **advanced service sector** is consistent with the economic structure of the two US cities under consideration.

Furthermore, LQ indexes based on exports data have been calculated to provide a narrower definition of those clusters formerly categorised and to detect additional or hidden specialisation economies (cf. § 3.1.2). The findings for the Province of Rome have been compared to the ones provided by the web platform [www.clustermapping.us](http://www.clustermapping.us) for the MSAs of Boston and San Diego, thus drawing a list of clusters to be potentially selected as case-studies for the forthcoming comparative analysis (§ 4.3.3).

The workflow followed four main stages:

#### 1. Selection of top strong clusters in the MSAs of Boston and San Diego

The website platform [www.clustermapping.us](http://www.clustermapping.us) uses a bundle of secondary data drawn from the County Business Patterns databases (<http://www.census.gov/econ/cbp/>) on employment, establishments, and wages by 4-digit SIC codes. A Cluster Portfolio tab is provided for different geographical scales (State, Metro/Micropolitan Statistical Area, Economic Area, or County), allowing the user to easily select and display the findings related to his spatial unit of interest. For the purpose of this analysis and for an easier comparison with the Italian scale of analysis adopted (Provincial area), data related to the MSAs of Boston and San Diego have been selected. The top Strong Traded Clusters for the two areas are shown further

#### 2. Data gathering for Italian provinces and computation of LQ indexes

Following Porter's categorisation of "traded" and "local" clusters by means of LQ indicator (cf. Box 5, § 3.1.1), the corresponding LQs for the Italian provinces have been calculated using two sets of data:

- a. National labour force data, gathered from the ISTAT data warehouse <http://dati.istat.it/>, by means of number of employees and establishments per industry classified by province and by ATECO 2007 2-digit codes.
- b. Exports data, gathered from the ISTAT data warehouse [www.coeweb.istat.it](http://www.coeweb.istat.it), by means of total value of exported goods or services classified by province and ATECO 2007 3-digit codes
- c. Implementation of Porter's methodology for the identification of traded and local clusters using employment data

Firstly, "Traded" and "Local" clusters have been discriminated following the three criteria adopted by Porter for the Cluster Mapping project:

- a. Identification of Traded and Local Industries. Almost the 88% of the traded industries (45) derived from the application of the 2nd criterion, while less the 10% (5) derived from the application of the 1st criterion, the 3rd one being mostly irrelevant (only one case). Indeed, the 1st criterion exclusively proved suitable to detect those specialisation economies related to the exploitation of natural resources (coal, oil and metals).
- b. Clustering of industries. Cluster Mapping project provides a list of the 51 clusters identified with the 2nd step of Porter's methodology (cf. Box 5, § 3.1.1) based on co-location patterns and other Regional data computed by an algorithm to find inter-industry linkages. The present study adopts the same grouping strategies, by decomposing the 51 clusters listed in M., Porter M. E. and Stern S. (2014a) in their respective sub-clusters and industries (identified by means of NAICS code) and

then grouping Italian industries following the same schemes. Fig. 23 shows the composition of the “Biopharmaceuticals” cluster in Delgado et al (2014a).

Figure 24. Boston MSA's Traded Clusters. Source: Author's Elaboration, 2015

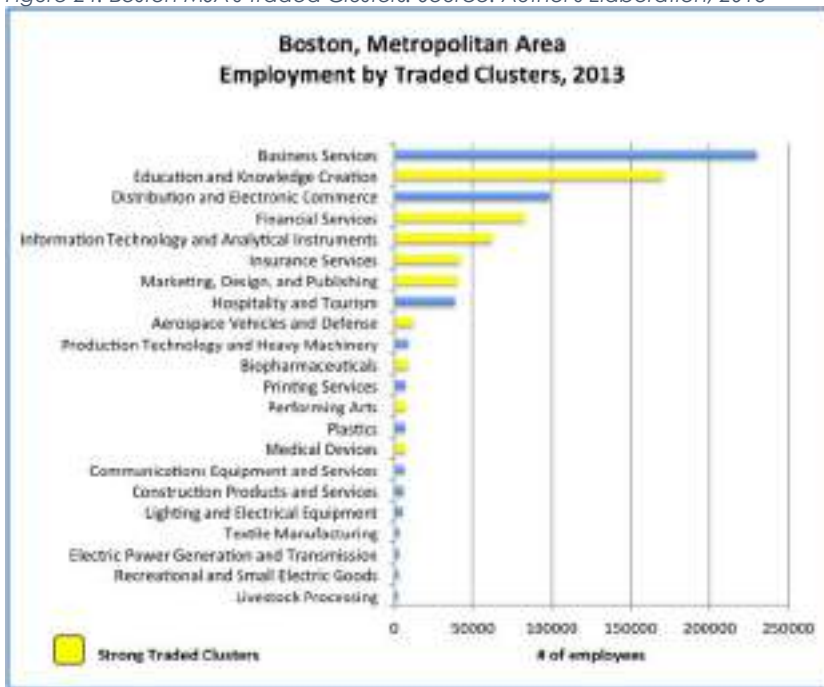
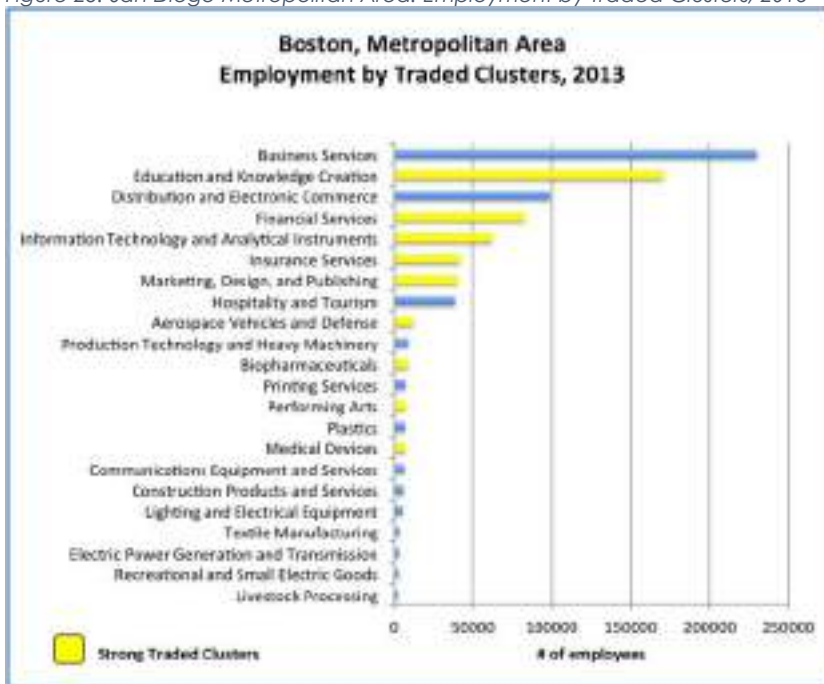


Figure 25. San Diego Metropolitan Area. Employment by Traded Clusters, 2013



Nevertheless, two main issues related to this step deserve to be mentioned:

- i. Italian employment data were only available at a broader level of industrial classification, i.e. 2-digit code instead of the 6-digit one used by Porter. This entailed, on one hand, some unavoidable merges of clusters and, on the other hand, a less degree of specificity in the composition of each cluster.
- ii. Italian data are classified by means of ATECO codification, while US adopt NAICS classification. The ATECO system is the Italian version of the European nomenclature, Nace Rev. 2 (EC, 2006), which, in turn, is a derived classification of the international codification system ISIC 4.0: categories at all levels of Nace are defined either to be identical to, or to form subsets of, single ISIC categories. ATECO, Nace and ISIC codifications coincide almost exactly up to the fourth level of economic activity, which is beyond the one considered for the analysis. Therefore, in order to be able to compare the US and the Italian industries classifications, it was necessary to employ the concordance tables from NAICS to ISIC codes provided by the US Census Bureau Office (<http://www.census.gov/eos/www/naics/concordances/concordances.html>).

The procedure delivered a list of 32 Traded Clusters and 18 Local Clusters, as summarised in Table 4.

Finally, Strong Traded Clusters have been selected accordingly with the 3<sup>rd</sup> step of Porter's methodology (cf. Box 5, § 3.1.1), exclusively for the province of Rome.

The charts showed below compare Italian clusters, as resulting by the application of the aforementioned methodology on employment data, with US clusters. Consistently with the US context (Delgado et al., 2014a), Italian Traded clusters, though larger in number (32 Traded Clusters vs. 18 Local Clusters), account for a smaller part of total employment (44%) as compared to Local Clusters (56%). However, as summarised in Table 5, US and Italian categorisations of traded and local clusters show some relevant differences, to be mostly attributed to specific peculiarities of the US industrial structure with respect to the Italian one:

- some US industries apparently benefit from specialisation economies in a greater account than the respective Italian ones, which in turn show even distribution patterns across the country. This is the case for "Food processing and manufacturing" and "Wood products";
- other US industries, mainly related to advanced services, show a more accentuated outward-orientation, in terms of capacity to sell their product in other Regions or to serve a broader market than the one constituted by resident customers. This is the case for "Education and Training" and "Entertainment industry".

Figure 26. Italian Traded and Local Cluster

Traded Clusters			Local Clusters		
1	COAL MINING	19	OTHER MANUFACTURING	101	LOCAL FOOD PROCESSING AND MANUFACTURING
2	OIL AND GAS PRODUCTION	20	REMEDIATION SERVICES	102	LOCAL WOOD PRODUCTS
3	METAL MINING	21	WHOLESALE	103	LOCAL CHEMICAL PRODUCTS
4	NONMETAL MINING	22	WATER TRANSPORTATION	104	LOCAL CONSTRUCTION PRODUCTS AND SERVICES
5	BEVERAGES	23	AIR TRANSPORTATION	105	LOCAL COMMERCIAL SERVICES
6	TOBACCO	24	LOGISTICS	106	LOCAL UTILITIES
7	APPAREL AND TEXTILE	25	HOSPITALITY AND TOURISM	107	LOCAL ENVIRONMENTAL SERVICES
8	FOOTWEAR AND LEATHER	26	MARKETING AND PUBLISHING	108	LOCAL REAL ESTATE, CONSTRUCTION AND DEVELOPMENT
9	PAPER AND PACKAGING	27	VIDEO AND MUSIC	109	LOCAL AUTOMOTIVE WHOLESALE
10	PRINTING	28	COMMUNICATIONS	110	LOCAL RETAILING
11	BIOPHARMACEUTICALS	29	BUSINESS SERVICES	111	GROUND TRANSPORTATION
12	PLASTICS	30	FINANCIAL SERVICES AND INSURANCE	112	LOCAL COMMERCIAL SERVICES
13	METAL MANUFACTURING	31	RESEARCH ORGANIZATIONS	113	LOCAL HOSPITALITY ESTABLISHMENTS
14	IT AND ANALYTICAL INSTRUMENTS	32	PERFORMING ARTS	114	LOCAL COMMERCIAL SERVICES
15	LIGHTING AND ELECTRICAL EQUIPMENT			115	LOCAL PERSONAL SERVICES
16	PRODUCTION TECHNOLOGY			116	LOCAL EDUCATION AND TRAINING
17	APPROPRIATE VEHICLES AND EQUIPMENT			117	LOCAL HEALTH SERVICES
18	FURNITURE			118	LOCAL ENTERTAINMENT AND MEDIA

Figure 27. US vs IT distribution of Employment (on the left) and Categorisation of Clusters (on the right). Source: Authors' elaboration 2016

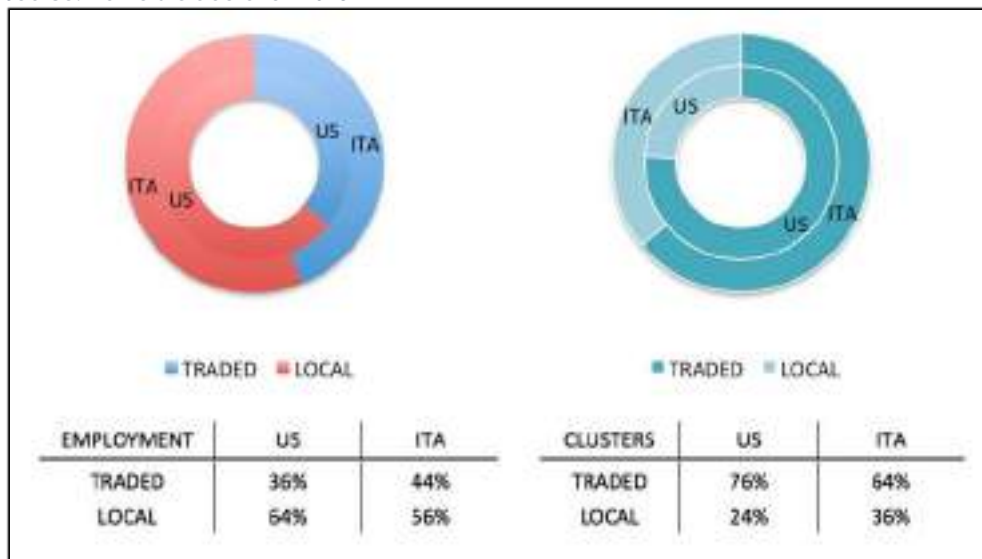


Figure 28. Main Categorisation differences between Italy and US

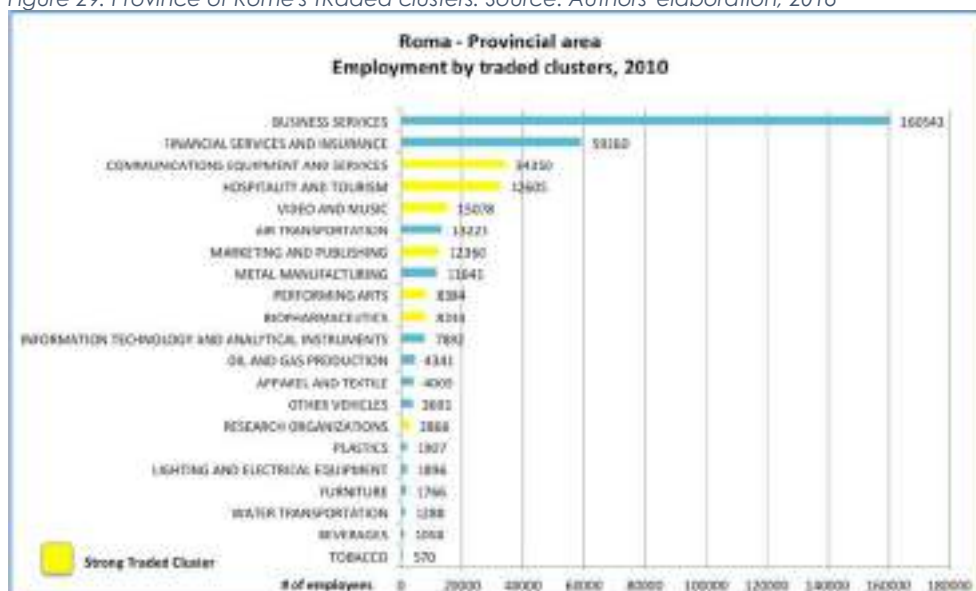
Clusters	US	Italy
Food processing and manufacturing	Traded	Local (except for Beverages)
Wood Products (no Furniture)	Traded	Local
Remediation services	Local	Traded
Education and Training	Traded	Local (except for Private Research Organizations)
Entertainment industry	Traded	Local



The results for the Province of Roma are displayed hereby. As shown, the four top ranking traded clusters, "Business Services", "Financial services and Insurance", "Communications Equipment and Services", and "Hospitality and Tourism" belong to the main sector of "advanced services". This is consistent with the employment distribution pattern of a large metropolitan area like Rome, which has long made its way towards an advanced, tertiary-led economy.

In particular, "Hospitality and Tourism" reveals to be one of the strongest traded clusters, due to the presence of a fervent tourism industry in the city. With respect to manufacturing clusters, "Biopharmaceuticals" and "Video and Music" are undoubtedly two of the most peculiar economic specialisations of the area, the former being led by the presence of big pharmaceutical companies in the province and the latter related to the presence of the most important and productive cinema industry of the country.

Figure 29. Province of Rome's Traded clusters. Source: Authors' elaboration, 2016



#### Detection of sub-clusters and other specialization economies in the Province of Rome using exports data

In the last stage of the work, exports-based LQ indexes have been employed in order to identify additional or hidden specialization economies in the Province or Rome. The procedure entailed the application of the same three criteria adopted in the second stage of the work, even if the higher level of detail in terms of industrial classification provided by exports data (3-digit codes instead of 2-digit) allowed a narrower definition and a more comprehensive composition of each cluster. Indeed, with specific regard to the strong traded clusters of the Province of Rome, additional strong subclusters have been identified, by selecting those ones exhibiting exports-based LQs > 2. These findings have been summarised in Table 6.

Figure 30. Traded Clusters and SubClusters in the Province of Rome based on exports data

Sub-clusters (from stage 4)	Respective Cluster (from stage 3)	Rome (LQ)
LIBRARY, ARCHIVES, MUSEUMS AND OTHER CULTURAL ACTIVITIES	HOSPITALITY AND TOURISM	37.35
CREATIVE, ARTS AND ENTERTAINMENT ACTIVITIES	PERFORMING ARTS	13.58
WEAPONS AND AMMUNITION	METAL MANUFACTURING	12.19
SOUND RECORDING AND MUSIC PUBLISHING	VIDEO AND MUSIC	7.05
SOAP AND DETERGENTS, CLEANING, AND POLISHING PREPARATIONS, PERFUMES, AND TOILET PREPARATION	LOCAL CHEMICAL PRODUCTS	5.33
MOTION PICTURE, VIDEO AND TELEVISION PROGRAMME PRODUCTION ACTIVITIES	VIDEO AND MUSIC	5.01
COMMUNICATION EQUIPMENT	COMMUNICATIONS EQUIPMENT	5.00
MEASURING, TESTING, NAVIGATING, AND CONTROL	METAL MANUFACTURING	4.84
ARTICLE OF FUR	APPAREL AND TEXTILE	4.38
VIDEOGAMES AND OTHER SOFTWARES	SOFTWARE	3.54
OPTICAL INSTRUMENTS AND PHOTOGRAPHY	VIDEO AND MUSIC	3.20
AIR AND SPACECRAFT AND RELATED MACHINERY	OTHER VEHICLES	2.84
PHARMACEUTICALS, MEDICAL, CHEMICAL, AND BOTANICAL PRODUCTS	BIOPHARMACEUTICS	2.76
OTHER CHEMICAL PRODUCTS	LOCAL CHEMICAL PRODUCTS	2.73
MAGNETIC AND OPTICAL MEDIA	IT, AND ANALYTICAL INSTRUMENTS	2.61
BASIC CHEMICALS	LOCAL CHEMICAL PRODUCTS	2.50
PULP, PAPER AND PAPERBOARD	PAPER AND PACKAGING	2.52
CONSUMER ELECTRONICS	IT, AND ANALYTICAL INSTRUMENTS	2.37
COMPUTERS AND PERIPHERAL EQUIPMENT	IT, AND ANALYTICAL INSTRUMENTS	1.83
IRRADIATION, ELECTROMEDICAL AND ELECTROTHERAPEUTIC EQUIPMENT	PRODUCTION TECHNOLOGY	1.75
BASIC PHARMACEUTICALS	BIOPHARMACEUTICS	1.07

Source: Author's elaboration, 2018

Strong Traded clusters =	
Strong Traded clusters (NEW)	

Within the present methodological framework, the additional information provided by the utilisation of the exports-based LQ does not pose any risk of overlapping with the definitions given in the third stage, since the groups identified in the third stage are still kept valid in order to allow comparisons with the US clusters. Nevertheless, this stage allows targeting two critical objectives:

1. Pointing out which Subcluster contributes the most in terms of exports magnitude within its respective Traded Cluster. For instance, this is the case of the “Motion Picture, Video And Television Programme Production Activities” and the “Sound Recording And Music Publishing” sub-clusters within the main cluster “Video and Music”, which notably represents one of the most important creative cluster in Italy (Lazzeretti et al., 2008).
2. Disclosing which Subclusters, though belonging to Local or Not-strong Traded Clusters, exhibit an outstanding performance in terms of exported goods or services. For instance, this is the case of the “Basic Chemicals” and the “Soap and detergents, cleaning, and polishing preparations, perfumes, and toilet preparation” sub-clusters within the Local Chemical Products. This sector, though categorised as “local”, is notoriously related in terms of shared competencies and technologies with the leading Strong Traded Cluster of “Biopharmaceuticals” (Boschma and Frenken, 2011), thus allowing future overarching assessments of the two sectors. Another relevant sub-cluster identified in this stage is the “Air and Spacecraft and Related Machinery”, which belongs to the cluster “Other vehicles” previously categorised as Not-Strong Traded cluster; indeed, the Province of Rome hosts a Europe's

leading Aerospace cluster, which was likely to be overlooked without going through this stage of the analysis.

#### BOX 9

##### A GLIMPSE AT THE OTHER PROVINCES OF LAZIO

The other four Provinces (Frosinone, Latina, Rieti, Viterbo) of the NUTS-2 Region "Lazio" host some of the leading manufacturing clusters in Italy, as shown in the below. Most notably, three of the four provinces displayed reveal an important presence of biopharmaceuticals (or related) clusters, which are likely to be strongly intertwined with the one identified in the Province of Rome, thus giving further evidence of the pivotal role played by this sector in the area.

##### STRONG TRADED CLUSTERS IN THE OTHER PROVINCES OF LAZIO

Provinces	Employment-based analysis	Exports-based analysis
VITERBO	<ul style="list-style-type: none"> <li>Other porcelain and ceramic products (1<sup>st</sup> in Italy, LQ = 4,5)</li> </ul>	<ul style="list-style-type: none"> <li>Other porcelain and ceramic products (1<sup>st</sup> in Italy, LQ = 174,53)</li> </ul>
LATINA	<ul style="list-style-type: none"> <li>Biopharmaceuticals (1<sup>st</sup> in Italy, LQ = 11,26)</li> </ul>	<ul style="list-style-type: none"> <li>Biopharmaceuticals, medical chemical and botanical products (1<sup>st</sup> in Italy, LQ = 15, 41)</li> </ul>
FROSINONE	<ul style="list-style-type: none"> <li>Biopharmaceuticals (3<sup>rd</sup> in Italy, LQ = 11,26)</li> <li>Paper and packaging (5<sup>th</sup> in Italy, LQ = 2,5)</li> </ul>	<ul style="list-style-type: none"> <li>Biopharmaceuticals (3<sup>rd</sup> in Italy, LQ = 12,74)</li> </ul>
RIETI	<ul style="list-style-type: none"> <li>Biopharmaceuticals (11<sup>th</sup> in Italy, LQ = 2,20)</li> <li>Measuring, testing, navigating and control machineries (3<sup>th</sup> in Italy, LQ = 4,35)</li> </ul>	<ul style="list-style-type: none"> <li>Biopharmaceuticals, medical chemical and botanical products (4<sup>th</sup> in Italy, LQ = 10,76)</li> </ul>

#### The Selection of Clusters for the Case Studies Analysis

The work described delivered a detailed picture of the economic structure of the Province of Rome, though further analyses might still be needed in order to better specify the composition of each cluster. Comparing the findings obtained for the Province of Rome and the information downloaded from the Cluster Mapping web platform for the Boston and San Diego MSAs, some research proposals for the forthcoming WPs of MAPS-LED project can be drawn. Indeed, the results for the province of Rome, compared with the US context, showed the presence of a similar economic-productive structure both in terms of advanced services (business services, financial services, marketing, research and development) and of industrial sectors, thus allowing multiple comparisons across the three areas to be feasible. Table 7 summarises the main similarities between the three areas under exam. Among the three top traded clusters that revealed to have a strong presence in all the three areas analysed, "Biopharmaceuticals" is by all means the most pervasive in terms of share of employment and exports magnitude. More in detail, the role of this cluster in the Province of Rome, as already mentioned (§ 3.3.2), is characterised by two important features:

1. The simultaneous presence of other Strong Traded “Biopharmaceuticals” Clusters in the areas surrounding the Province of Rome, which definitely ensures Lazio’s Region to be ranked 1st in Italy for this sector.
2. The strong relatedness with the Chemical Industry, which is another major specialisation of the Province of Rome and of surrounding areas (Latina, in particular).

Similar conclusions can be made for the “Medical devices” and the “Aerospace and Defence” clusters, which are the other two main specialisations that the three areas share.

Other suggestions include the “Hospitality and Tourism” and “Video and Music”, which are two leading specialisations in the areas of San Diego and Roma, as well as “Research Organisations” and “Marketing and publishing”.

Figure 31. Comparison Table between the Areas of Boston, San Diego and Rome

Top strong clusters	Boston	San Diego	Rome
Biopharmaceuticals	8 <sup>th</sup> in US ranking	7 <sup>th</sup> in US ranking	<ul style="list-style-type: none"> <li>• Top strong cluster in Rome</li> <li>• Along with other provinces in Lazio, 1<sup>st</sup> cluster in Italy ranking</li> <li>• Strong relatedness with the Chemical Industry, another top cluster in the province of Rome</li> </ul>
Medical devices	4 <sup>th</sup> in US ranking	8 <sup>th</sup> in US ranking	Top strong cluster in Rome (export-based LQ = 1,76)
Aerospace and defence	10 <sup>th</sup> in US ranking	8 <sup>th</sup> in US ranking	<ul style="list-style-type: none"> <li>• 7<sup>th</sup> in Italy ranking (export-based LQ = 2,85)</li> <li>• Strong relatedness with Arms and Ammunitions, another top cluster in Rome</li> </ul>
Other strong clusters	Boston	San Diego	Rome
Hospitality and tourism	-	8 <sup>th</sup> in US ranking	Top strong cluster in Rome
Video and music	-	Top strong cluster (12 <sup>th</sup> in the US ranking)	Top strong cluster in Rome (1 <sup>st</sup> in Italy ranking by employment and exports)
Research organizations	8 <sup>th</sup> in US ranking	2 <sup>nd</sup> in US ranking	Top strong cluster (employment-based LQ = 1,74)
Marketing and publishing	8 <sup>th</sup> in US ranking	13 <sup>th</sup> in US ranking	Top strong cluster (5 <sup>th</sup> in Italy ranking)

Eventually, the strength of a specific cluster, in terms of its economic magnitude, and the cluster’s relatedness with other economic sectors in the area represent two of the most useful criteria to be adopted for the selection of the case studies. Furthermore, the clusters identified in this section show a potential connection with the six Key Enabling Technologies (micro and nanoelectronics, nanotechnology, industrial biotechnology, advanced materials, photonics, and advanced manufacturing technologies) that are largely acknowledged in Europe as one of the investment priorities in fostering the transition to a “smart, sustainable and inclusive economy” (European Council, 2010). Therefore, tracing back the emergence and the evolution of industries related to KET is pivotal to derive those factors that can drive their implementation in the European local economies, either as an emerging sector or as a means to modernise traditional sectors.

### Relation Within Theories

#### Comparison between RIS3 and Implementation of Regional Policies

As discussed in point 1.3.3 most of the Italian Regions did not start on time in implementing their RIS3. In 2013, only Lombardy and Liguria approved their final report

at Regional council. Then, a year later other eleven Regions completed the same steps. Considering that EC settled as expiring date the end of 2014, in Italy only fourteen out of twenty-one between Regions and autonomous provinces respected this deadline. In 2015, other five Regions obtained the final RIS3 document approved by their respective Regional councils. Except for Regions excluded by this study, for difficulty in finding official materials (Basilicata, Campania), only Abruzzo Region still miss to implement RIS3 strategy. Overall, this initial framework in RIS3 implementation, as a pre-condition for ERDF funding, determined a general delay on the implementation of Operational Programmes.

However, on January 2016 has been possible built a general overview about implementation and approval of ROP-ERDF, as shown by the graph below.

In 2015, European Commission approved all Regional Operational Programmes. However, some Regions received the approval before than others, coherently with the RIS3 implementation process. Noteworthy is the Abruzzo' case that received the ROP-ERDF approval on August 2015. That means that Abruzzo developed its Operational Programmes without taking in account the RIS3 strategy, as recommended by the EC. According to the European Commission, the concept of the RIS3 is mostly one of policy strategy development, which would subsequently be implemented in the Operational Programmes (EC, 2015).

Assuming this overall framework as the most current, it is difficult to begin a qualitative analysis in order to find coherence between concept developed in RIS3 and their coherency in Regional politics.

One of the main tool strongly suggested by EC, also recommended by RIS3 Guide as one of the six fundamental steps, is the monitoring and evaluating strategy. Into the Guide, this last step of overall strategy is highlight by evoking the smart specialisation concept as a means that should evolve and adjust to changes in economic and framework conditions, as well as to emergence of new evidence during implementation through evaluation and monitoring activities (RIS3 GUIDE, 2012).

Therefore, some Regions have clearly declared in their RIS3 document, the commitment in monitoring and evaluating implementation of their RIS3 on territory. In order to measuring the effectiveness of instruments and the development of transition processes fostered by RIS3 strategy some Regions has also developed a system of indicators. Within these Regions there are: Marche, Calabria, Friuli-Venezia Giulia, Liguria, Lombardy, Piedmont, Apulia, Sardinia, Sicily, Tuscany, autonomous province of Trento, Umbria, Valle d'Aosta and Veneto.

Figure 32. POR - ERDF implementation. Source: our processing from Agency for territorial Cohesion and Campania Region Official Website

Italian Regions	ROP-ERDF				
	Feb 2015	Jul 2015	Aug 2015	Oct 2015	Dec 2015
VALLE D'AOSTA	APPROVED 03/03/2015 - 11/02/2015				
PICEMONT	APPROVED 03/03/2015 - 03/03/2015				
FRKA-VENEZIA-GAUA		APPROVED 03/03/2015 - 16/03/2015			
LOMBARDY	APPROVED 03/03/2015 - 11/02/2015				
LIGURIA	APPROVED 03/03/2015 - 11/02/2015				
TREVIPO	APPROVED 03/03/2015 - 11/02/2015				
BOLZANO*	APPROVED 03/03/2015 - 11/02/2015				
VENETO			APPROVED 03/03/2015 - 11/02/2015		
EMILIA-ROMAGNA	APPROVED 03/03/2015 - 11/02/2015				
TUSCANY	APPROVED 03/03/2015 - 11/02/2015				
LAZIO	APPROVED 03/03/2015 - 11/02/2015				
MARCHE	APPROVED 03/03/2015 - 11/02/2015				
MOUZE		APPROVED 03/03/2015 - 11/02/2015			
UMBRIA	APPROVED 03/03/2015 - 11/02/2015				
APULIZO			APPROVED 03/03/2015 - 11/02/2015		
CAMPANIA					APPROVED 03/03/2015 - 11/02/2015
CALABRIA				APPROVED 03/03/2015 - 11/02/2015	
BASILICATA			APPROVED 03/03/2015 - 11/02/2015		
APULIA			APPROVED 03/03/2015 - 11/02/2015		
SIPI			APPROVED 03/03/2015 - 11/02/2015		
SARDINIA		APPROVED 03/03/2015 - 11/02/2015			

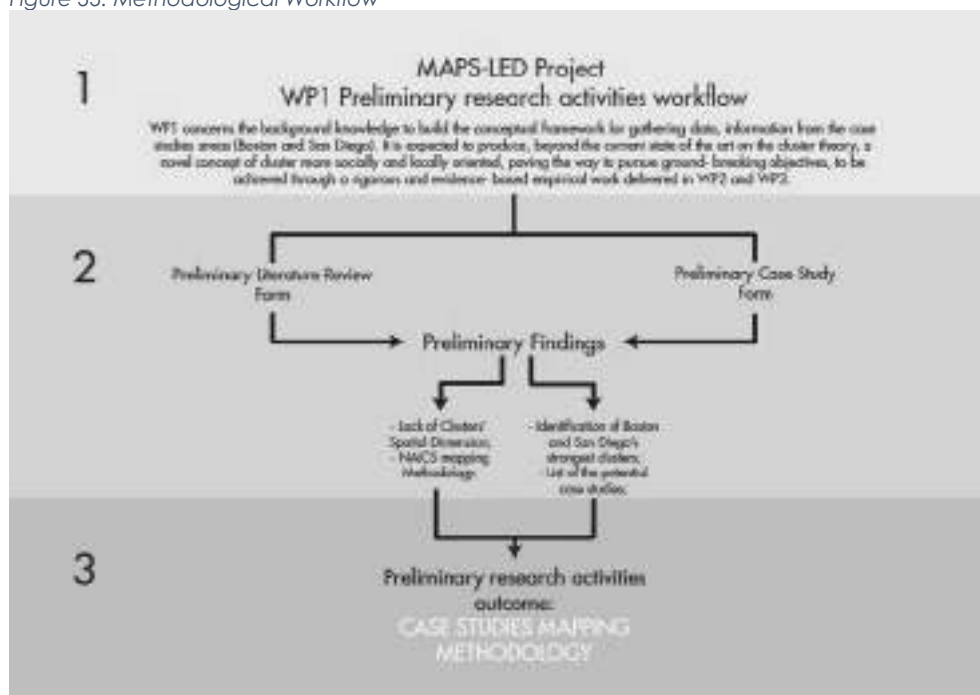
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Part III  
Cluster Spatialisation Methodology  
PAU Unit

# The Preliminary Research Activities Methodological Workflow

In order to build the conceptual framework for gathering data from the case studies areas (Boston and San Diego), the preliminary activities conducted along this preliminary phase have been led in compliance with the following workflow, as outlined below.

Figure 33. Methodological Workflow



Section 1 summarizes the preliminary research activity concerning both the literature review and preliminary case studies and the analytical tools adopted. Section 3.2 describes the forms used in approaching the case studies as well as the main data source, the web platform “clustermapping.us”.

Section 2 is related to the preliminary GIS methodology. GIS has been demonstrated to be a useful tool, firstly for mapping Boston and San Diego Metropolitan Statistical area, and secondly for analysing Data collected through a spatial perspective.

Section 3 regards the main data source used for the applied methodology. Data have been gathered combining the us cluster mapping website and the us census data together with local databases about land use.

Section 4 lists preliminary study findings from the research, that will pave the way to undertake further research activities.

## Section 1 The Preliminary Literature Review Form

Scientific literature reviews are crucial when planning a research study because «they can help guide the researcher in an appropriate direction by answering several questions related to the topic area» (Marczyk G., 2005, p. 33). Furthermore, «such a conceptual literature review is an attempt to bring together writings on diverse matters



related to the coming study's phenomena. It is a search for contextual relationships. It is the territory covered by a concept map» (Stake R. E., 2010, p. 111).

The literature review forms' fill out stage is the result of a preliminary process of research and study about Smart Specialization Strategies and related topics, such as Cluster Economic Development and policies, Governance, Place Based Approach, Innovation and Global Value Chain.

During this preliminary phase, a pre-defined form has adopted in order to lead a homogeneous approach to the subject. Form's Sections are listed in the figure below.

Figure 34. Preliminary Literature Form's Section

<p><b>Literature reference</b></p> <p>Source Typology: Book <input type="checkbox"/> Paper <input checked="" type="checkbox"/> Other <input type="checkbox"/></p> <p>Author(s) name (s) (full): Michael Eugene Porter</p> <p>Title: Clusters and the New Economics of Competition</p> <p>Year: 1998</p> <p>Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages): Harvard Business Review, November-December 1998: 77.</p> <p>Link to Publication: <a href="https://doi.org/10.1177/001316449801100101">https://doi.org/10.1177/001316449801100101</a></p> <p>Keywords as they appear in the document: -</p> <p>Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WPI):          What is a Cluster? Pages 75-80          Why Clusters are critical to Competition. Pages 80-84</p> <p>Level: National <input type="checkbox"/> Regional <input type="checkbox"/> Local <input checked="" type="checkbox"/></p> <p>Case Study: indicated in the paper (Y): Case studies: California Wine Cluster, Italian Leather Cluster, US Clusters, Portugal's Clusters.</p> <p>Research Method applied: <input type="checkbox"/> Quantitative Method <input checked="" type="checkbox"/> Qualitative Method - It is an exploratory study providing a new concept for clusters <input type="checkbox"/> Mixed approach</p>	<p><b>Key sectors</b></p> <p>(to be selected within the list below)</p> <p>Smart Specialisation Strategies</p> <p>RIS3 - Research and Innovation Smart Specialisation Strategies - Regional Plan</p> <p><input checked="" type="checkbox"/> Cluster Economic Development</p> <p><input checked="" type="checkbox"/> Cluster Policy</p> <p>Social Innovation</p> <p>Place-Based Approach</p> <p>Territorial milieu</p> <p>Spatial Planning</p> <p>Urban Cluster</p> <p>Urban Regeneration and economic development</p> <p>Metropolitan city</p> <p>Urban network</p> <p><input checked="" type="checkbox"/> Urban competitiveness</p> <p>Governance and cluster</p> <p>Note:</p>
<p><b>Reference Typology</b></p> <p><input checked="" type="checkbox"/> Theory</p> <p>Methodology</p> <p>Best Practices</p> <p>Guidelines</p> <p>Policy Analysis</p> <p>Others</p> <p>Note:</p>	<p><b>Reference Field of Interest</b></p> <p>Spatial dimension</p> <p>Social context</p> <p>Environmental aspects</p> <p><input checked="" type="checkbox"/> Economic Development</p> <p><input checked="" type="checkbox"/> Governance</p> <p><input checked="" type="checkbox"/> Local innovation process</p> <p>Public Policy</p> <p>Others</p> <p>Note:</p>
<p><b>Reference Keywords according with the MAPS-LED Project</b></p> <p>Key words (three to five keywords selected within the list below)</p> <p><input checked="" type="checkbox"/> Territorial milieu</p> <p><input checked="" type="checkbox"/> Social networks</p> <p>Enabling technologies</p> <p>Law profiles</p> <p>Regeneration strategies</p> <p>Urban-rural link</p> <p>Assessment models</p> <p><input checked="" type="checkbox"/> Supply chains</p> <p>Governance schemes</p> <p><input checked="" type="checkbox"/> Innovation</p> <p>Smart technologies</p> <p><input checked="" type="checkbox"/> Local value chain</p> <p>PPP</p> <p>Others</p> <p>Notes:</p>	<p><b>Synthesis and Comments</b></p> <p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project:</p> <p>The document is a milestone for the cluster theory. It explains specifically the meaning of clusters and why they are so extremely important for a local economy and critical for competition. In the first part the paper focuses on cluster theory, with reference on some case study and how to spur economic development in those areas. It is presented also the relation among clusters and productivity, with few case studies taken as an example, such as California wine cluster, Italian leather cluster, US clusters and Portugal clusters. The understanding of clusters lays on the following issues: the choice of the right location, local engagement, the upgrade of the cluster and the collective work within a cluster. In the last part takes place a section about the mistakes of industrial policy and Public-private responsibilities and investments, so with more focus on governance.</p> <p>Comments about the possible connection with the specific objectives of the WPI:</p> <p>Within the objectives of the WPI, in this paper is presented a concept of social clusters, intended as the local engagement of the community within the clusters. The social glue that binds together a cluster facilitates access to important resources and information. To maximize the benefits of cluster involvement, companies must participate actively and establish a significant local presence. It is crucial within this view, to foster ongoing relationships with government bodies and local institutions such as utilities, schools and research groups.</p>

The following criteria have been applied in order to synthesize the data gathered on scientific literature review analysis:

1. source typology;
2. year;
3. territorial level;
4. number of case studies;

5. research method applied;
6. key sectors;
7. reference typology;
8. field of interest;
9. keywords according with the MAPS-LED Project.

A statistical-descriptive analysis has been carried out comparing the collected literature references.

### Section 1 The Preliminary Case Study Form

Filling out the forms on the case studies is the result of a preliminary process of approaching and studying the geographic “concentration of related industries” (definition provided by the U.S. Cluster Mapping website) across the Boston and San Diego regions (in terms of Metropolitan Statistical Areas). The analysis of 51 Traded and 16 Local clusters’ sectors - both located within the Boston and San Diego Metropolitan Statistical Areas - has been conducted according to the classification provided by the U.S. Cluster Mapping website<sup>21</sup>.

Data about the economic performance has been measured and provided for both MSAs, hence displayed through the Region Dashboard on the website mentioned above. each cluster is identified by NAICS industry codes which are aggregated in sub-clusters that, in turn, define the cluster itself (Figure 36).

The analysis has been based on the following economic indicators<sup>22</sup>, selected in order to describe the economic performances of each cluster:

Employment data within each sector;  
 Job creation data (measured in absolute value);  
 Annual Wage and Annual Wage Growth Rate;  
 Specialization understood in terms Location Quotient (LQ) and National Employment Share;  
 Establishment and Establishment Growth Rate;  
 Innovation measured in terms of Patent Count and Patent Count Growth Rate.  
 Cluster Data - collected for the date-range from 1998 to 2013 - have been organized in tables, differentiating Traded from Local cluster related to each metropolitan statistical area (Boston and San Diego). Subsequently, the descriptive analysis has been integrated with graphs.

Data have been reorganized according to the main indicators already defined, giving priority to the economic ones. In order to show the performances of the full set of clusters for every economic indicator, two different types of graphs have been plotted: stacked bar charts for depicting Growth Rates, whereas line graphs for displaying Specialization and Employment. Finally, the graphs produced have been levelled out.

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21 Source of Data on [www.clustermapping.us](http://www.clustermapping.us) comes from U.S. Census Bureau

22 The economic indicators’ definitions are referred to the glossary of the website [www.clustermapping.us](http://www.clustermapping.us)

Figure 35 Example of Cluster Composition.

<b>Cluster Name:</b>	<b>Business Services</b>
<b>Cluster Code:</b>	<b>6</b>
<b>Description:</b>	Firms in this cluster include establishments and services primarily designed to support other aspects of a business or to assist unrelated companies. This includes corporate headquarters, professional services such as consulting, legal services, facilities support services, computer services, engineering and architectural services, and placement services. All for-hire ground passenger transportation services are also present in this cluster.

Number of Industries 33

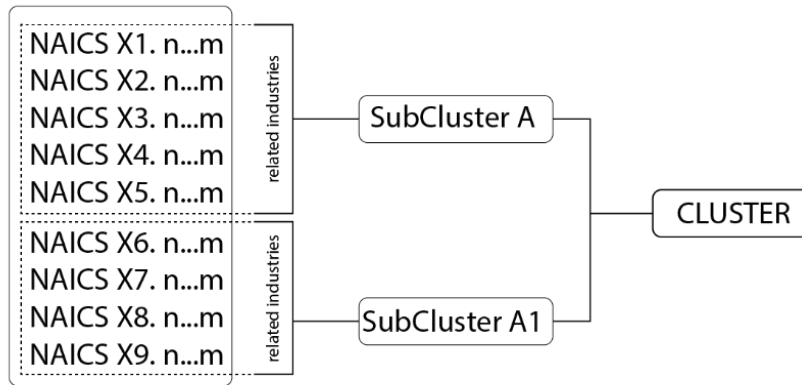
NAICS	NAICS Name	Subcluster Name
35111	Offices of Bank Holding Companies	Corporate Headquarters
35112	Offices of Other Holding Companies	Corporate Headquarters
35118	Corporate, Subsidiary, and Regional Managing Offices	Corporate Headquarters
54101	Administrative Management and General Management Consulting Services	Consulting Services
54102	Human Resources and Executive Search Consulting Services	Consulting Services
54104	Process, Physical Distribution, and Logistics Consulting Services	Consulting Services
54108	Other Management Consulting Services	Consulting Services
54199	Other Scientific and Technical Consulting Services	Consulting Services
22210	Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	Business Support Services
54199	All Other Legal Services	Business Support Services
54224	Payroll Services	Business Support Services
54190	Translation and Interpretation Services	Business Support Services
54199	All Other Professional, Scientific, and Technical Services	Business Support Services
56220	Facilities Support Services	Business Support Services
56320	Professional Employer Organizations	Business Support Services
56142	Telephone Answering Services	Business Support Services
56142	Telemarketing Bureaus	Business Support Services

### Section 3 The Cluster Data Source

The website “*clustermapping.us*” has been set up by a scientific team led by Michael E. Porter, Professor at Harvard Business School. The website provides detailed data sets concerning all clusters US Nationwide which have been focused by the research team.

All the classification on the website is based on Professor Porter's Cluster definition, which does entail more economic aspects providing a general spatial localization. The classification draws from data concerning different NAICS – *North American Industry Code System*, each of them representing one industry sector. So, different NAICS, according to criteria further illustrated, are filed together into a “subcluster”. More subclusters are grouped into a single “cluster”, as shown below.

Figure 36. Clusters Organisation by NAICS Codes



Further, the distinction among “traded” and “local” clusters, proposed by Porter’s research team, shape the overall hierarchy of the data platform.

The so-called “Traded” clusters are «groups of related industries that serve markets beyond the region in which they are located. They are free to choose their location of operation (unless the location of natural resources drives where they can be) and are highly concentrated in a few regions, tending to only appear in regions that afford specific competitive advantages».<sup>23</sup>

Instead, the “Local” clusters consist of industries that serve the local market. «They are prevalent in every region of the country, regardless of the competitive advantages of a particular location. As a result, a region’s employment in local clusters is usually proportional to the population of that region».<sup>24</sup> According to this distinction «the sets of traded industries are then organized into traded clusters based on an overall measure of relatedness between individual industries across a range of linkages, including input-output measures, use of labour occupations, and co-location patterns of employment and establishments. Local industries are grouped primarily based on similarities in activities reflected in aggregated U.S. industry categories.

Figure 37. Methodological grouping industry sector in traded or local cluster

REGION · INDUSTRY MEASURES	INDUSTRY MEASURES
<b>Co-location of Industry Employment</b> (U.S. Census Bureau: County Business Patterns)	<b>Input-Output Links</b> (U.S. Bureau of Economic Analysis: National Input-Output Tables)
<b>Co-location of Industry Establishments</b> (U.S. Census Bureau: County Business Patterns)	<b>Occupational Correlation</b> (U.S. Bureau of Labor Statistics: Occupational Employment Statistics)

23 Source: <http://www.clustermapping.us/content/clusters-101>

24 *Ibidem*

The geographic scope of a cluster is provided by the distances over which linkages and externalities have a meaningful impact. These distances differ by cluster categories and their underlying types of economic activities. For practical purposes, the geographic scope used in cluster mapping is an administratively defined region such as a state or economic area, even if it does not necessarily match the true geographic scope of specific clusters».<sup>25</sup>

It is possible to query the database, by selecting either "region" or "cluster". Each selection has the same territorial area focus.

Table 2 Region Type according to clustermapping.us categorisation

REGION TYPE
STATE
COUNTY
ECONOMIC AREA
METROPOLITAN OR MICROPOLITAN STATISTICAL AREA

The US Census, that represents the main data source for the US clustermapping website, defines "Economic Area" and "Metro/Micropolitan Statistical Areas" as follow

#### ECONOMIC AREA:

"BEA's economic areas define the relevant regional markets surrounding metropolitan or micropolitan statistical areas. They consist of one or more economic nodes (metropolitan or micropolitan statistical areas that serve as regional centres of economic activity) and the surrounding counties that are economically related to the nodes. These economic areas represent the relevant regional markets for labor, products, and information. They are mainly determined by labor commuting patterns that delineate local labor markets and that also serve as proxies for local markets where businesses in the areas sell their products. In less populated parts of the country, newspaper readership data are also used to measure the relevant regional markets".<sup>26</sup>

#### METRO/MICROPOLITAN STATISTICAL AREAS:

"Metropolitan and micropolitan statistical areas (metro and micro areas) are geographic entities delineated by the Office of Management and Budget (OMB) for use by Federal statistical agencies in collecting, tabulating, and publishing Federal statistics. A metro area contains a core urban area of 50,000 or more population, and a micro area contains an urban core of at least 10,000 (but less than 50,000) population. Each metro or micro area consists of one or more counties and includes the counties containing the core urban area, as well as any adjacent counties that have a high degree of social and economic integration (as measured by commuting to work) with the urban core"<sup>27</sup>.

The website "clustermapping.us" allows the economic analysis clusters grouping data by Region and by Cluster. Sorting data by region, the data set are categorized in three main Indicator Categories, each with its own economic indicators (Table 3).

25 Source: <http://clustermapping.us/content/cluster-mapping-methodology>

26 Source: Kenneth P. Johnson and John R. Kort (2004). Redefinition of the BEA Economic Areas. e The US Bureau of Economic Analysis (BEA). available at <https://www.bea.gov/scb/pdf/2004/11November/1104Econ%20Areas.pdf>. Accessed in August 2015

27 Source: US Census Bureau (2015). Metropolitan and Micropolitan Statistical Area Main. Accessed August 2015. <http://www.census.gov/population/metro/>.

Table 3 Data Indicators reported on the clustermapping.us

DEMOGRAPHICS & GEOGRAPHY	BUSINESS ENVIRONMENT	PERFORMANCE
GOV EMPLOYMENT LOCAL SERVICES	PROSPERITY	R&D EXPENDITURE PER CAPITA
GOV EMPLOYMENT FEDERAL SERVICES	PROSPERITY GROWTH	R&D EXPENDITURE PER CAPITA GROWTH
GOV EMPLOYMENT HIGHER EDUCATION	ANNUAL WAGE	FEDERAL FUNDING FOR R&D PER CAPITA
GOV EMPLOYMENT HEALTH & HOSPITALS	ANNUAL WAGE GROWTH RATE	FEDERAL FUNDING FOR R&D PER CAPITA GROWTH
MILITARY PARADIGM & CONTRACTS	LABOUR MOBILIZATION	VENTURE CAPITAL
REAL WAGE (2008=1)	CHANGE IN LABOUR MOBILIZATION	VENTURE CAPITAL GROWTH
POPULATION BY AGE (0-4)	EMPLOYMENT GROWTH RATE	SCIENTIFIC DEGREES AWARDED
POPULATION BY AGE (5-17)	JOB CREATION	ADVANCED SCIENTIFIC WORKERS
POPULATION BY AGE (18-24)	UNEMPLOYMENT	TOTAL RECEIVING HIGH SCHOOL DIPLOMA OR MORE
POPULATION BY AGE (25-44)	CHANGE IN EMPLOYMENT	TOTAL WITH SOME COLLEGE OR ASSOCIATES DEGREE OR MORE
POPULATION BY AGE (45-64)	POVERTY RATE	TOTAL COMPLETING A BACHELOR DEGREE OR MORE
POPULATION BY AGE (>65)	CHANGE IN POVERTY RATE	UNIONIZATION
TOTAL POPULATION GROWTH	LABOUR FORCE PRODUCTIVITY	GROWTH OF UNIONS
18-24 ADULT POPULATION GROWTH	LABOUR FORCE PRODUCTIVITY GROWTH	RATES AS PERCENTAGE OF GDP
	INNOVATION	CORPORATE TAXES AS PERCENT OF GDP
	INNOVATION GROWTH	CLUSTER STRENGTH
	PATENT COUNT	EMPLOYMENT GROWTH IN STRONG CLUSTER
	PATENT COUNT GROWTH	MANUFACTURING INTENSITY
	EXPORTS	CHANGE IN MANUFACTURING INTENSITY
	EXPORTS GROWTH	CONSUMER SPENDING
	ESTABLISHMENT GROWTH RATE	AGRICULTURE GDP
	FCI	

Sorting data by “cluster”, a reduced number of indicators is available for each cluster as well as for the related sub-clusters (Tab. 4).

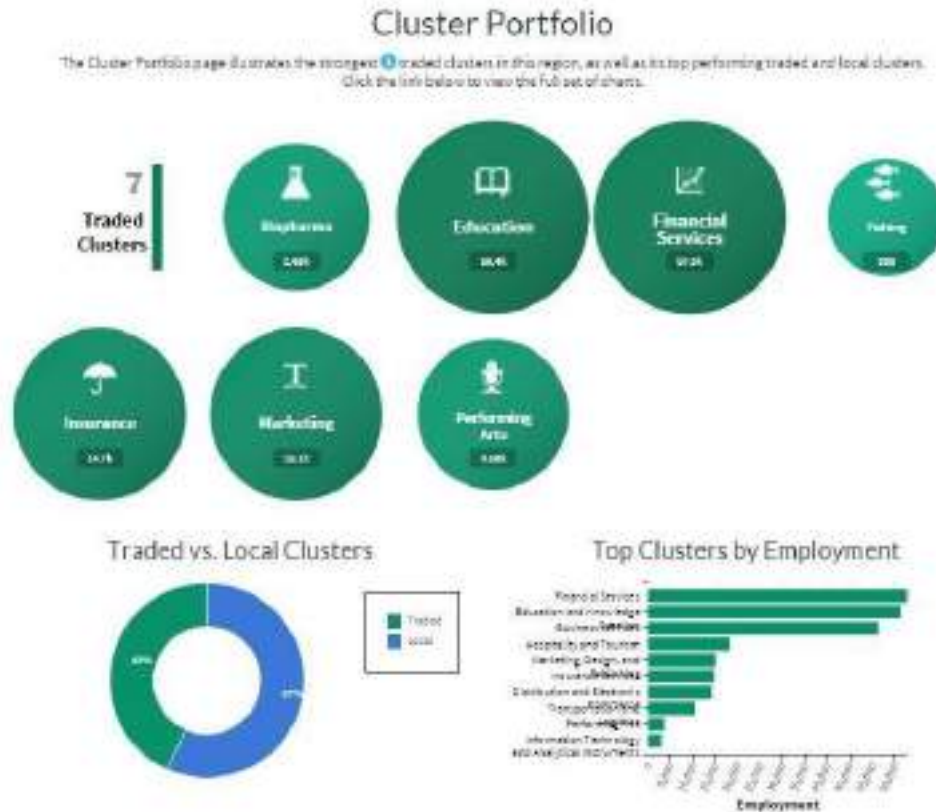
Table 4. Cluster Selection economic indicators

REGION TYPE	ECONOMIC INDICATOR	
STATE	SPATIALIZATION	CHANGE IN LOCATION QUOTIENT
ECONOMIC AREAS	EMPLOYMENT	ESTABLISHMENTS
REGIONAL DEVELOPMENT & REGIONAL POLICY COUNCILS	UNEMPLOYMENT GROWTH RATE	UNEMPLOYMENT QUOTIENT RATE
	JOB CREATION	ESTABLISHMENTS CREATION
	ANNUAL WAGE	PATENT COUNT
	ANNUAL WAGE GROWTH RATE	PATENT COUNT GROWTH RATE
	INDUSTRY DIVERSITY	

For each cluster and subcluster the website provides data related to the organizations involved in each of them, but data are not always available.

The link between the two different methodologies about data inquiry (to query data either by “region” or by “cluster”) is represented by the so called “cluster portfolio” which gathers together all the data for each region related to the “strong clusters” (Fig.39).

Figure 38. Example of Cluster Portfolio. Source: [clustermapping.us](http://clustermapping.us)



According to Porter (2010) «Strong clusters are defined as those where the location quotient, i.e. the cluster's relative employment specialization, puts them into the leading 25% of regions across the U.S. in their respective cluster category»<sup>28</sup>. The strong clusters in a region are identified «by the clusters that have High Employment Specialization in a region (in the top 25% of all regions by specialization, and also meeting minimum criteria for employment and establishment»<sup>29</sup>. The Table below shows the main database sources.

28 Source: <http://clustermapping.us/content/cluster-mapping-methodology>

29 Source: <http://www.clustermapping.us/content/glossary-terms>

Table 5 US clustermapping database sources

SOURCE	DATA PROVIDED	DATA PROVIDED
US CLUSTER MAPPING WEBSITE SOURCE	EMPLOYMENT GROSS REGIONAL PRODUCT BY COUNTY ANNUAL GROWTH EMPLOYMENT GROWTH RATE UNEMPLOYMENT POVERTY RATE PERCENT UNEMPLOYED BY EDUCATIONAL GROWTH RATE EDUCATIONAL GROWTH RATE TOTAL HIGHER EDUCATION ENROLLMENT TOTAL COLLEGE OR ASSOCIATED ENROLLMENT TOTAL COLLEGE ENROLLMENT GROWTH RATE TOTAL COLLEGE ENROLLMENT GROWTH RATE	CLUSTER STRENGTH GROSS REGIONAL PRODUCT POPULATION BY AGE (0-14) POPULATION BY AGE (15-24) POPULATION BY AGE (25-34) POPULATION BY AGE (35-44) POPULATION BY AGE (45-54) POPULATION BY AGE (55-64) POPULATION BY AGE (65+) TOTAL POPULATION GROWTH YOUTH ADULT POPULATION GROWTH PERCENT UNEMPLOYED NET EDUCATIONAL INVESTMENT NET EXPORT (NEGATIVE) ANNUAL GROWTH PERCENT UNEMPLOYED AND UNEMPLOYED GROSS REGIONAL PRODUCT
US BUREAU OF LABOR STATISTICS	LABOR PRODUCTIVITY GROSS REGIONAL PRODUCT UNEMPLOYMENT GROSS REGIONAL PRODUCT	LABOR PRODUCTIVITY GROSS REGIONAL PRODUCT GROWTH UNEMPLOYMENT LABOR PRODUCTIVITY
US BUREAU OF ECONOMIC ANALYSIS	REAL PERSONAL DISPOSABLE INCOME PERSONAL DISPOSABLE INCOME GROWTH	REAL PERSONAL DISPOSABLE INCOME PERSONAL DISPOSABLE INCOME GROWTH
US BUREAU OF ECONOMIC RESEARCH	UNEMPLOYMENT UNEMPLOYMENT GROWTH	
PROFIT CORPORATION	PROFITABILITY	PROFITABILITY GROWTH
NATIONAL BUREAU OF ECONOMIC RESEARCH	LABOR PRODUCTIVITY GROWTH GROSS REGIONAL PRODUCT GROWTH FEDERAL BUDGET DEFICIT FEDERAL BUDGET SURPLUS FEDERAL BUDGET DEFICIT GROWTH	GROSS REGIONAL PRODUCT GROWTH LABOR PRODUCTIVITY GROWTH GROWTH IN LABOR PRODUCTIVITY GROWTH ANNUAL PERSONAL DISPOSABLE INCOME GROWTH
RESEARCH	RESEARCH	RESEARCH
UNIVERSITY	UNIVERSITY	UNIVERSITY
UNIVERSITY	UNIVERSITY	UNIVERSITY
UNIVERSITY	UNIVERSITY	UNIVERSITY
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### Section 3 The Preliminary GIS Maps Construction Methodology

The preliminary research activity analysis on Traded and Local Cluster data has highlighted the need to visualize the spatial configuration of the Boston and San Diego Metropolitan Statistical Areas (MSA) at a local level. The US cluster mapping website (<http://www.clustermapping.us/>) is the main Data Source used to fill out the “Preliminary Case Study Form” and, although it can be considered a complete and exhaustive source of data on Traded and Local Clusters and a good “spatial” visualization tool at National and State level, has emerged the need of a better “spatial” visualization of clusters at MSA and Local level. Therefore, a “preliminary” Geographical Information System (GIS) has been set up in order to better visualize Clusters data. The information reported below summarises the steps adopted for the “preliminary” GIS map construction:

Metropolitan Statistical Areas’ (MSA) definition and delineation relies on the official Bulletin provided by the *Office of Management and budget of the White House*, which provides a profile for the Nation’s Metropolitan Statistical Areas.

The Boston-Cambridge-Newton, MA-NH Metropolitan Statistical Area with its major cities (Boston, Cambridge, Newton, Framingham, Waltham) is compounded by

- Norfolk, Plymouth and Suffolk counties (Boston, MA metropolitan division);
- Essex and Middlesex Counties (Cambridge-Newton-Framingham, MA metropolitan division);
- Rockingham and Strafford counties (NH metropolitan division) are integrated part of the Boston MSA.

The San Diego-Carlsbad, CA Metropolitan Statistical Area (San Diego and Carlsbad are the major cities) includes the San Diego county.

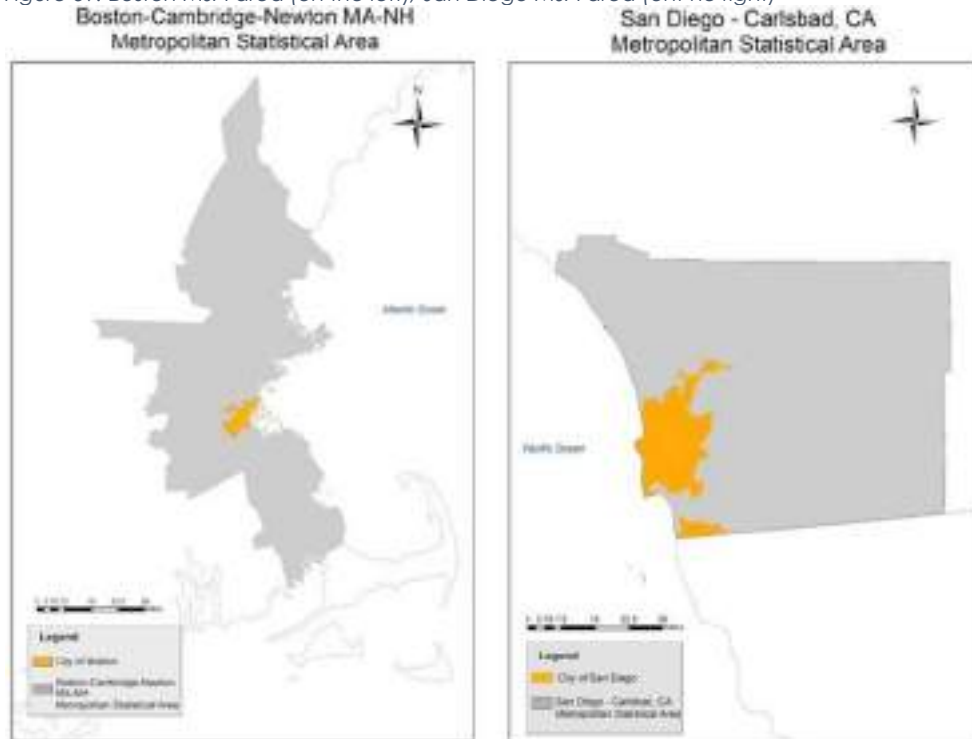


Shapefiles and Metadata have been gathered from the main US authorities' web site outlined below:

- Boston Redevelopment Authority;
- Metropolitan Area Planning Council;
- Commonwealth of Massachusetts;
- Massachusetts Department of Transportation;
- United States Census Bureau;
- New Hampshire state;
- Landsat.com (enterprise for acquisition of satellite imagery of Earth);
- San Diego Association of Governments;
- California State;
- Geographic Information System software for creating maps;
- Esri.com (supplier of GIS software's).

Afterwards, the two MSA areas were selected in the system in order to set the condition for further research activities.

Figure 39. Boston MSA area (on the left), San Diego MSA area (on the right)



## The Preliminary Findings

### The Preliminary Literature Review Findings

The preliminary literature review phase browsed a number of references consistent with the research project topics and sorted them according to the aforementioned scientific criteria, as indicated in the forms. References have been listed by typology, which whom scientific journal articles represent the majority among books, conference publications, report studies, presentations.

Below are represented the main findings regarding the literature review:

A. The research topics have been recently at the top of the scientific debate

By representing references per year of publications, it is clear how the topics (considered the selected analysed references) have been more recently remarked by the scientific community. Indeed, after 2011 the Literature production consistent with the selected topics has increased. It is likely that both the spread of the concept of Smart Specialisation (Foray, 2009)<sup>30</sup> and the raise of the S3 Platform (2011) have influenced the scientific debate

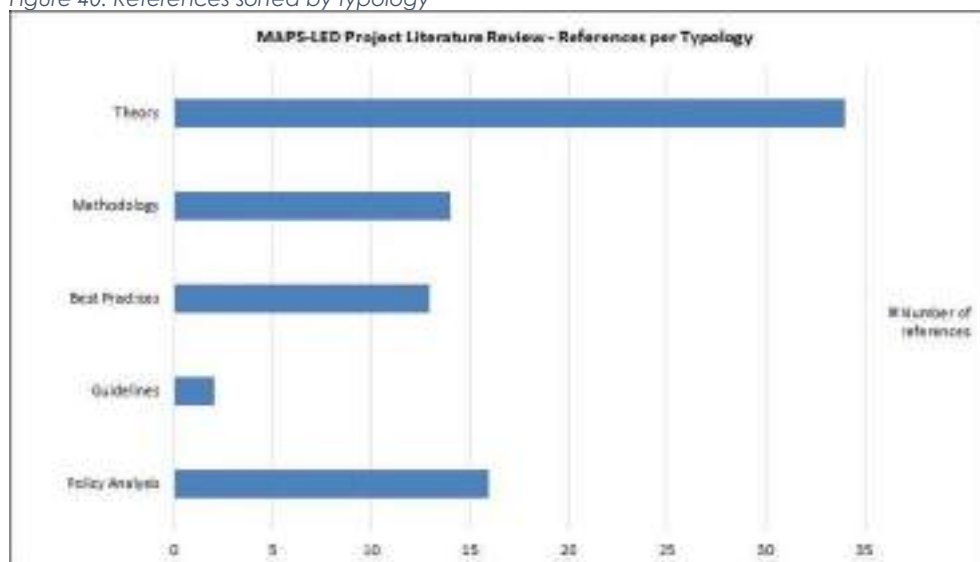
B. The regional spatial focus is the one mostly examined  
Consistently with what advocated by the Smart Specialisation Strategy approach, the regional spatial focus is the most taken into account by the majority of the references analysed.

C. Qualitative vs Quantitative

Among the references, it has been proven that the qualitative method approaches are most commonly used rather than the quantitative and mixed ones. A possible reason might reside in the fact that the majority of S3 policies have been set in place recently. Therefore, it is likely that a sufficient amount of quantitative data might not be available yet. Such data deficiency may also explain why the most common reference typology is the theoretical one, as shown below. Instead, the lack of guidelines it is likely due to the novelty of some of the selected topics, as for instance the Smart Specialisation Strategies.

D. Key sectors Most debated

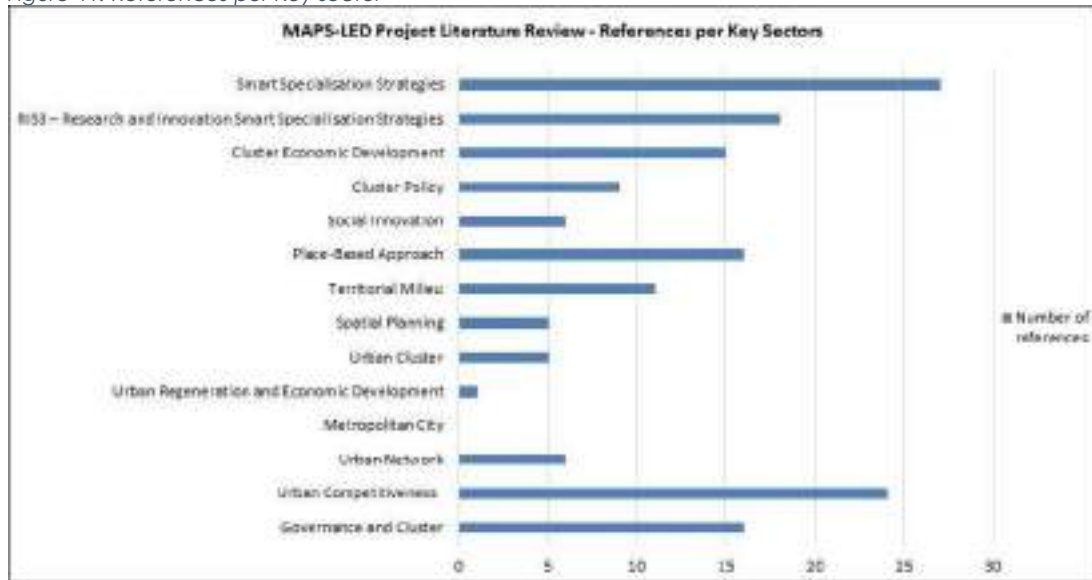
Figure 40. References sorted by typology



Whereas, considering the contents of the references taken into account, the most discussed key sectors are economic-driven.

30 D. Foray, P.A. David and B. Hall, "Smart specialisation: the concept", in career of a concept and the difficulties involved in its implementation", Working Paper series, 2011-01, Management of Technology and Entrepreneurship Institute, EPFL, 2011

Figure 41. References per Key sector



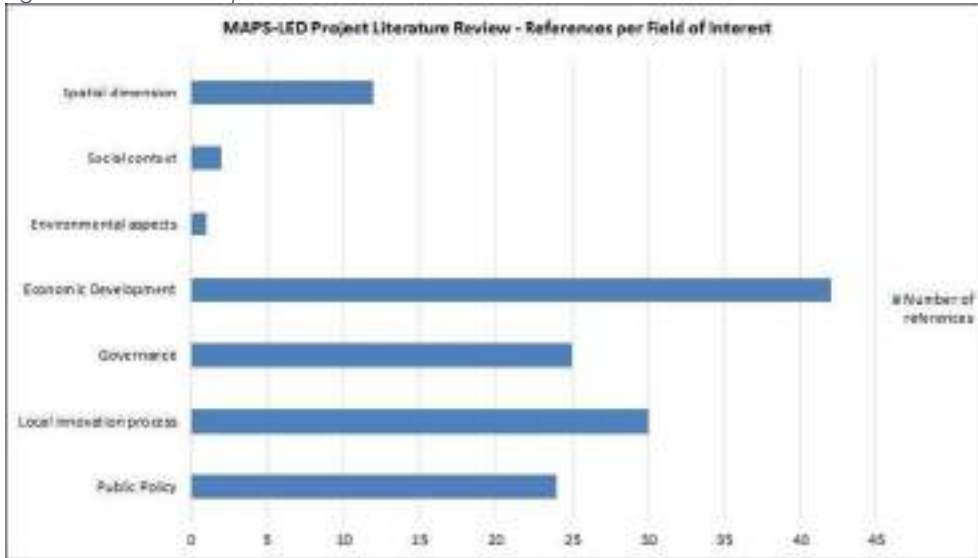
The most recurring topics accordingly with those selected in the specific section of the Literature Review form are:

- “Smart Specialisation Strategies”;
- “Urban Competitiveness”;
- “RIS3 – Research and Innovation Smart Specialisation Strategies”.

Those are mostly related to economic issues. Instead, topics related to spatial concepts are not so much debated, as for instance “Territorial Milieu” or “Spatial Planning”. In the few references concerning the latter topics, scholars highlight the deficiency of a spatially-oriented approach. Despite being the only topic taken into account that concerns social issue, “social innovation”, is not much object of the selected references. Such unbalanced amounts among the references concerning economic, spatial and social issues, support the need to identify and examine S3 policies in terms of spatial, social and environmental factors consistent with one of the main goal of the present research project. After analysing and sorting references by different field of interest, has been highlighted a deficiency in considering the three aforementioned aspects.

The predominant field of interest is doubtless the “Economic Development”, while “social context” and “spatial dimension” are not main field of interest in those selected references.

Figure 42. References per field of interest



Below are represented principal literature review activity's outcomes.

#### LITERATURE REVIEW OUTCOMES

- The implementation guidelines concerning Smart Specialisation Strategies are poor or missing
- The topics mostly debated concern almost lonely economic issues. Hence, aspects related to both the “spatial dimension” and “social contexts” are poorly debated
- The definition of Cluster does not entail any spatial dimension, since it is based on related industry sectors filed together on the basis of the geographical correlation of employment across traded industries

The aforementioned outcomes support the goals and objectives of the MAPS-LED research project. Hence, the project is at forefront into this unexplored new research domain.

#### The Preliminary Case Studies Findings

The preliminary research activities have focused on the 51 clusters according to the categorization and data provided by *clustermapping.us* database. The areas taken into account were the Boston and the San Diego MSAs. A total amount of 102 clusters have been investigated.

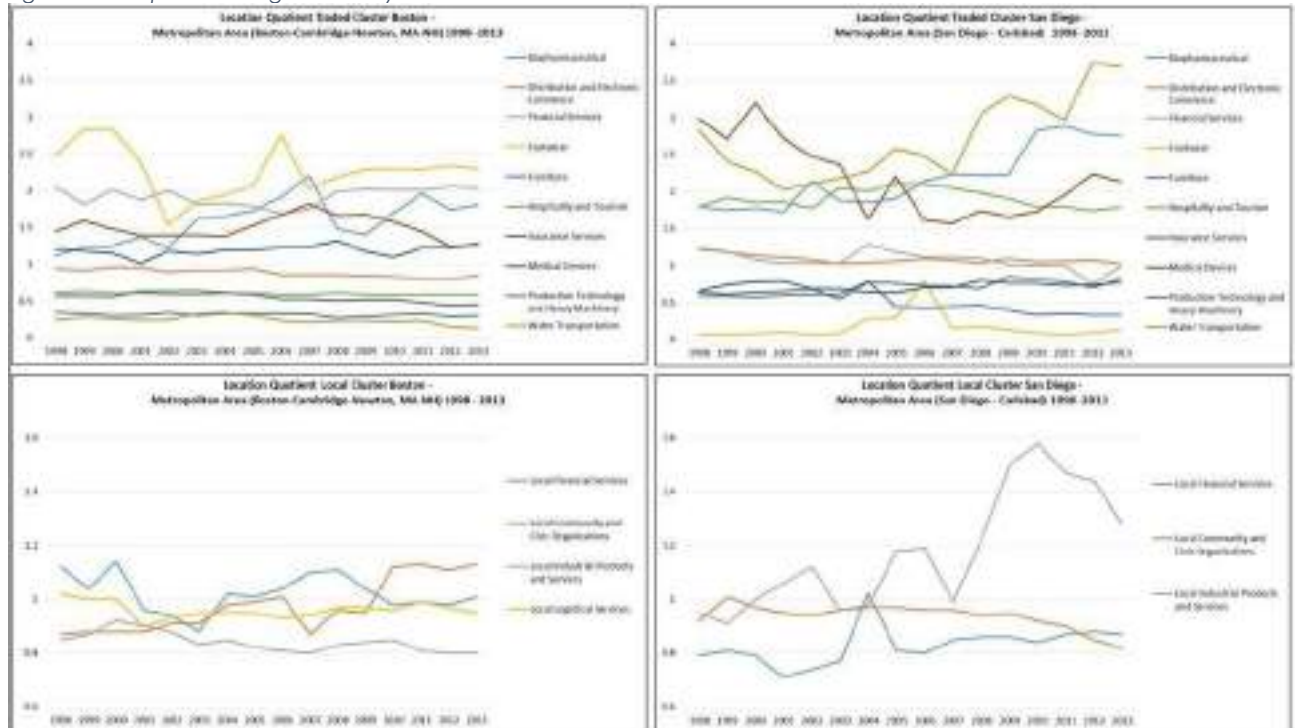
As for the preliminary Literature Review activity, a unique a pre-defined form has been used in order to lead a homogeneous approach to the subject. The structure of the Preliminary Case Study Form is reported in Table 6.

Table 6 Preliminary Case Studies Selection

FORM SECTION	DESCRIPTION
1. PH.D. STUDENT REFERENCE	Name Program Training Course In The U.S. Etc
2. GLOSSARY OF TERMS	Cluster, Establishment, Innovation Etc (Source: www Clustermapping (fr))
3. LIST OF TRADED CLUSTERS - BOSTON MSA	They Serve Markets In Other Regions Or Nations (Financial Services, Information Technology, Wine Production And Distribution, Etc)
4. MAIN INDICATORS/FILTER - TRADED	Annual Wage, Job Creation, Specialization, Patent Counts
5. ECONOMIC INDICATORS - TRADED	Annual Wage Growth Rate, Patent Count Growth Rate, Establishment Growth Rate
6. LIST OF TRADED CLUSTERS - S.DIEGO MSA	As Above
7. MAIN INDICATORS/FILTER - TRADED	As Above
8. ECONOMIC INDICATORS - TRADED	As Above
9. LIST OF LOCAL CLUSTERS - BOSTON MSA	They Serve The Local Markets Within A Region (Local Entertainment, Local Health Services Etc)
10. MAIN INDICATORS/FILTER - LOCAL	As Above
11. ECONOMIC INDICATORS - LOCAL	As Above
12. LIST OF LOCAL CLUSTERS - S.DIEGO MSA	As Above
13. MAIN INDICATORS/FILTER - LOCAL	As Above

All data concerning the 102 clusters have been processed by sorting each indicator in order to evaluate any difference between several clusters on the same MSA as well as any different performance for each cluster on the two MSAs. Hereby it is the reported a sample in order to show the representation of the data processed.

Figure 43. Sample of sorting clusters by Location Quotient



In order to better investigate the impact of any cluster at urban/local level, it has been chosen to restrict both the study areas and the clusters to analyse. Otherwise, the massive amount of data, and the size of the area, would not have matched the objective of the Research project.

Indeed, considering the economic data, the number of clusters taken into account for further studies has been narrowed to the number of “strong clusters”, which are more likely to have a higher scientific significance in terms of impacts at urban level.

The Boston MSA data have been sorted by county, as shown in Tab. 7.

Table 7 Boston MSA Strong Cluster

STRONG CLUSTER	BOSTON MSA	MIDDLESEX COUNTY	SUFFOLK	ESSEX	MIDDLESEX	SUFFOLK	MIDDLESEX	SUFFOLK
AEROSPACE	15125			6826	995			
PHARMACEUTICAL	8971	3109	2685	2245			925	
EDUCATION	17042	34744	34432	7427	10047			
TV	8709	34791		5720	3071	1164	2774	
FINANCIAL SERVICES	10368		5791	4097	7532	1763	2643	
FINANCE	1230		398	480		80	195	20
FOOTWEAR	752			254		95	20	
WIRETELE	4008	15585	15068	4482	3348		1345	
ARTS AND CULTURE	2018	3415		645	329	453	1172	175
PERFORMING ARTS	7322		3367		2006	868		
INSURANCE	41202		14704		16132	2324	2550	3620

The Middlesex County and the Suffolk County are the ones that mostly affect the employment data concerning the “Strongest Clusters” reported for the Boston MSA.

Indeed, the data are consistent with the fact that both counties contain respectively Cambridge and Boston, which can be considered the economic engines of the region.

### STUDY CASES' OUTCOMES

- To increase the scientific significance of further scientific activities, it has been chosen to pick up the “Strong Clusters”, as defined by the website “clustermapping.us”
- Over the Boston MSA, the data concerning the Strongest Clusters have been compared over the seven counties. The Middlesex County and the Suffolk County have been selected since they impact mostly on the evaluated strong clusters.

### Cluster Spatialisation Methodology

It is possible to identify two main findings emerging from the literature review activity conducted in this preliminary phase:

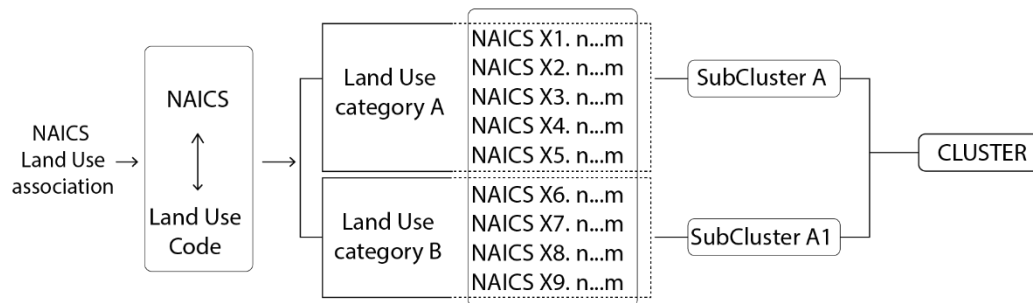
- The lack of “Spatial Dimension” within the literature reviewed. The topics mostly debated concern economic development issues;
- The Cluster concept defines related industries on the basis of the geographical correlation of employment across traded industries. The physical dimension and morphology of clusters has not emerged.

These preliminary findings have turned out to be essential for the development of a methodology aimed at taking into account the spatial dimension as whole of Porter's clusters concept. Indeed, as already mentioned, the clustermapping.us platform allows to figure out what kind of clusters are located in a certain region, considering the county level as the smallest territorial unit, just based on economic indicators. Drawing insights by the idea developed by the City of Commerce in Colorado, which combines land

use development codes and NAICS codes (North America Industry Classification System), the methodology developed by the ESRs aims at displaying where clusters are physically localized within a smaller territorial scale than the Porter considered one.

In particular, the methodology's rationale is that a specific land use code can be combined to a set of economic activities classified within NAICS codes. The availability of data related to the presence of certain industries within a specific ZIP code (NAICS codes per Zip code) makes feasible the physical localization in a specific area of related industries belonging to a specific cluster. The following schemes show the rationale of this methodology, starting from the Porter's cluster definition and ending in a synthesis between economic and spatial dimension.

Figure 44. The association between Land Use and Cluster



The proposed methodology has been tested for the Zip code 02138, Cambridge, MA, by using a GIS software. The clusters taken into account for this test were just the strongest traded ones, according to the Porter's definition. The methodology is characterized by the following stages:

1. data gathered from the Census Bureau website, Zip Code Business Statistics, in order to assess:

- Which economic activities (identified through NAICS code classification of 2008) are present in the specific Zip code 02138;
- Number of establishments per NAICS in each Zip Code;
- Number of employees per Zip code (size of establishments).

Figure 45. US Census Bureau American Factfinder

Geographic area name	2007 NAICS code	Meaning of 2007 NAICS code	Meaning of Employment size of establishments	Year	Number of establishments
ZIP 02138 (Cambridge, MA)	114012	Shelfish fishing	All establishments	2008	1
ZIP 02138 (Cambridge, MA)	114012	Shelfish fishing	Establishments with 1 to 4 employees	2008	1
ZIP 02138 (Cambridge, MA)	114012	Shelfish fishing	Establishments with 5 to 9 employees	2008	0
ZIP 02138 (Cambridge, MA)	114012	Shelfish fishing	Establishments with 10 to 19 employees	2008	0
ZIP 02138 (Cambridge, MA)	114012	Shelfish fishing	Establishments with 20 to 49 employees	2008	0
ZIP 02138 (Cambridge, MA)	114012	Shelfish fishing	Establishments with 50 to 99 employees	2008	0
ZIP 02138 (Cambridge, MA)	114012	Shelfish fishing	Establishments with 100 to 249 employees	2008	0
ZIP 02138 (Cambridge, MA)	114012	Shelfish fishing	Establishments with 250 to 499 employees	2008	0
ZIP 02138 (Cambridge, MA)	114012	Shelfish fishing	Establishments with 500 to 999 employees	2008	0
ZIP 02138 (Cambridge, MA)	114012	Shelfish fishing	Establishments with 1,000 employees or more	2008	0

2. The existing GIS map of the Boston Metropolitan areas has been developed by adding ZIP Code boundaries and Land Use pattern of the zip code 02138, Cambridge MA.

The worksheets and shape files have been gathered from on line sources: the official website of the Commonwealth of Massachusetts and the geographic information system web sites of the cities included in the Metropolitan Statistical Area of Boston, the city of Cambridge, MA official web site. In an effort to clarify land use type the data has been cleaned and subdivided to break the original use code into several different fields. Land use status is up to date as of July 1, 2014.

Figure 46. Land Use Code Description, Category for the City of Cambridge, Ma. Source: [www.cambridgema.gov](http://www.cambridgema.gov)

Land Use Code	Land Use Description	Category
101	MXD SHGL-FAM-RE	Mixed Use Residential
104	MXD TWO-FAM-RES	Mixed Use Residential
105	MXD THREE-FAM-RE	Mixed Use Residential
111	MXD 4-6-UNIT-APT	Mixed Use Residential
112	MXD >6-UNIT-APT	Mixed Use Residential
121	MXD BOARDING-HS	Mixed Use Residential
13	MULTIUSE-RES	Mixed Use Residential
31	MULTIUSE-COM	Mixed Use Commercial
41	MULTIUSE-IND	Mixed Use Industrial

3. The land use codes of City of Cambridge were connected to NAICS code s located in that area by testing the Zip code 02138.

Figure 47. City of Cambridge Land Use Map and Zipcode 02138 (green selection upper part of the figure)

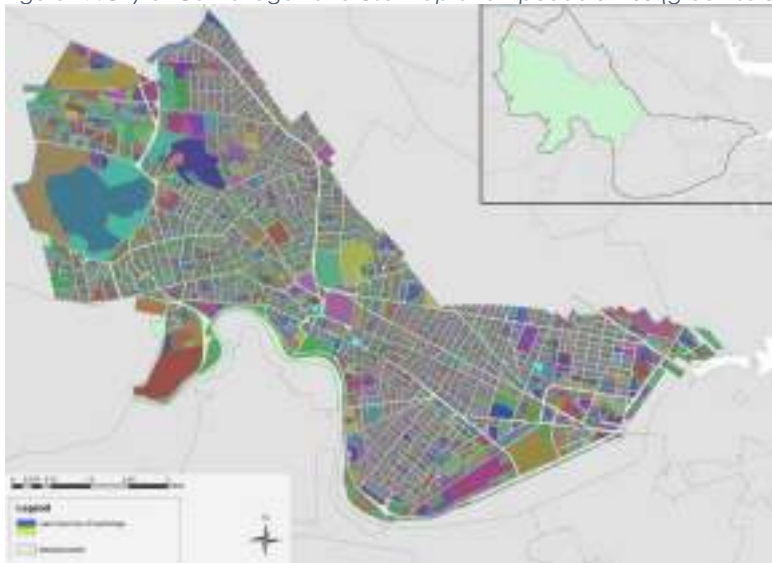




Table 8 NAICS Code associated per Land Use categories in the zipcode 02138, City of Cambridge

Geographic	Land Use	Category	Land Use Description	2007	Meaning of 2007 NAICS code
Cambridge, MA	113	Assisted Living/Supporting HOME	ASSISTED-LIV		
	210	Commercial	WAREHOUSE	114111	Shedskin Finishing
	311	Commercial	BANK	522120	Savings Institutions
	323	Commercial	FRAT-ORGANZ	522240	Real estate credit
	382	Commercial	THEATRE	711110	Theater Companies and Dinner Theaters
				711120	Orchestra Companies
				711130	Musical Groups and Artists
				711150	Independent Artists, Writers, and Performers
				711180	Producers of Performing Arts, Sports, and Similar Events with Facilities
				711190	Promoters of Performing Arts, Sports, and Similar Events without Facilities
	342	Higher Education	Private College	811110	Colleges, universities, and postsecondary schools
				811420	Computer training
				811430	Professional and management development training
				811630	Language schools
				811691	Exam preparation and tutoring
				811710	Educational support services
				811711	Research and development in biotechnology
				811712	Research and development in the physical, engineering, and life sciences (except biotechnology)
				811720	Research and development in the social sciences and humanities
				813020	Professional organizations
	345	Office	RETAIL-OFFICE	541810	Advertising Agencies
				541890	Other Services Related to Advertising
				541913	Marketing Consulting Services
				541920	Public Relations Agencies
				541930	Interior Design Services
				541940	Industrial Design Services
				541990	Graphic Design Services
				511120	Periodical Publishers
				511199	All Other Publishers
				519110	News Syndicates
	346	Office	INV-OFFICE	519130	Internet Publishing and Broadcasting and Web Search Portals
				523910	Miscellaneous Intermediation
				523920	Portfolio management
				523930	Investment advice
				525990	Other financial vehicles
				527120	Securities brokerage
				524112	Direct Life Insurance Carriers

As we can see from the above image, each land use code belongs to a category with a land use description to which is possible to connect an economic activity classified within the NAICS codes.

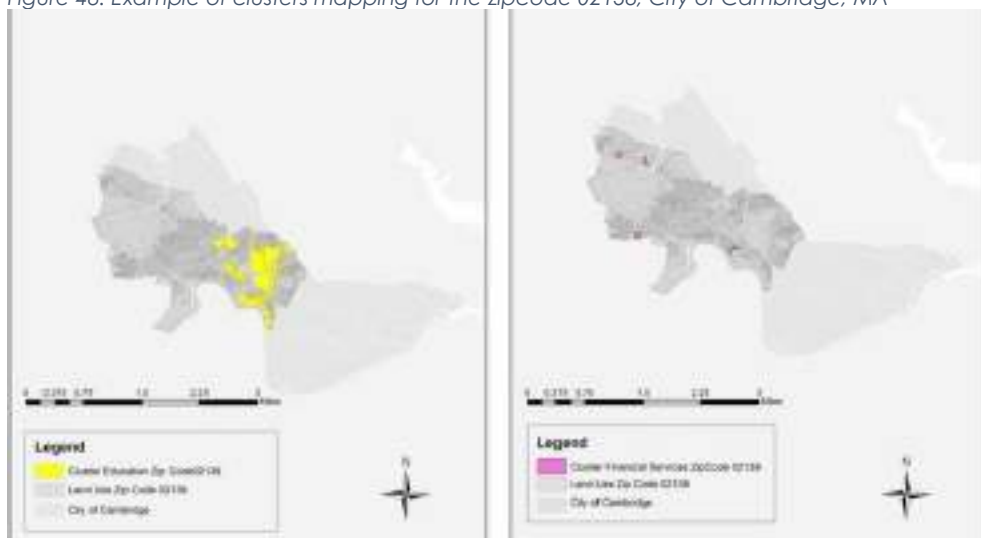
4. the list of clusters and sub-clusters elaborated by Porter have been associated with the above list of land use codes connected to NAICS codes. The aim is to display which clusters are located in that specific zip code and where they are most likely to be physically localized within the land use pattern.

Table 9NAICS-Land Use-Cluster association according with Porter's Definition

Geographic Area	2007 NAICS Code	Land Use	Cluster according with the Porter's classification	Cluster according with the FAO/UNECLD definition
ZIP 02138 (City of Cambridge, MA)	811420	Other Educ. & Research O/g	Training Programs	Education and Knowledge Creation
	811430	Other Educ. & Research O/g	Training Programs	Education and Knowledge Creation
	811490	Other Educ. & Research O/g	Training Programs	Education and Knowledge Creation
	811811	Other Educ. & Research O/g	Training Programs	Education and Knowledge Creation
	811810	Other Education	Colleges, Universities, and Professional Schools	Education and Knowledge Creation
	811110	Other Educ. & Research O/g	Educational Support Services	Education and Knowledge Creation
	811711	Other Educ. & Research O/g	Research Organizations	Education and Knowledge Creation
	811712	Other Educ. & Research O/g	Research Organizations	Education and Knowledge Creation
	811710	Other Educ. & Research O/g	Research Organizations	Education and Knowledge Creation
	812910	Other Educ. & Research O/g	Professional Organizations	Education and Knowledge Creation
	529110	Office	Financial Investment Activities	Financial Services
	529210	Office	Financial Investment Activities	Financial Services
	529310	Office	Financial Investment Activities	Financial Services
	529910	Office	Financial Investment Activities	Financial Services
	527210	Commercial	Credit Intermediation	Financial Services
	527310	Commercial	Credit Intermediation	Financial Services
	527910	Office	Securities, Brokerage, Finance, and Insurance	Financial Services
	528110	Commercial	Finance and Finance Products	Financial Services
	534413	Industrial	Service structures	Information Technology and Analytical Instruments
	528110	Office	Insurance Carriers	Insurance Services
	548410	Office	Advertising Related Services	Marketing, Design, and Publishing
	548990	Office	Advertising Related Services	Marketing, Design, and Publishing
	548913	Office	Other Marketing Related Services	Marketing, Design, and Publishing
	548910	Office	Other Marketing Related Services	Marketing, Design, and Publishing
	548910	Office/IND	Other Marketing Related Services	Marketing, Design, and Publishing
	548410	Office	Design Services	Marketing, Design, and Publishing
	548420	Office	Design Services	Marketing, Design, and Publishing
	548430	Office	Design Services	Marketing, Design, and Publishing
	511110	Office	Publishing	Marketing, Design, and Publishing
	511120	Office	Publishing	Marketing, Design, and Publishing
	519110	Office	Publishing	Marketing, Design, and Publishing
	519190	Office	Publishing	Marketing, Design, and Publishing
	333314	Industrial	Optical Instruments and Optoelectric Devices	Medical Devices
333313	Industrial	Optical Instruments and Optoelectric Devices	Medical Devices	
711140	Commercial	Performing Arts	Performing Arts	
711120	Commercial	Performing Arts	Performing Arts	
711130	Commercial	Performing Arts	Performing Arts	
711510	Commercial	Performing Arts	Performing Arts	
711210	Commercial	Producers and Managers	Performing Arts	
711220	Commercial	Producers and Managers	Performing Arts	
711410	Commercial	Producers and Managers	Performing Arts	

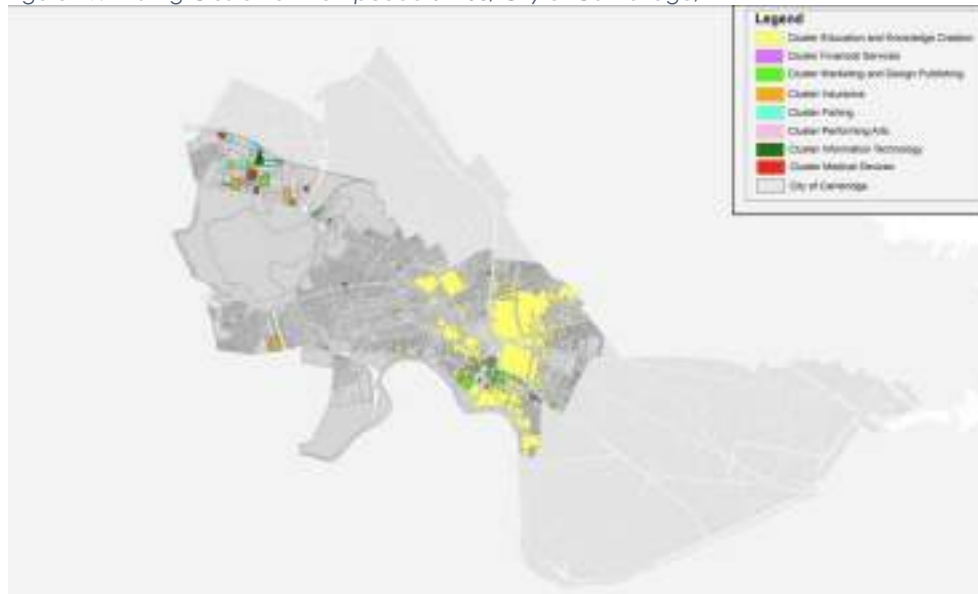
5. By using the data of the above tables and the land use pattern shapefiles providing all the land uses per colour (fig 52) the economic activities belonging to a specific cluster of the Boston MSA have been mapped at zip code territorial level

Figure 48. Example of clusters mapping for the zipcode 02138, City of Cambridge, MA



6. The outcome of this process is a map where the economic activities are highlighted according to the clusters they belong to. On the basis of this outcome some question can be developed and organized in survey and interview forms in order to investigate in depth the preliminary findings of the WP1. Indeed, by developing the methodology it will be deepened the impact of economic clusters in terms of socio- economic, spatial, policy and governance effects at urban planning scale

Figure 49. Existing Cluster for the Zipcode 02138, City of Cambridge, MA

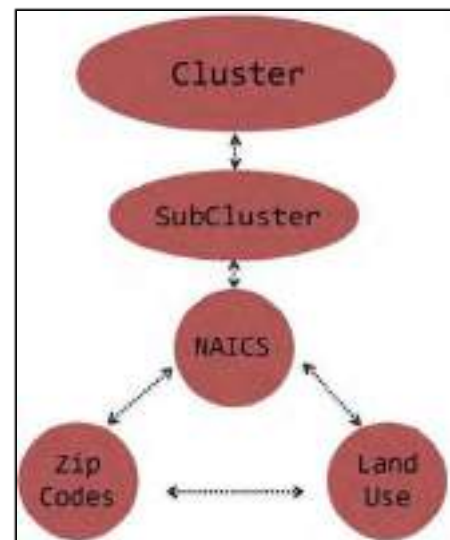


#### METHODOLOGY

The process of spatialization of the economic cluster follows three steps as outlined aside. It draws from the economic clusters labelled according to Porter 's definition and it comes to define which economic activities (belonging to a specific NAICS) operate in a selected Zip Codes.

Further, each land use code belongs to a category with a land use description to which is possible to connect an economic activity classified within the NAICS codes

The procedure relies upon the use of the ESRI's ArcGIS software both as a visualisation and analytical tool and has been tested for the ZIP code 02138 of the Cambridge Municipality, MA.



## Cluster Case Studies Selection

The final step of the WP1 activities condensed into the attempt to spatialize clusters occurring in the Middlesex and Suffolk County through GIS mapping activity according with the clustermapping.us website's information.

All the Counties belonging to the Boston MSA were sorted in terms of employment. Among them, both the Middlesex and the Suffolk County presented the best performance, and have been selected to apply the methodology described in the previous paragraph.

Table 10 Middlesex and Suffolk County Strong Cluster

<b>MIDDLESEX COUNTY</b>	<b>SUFFOLK COUNTY</b>
1 Biopharmaceuticals	1 Biopharmaceuticals
2 Business Services	2 Education and Knowledge Creation
3 Education and Knowledge Creation	3 Financial Services
4 Information Technology and Analytical Instruments	4 Fishing and Fishing Products
5 Marketing Design and Publishing	5 Insurance Services
6 Medical Devices	6 Marketing Design and Publishing
	7 Performing Arts

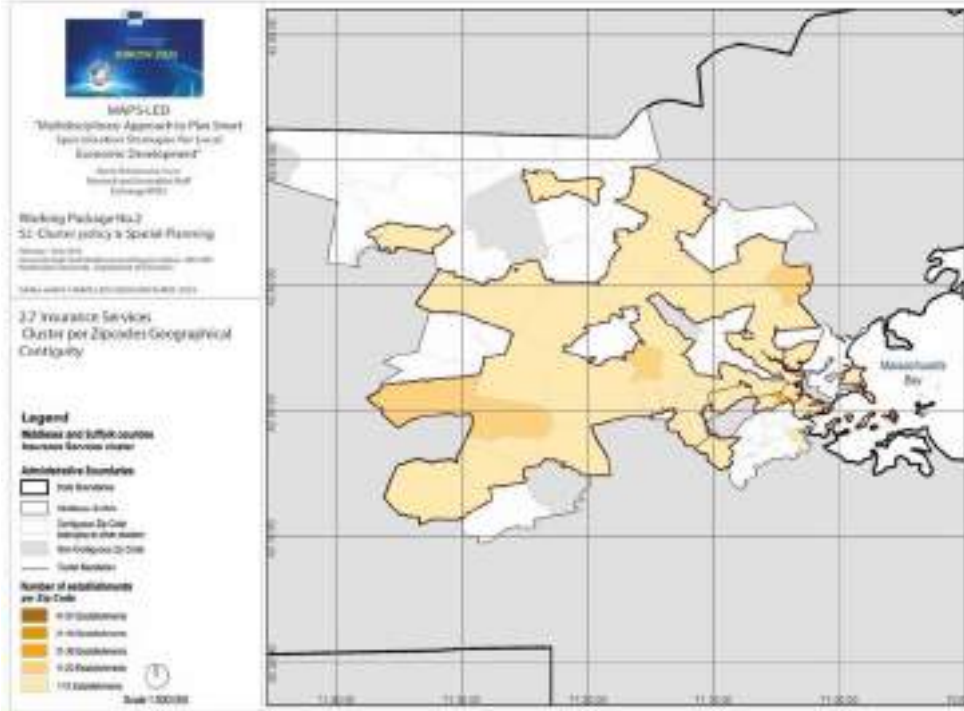
The adopted process is articulated in the following steps:

1. Selection of clusters per Zipcode geographical (spatial) contiguity;
2. Set out a set of quantitative indicators (for the selected contiguous Zipcodes);
3. Data Gathering and Collection for the resulting Zipcodes on the selected indicators (for the selected contiguous Zipcodes);
4. Production of Maps for each indicator through GIS software (for the selected contiguous Zipcodes);
5. Overlay of the resulting maps in order to select the strongest areas in the Boston Area;
6. Set out a case studies list to analyse in during the Working Package No. 2 and present to the First Mid Term Meeting in Boston (6-7 June 2016) at the Northeastern University of Boston.

The description of each step is reported here:

1. **Clusters geographical (spatial) contiguity.** The first criterion set up in order to select clusters occurring in Zipcodes in the Boston Area has been the spatial clusters contiguity. Only contiguous Zipcodes where clusters occur have been selected in order to clearly identify geographical boundaries for a more detailed and specific analysis. The selection of clusters per Zipcode spatial (geographical) contiguity is depicted below.

Figure 50. Example of Cluster Selection per contiguous Zip codes. PAU Unit elaboration



**2. Selection of Quantitative indicators.** A set of quantitative indicators has been sorted out in order to refine the area of inquiry and to consequently select then a possible case studies list based also on “cluster” policies. The quantitative indicators selected are reported in the following table.

Table 11 Selected Quantitative Indicators

**Indicator**

1. Establishment Density
2. Educational Attainment Index
3. Per Capita Income
4. Employment
5. Population Distribution per Age (concentration) per ZCTA
6. Services Concentration Index per Zipcode
7. Business Concentration per Employment Size of Establishment per Zipcode

**3. Data Gathering, Collection.** Starting from the “preliminary research activities” conducted during the WP1, the initial Zipcodes list has been refined using a “geographical (spatial) contiguity” criterion. This step allowed to identify only contiguous Zipcodes where clusters occurred. At this stage the above mentioned indicators have been calculated for the selected Zipcodes and corresponding ZCTAs using the US Census Bureau as main Data Source. Data have been collected as follows:

- a. Establishment Density:

$$ED = \frac{\text{No. Establishment}}{\text{Area (sqm)}}$$

- b. Educational Attainment. For the educational attainment the “Graduate and Professional Degrees” class (from Zctas Data) has been selected and related to the Labor Force in order to understand the incidence of highly skilled class in the Zipcode.;

$$ID = \frac{\text{Graduate and Professional Degrees population}}{\text{Total Labor Force per Zipcode}}$$

- c. Per Capita Income;  
d. Employment Rate:

$$E_m D = \frac{\text{employment}}{\text{Labour Force}}$$

- e. Population Distribution per Age Class (concentration) per ZCTA. For the population by age the 25-39 class has been selected and reported to total population per Zctas in order to understand the incidence of young people and professionals on the total population;  
f. Services concentration Index (Coefficient of Localisation) per Zipcode.

$$CI = \frac{E_{ij}}{R_j} / \frac{E_{in}}{R_n}$$

Where:

$E_{ij}$  = Employed in Service Sector in the Zipcode

$E_{in}$  = Employed in service Sector in the County

$R_j$  = Total Zipcode Population

$R_n$  = Total County Population

**Maps production.** For each indicator has been drawn up a map using a GIS software in order to visualise the information linked to each indicator. GIS helped in data visualisation and in the Data analysis phase in order to produce reliable maps in shifting from the regional dimension to the local one. Socio-Economic and Demographic data have been gathered by ZCTAs (Zipocode Tabulation Areas), and Businesses Data have been gathered by ZipCode. Data have been used for the calculation of the above mentioned indexes separately. The produced maps are the following:

Figure 51 Graduate Professional Degree over labor force. PAU Unit Elaboration

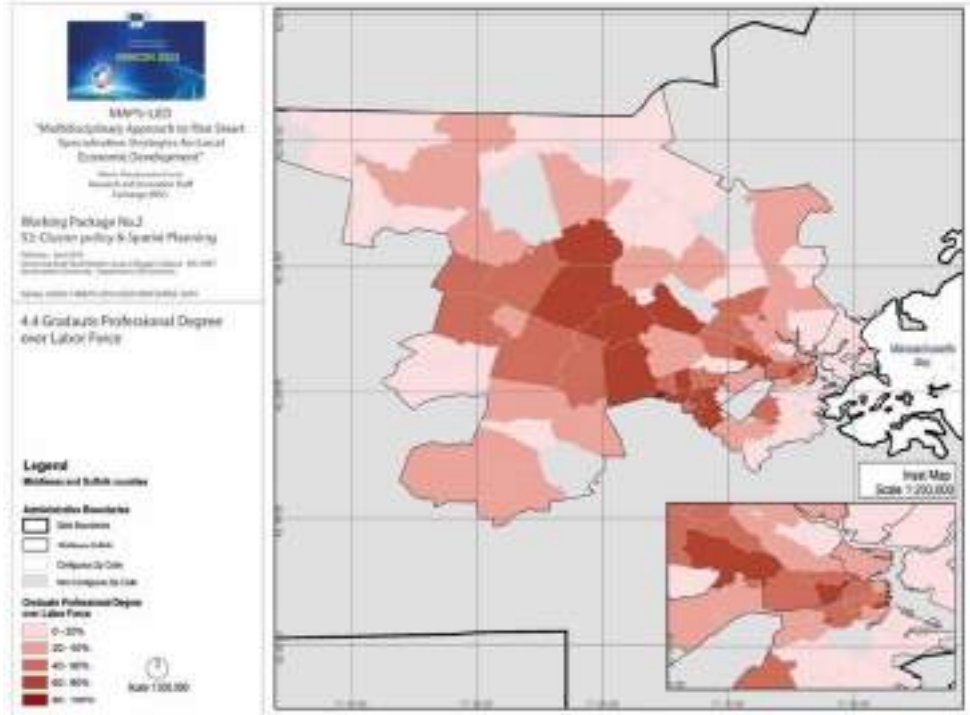


Figure 52. Establishment Density Maps. PAU Unit Elaboration

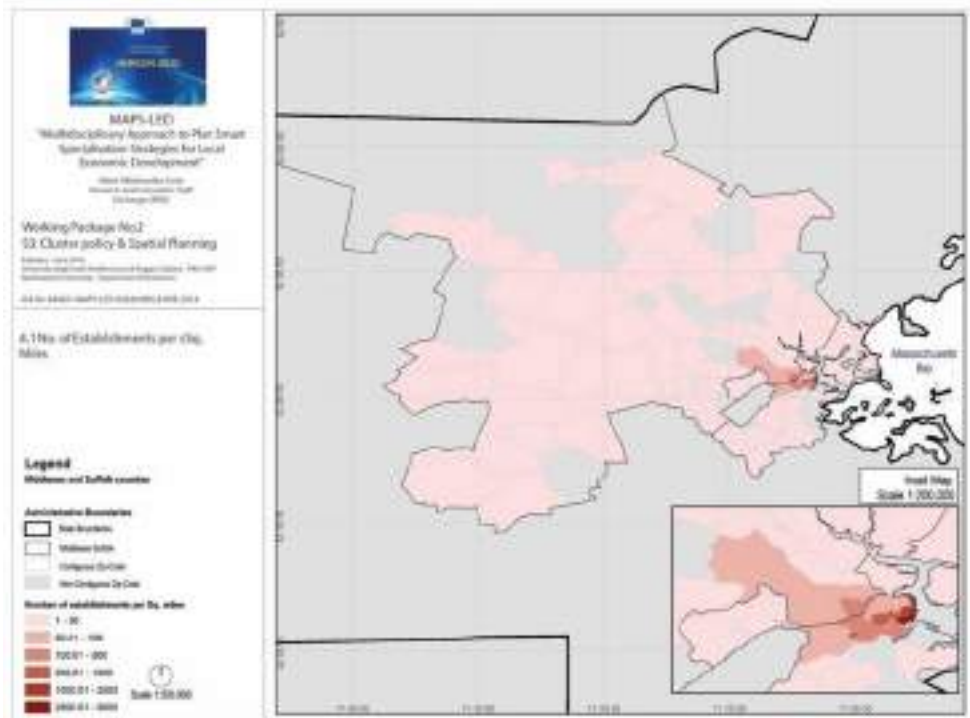


Figure 53. Per Capita Income per Zipcode

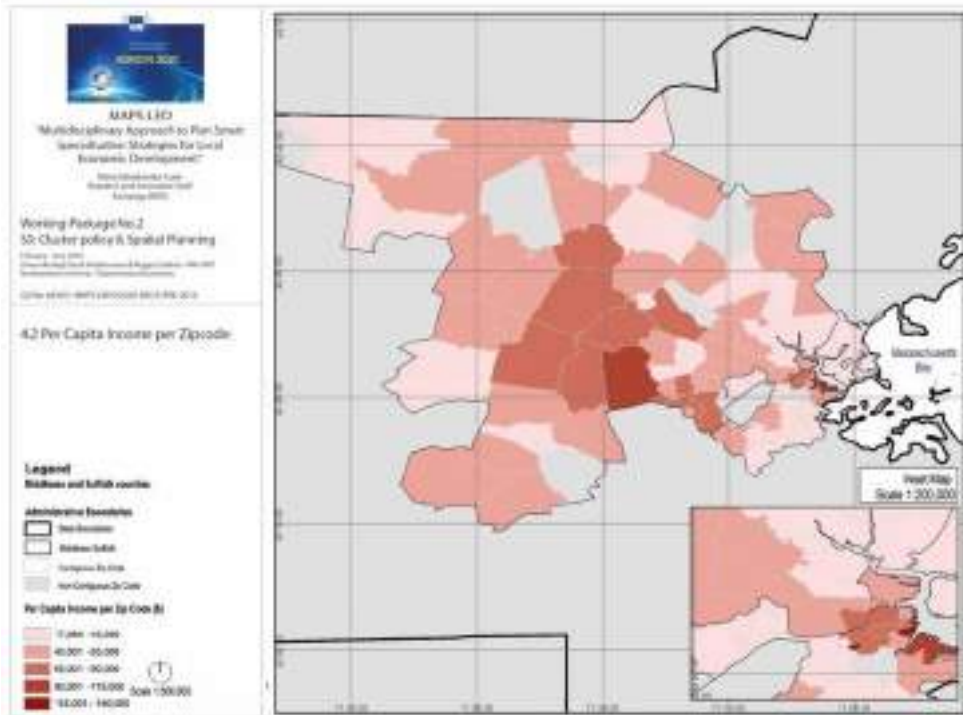


Figure 54. % of Age Group 25-39 over the total population

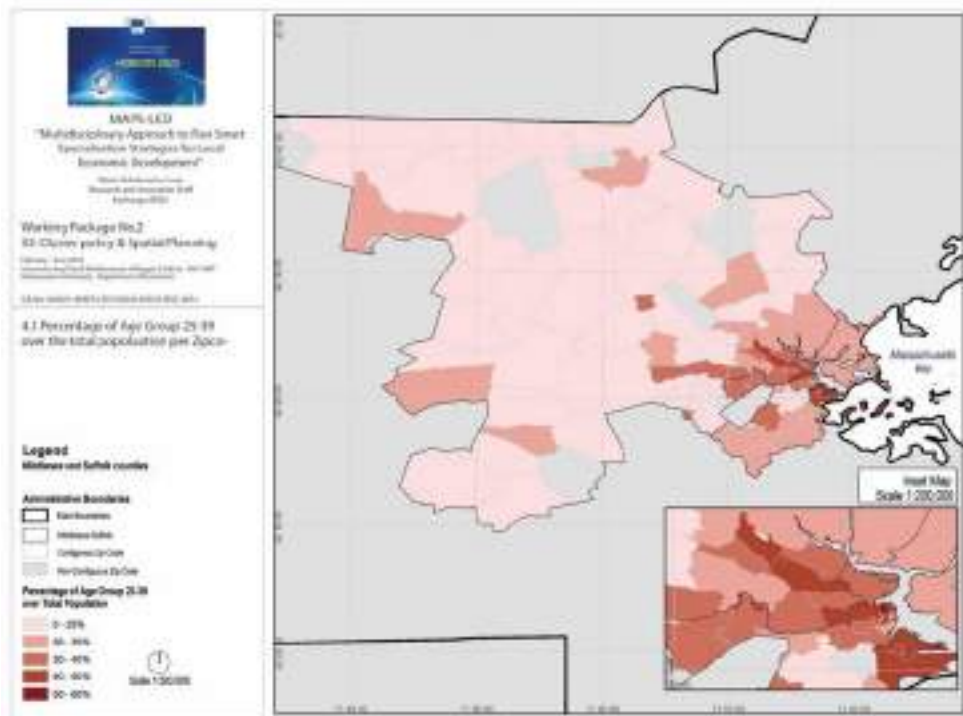
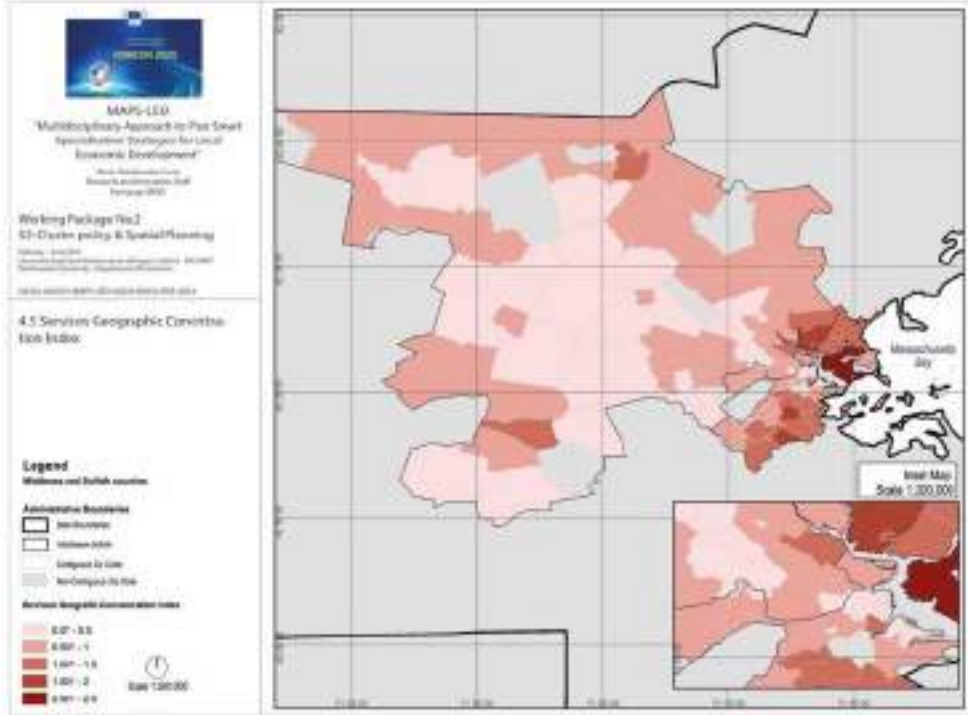


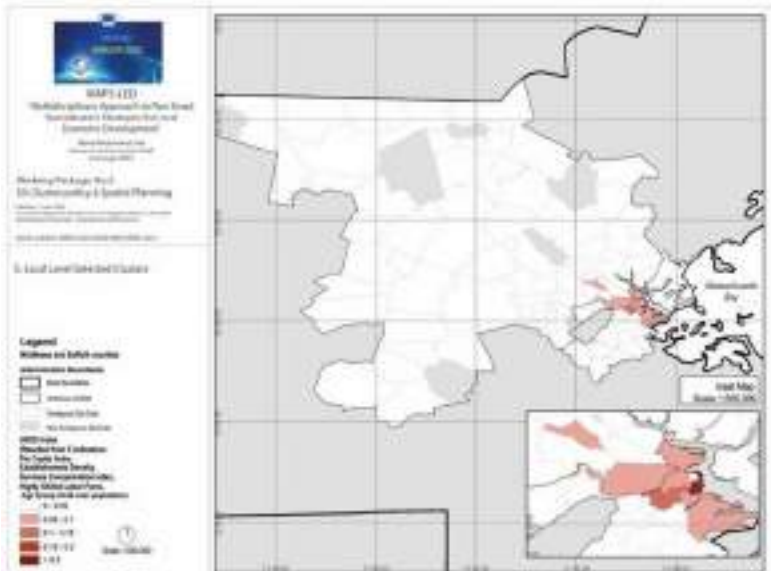


Figure 55. Service Geographic Concentration Index Map. PAU Unit Elaboration



**Mapping Overlay.** The final step of this process is represented by a simple overlay technique in order to select local areas where identify a possible case studies list to investigate with quantitative and qualitative methods during the Working Package No. 2 and to discuss the preliminary results during the First MidTerm Meeting held in Boston at Northeastern University on 6 and 7 of June 2016. The Mapping overlay technique allowed to identify the city of Cambridge and Boston as Focus areas of inquiry. Here it is possible to identify cluster policy and initiatives that constitute the base for the case studies' identification.

Figure 56. Overlay Map



Part IV  
Smart Specialisation Strategies as Drivers for  
(Smart) Sustainable Urban Development  
SOBE Unit

## Implementation Issues and Spatial-Led Perspective in S3

Policy makers, planners, stakeholders at all latitudes constantly face the issue of developing and implementing better policies to support local economic development and offer people better living environments and well-being. How it is made, varies a lot. Nowadays, the European Commission is undertaking the huge effort of launching something that explicitly implies risk-taking, and therefore particularly needs and evidence- base for actions. The research role is to reflect on this challenge from a theoretical perspective, that might possibly suggest paths and solutions.

This chapter stems from a broader research project financed by the European Commission and aimed at approaching the issue of strategy building, developing and implementation from the perspective of architects and planners, temporarily contaminating themselves with economic matters to try to bridge the gap between shape of the built environment and economic growth. The Smart Specialisation Strategy will be investigated through a spatial- led perspective, implying that if *place* matters, then also *space* matter, with all the implications within a concept that incorporates environmental behavioural science, ecosystem and social values, cultural assets and identity. All these elements are absolutely essential in a *sustainability* perspective. Therefore, the overall discussion has in the background the *fil rouge* of demonstrating how sustainable development (environmental, social and economic) can be systematically embedded in S3, in particular, in the urban built environment.

The chapter briefly explains what Smart Specialisation Strategy is and then discusses it in a critical perspective, by clarifying explicit and less evident theoretical legacy of this rationale, not because of the pleasure of the academic discourse in itself, but because the theory should support the construction a robust logical framework suitable to produce further novel approaches. Because of the dynamic nature of the topic, even the theoretical section, rather than relying on a review of the literature, is nurtured by interviews. The chapter includes a discussion of the research hypothesis through empirical data gathered in a US case study, Kendall Square. As major expected impact of the preliminary findings of this research, it the opportunity to support current implementation of S3 policies in Europe, both in competitive and in lagging behind regions. To reinforce the transferability of the findings, the field work in the States has been preceded by some preliminary research in Europe, aimed at substantiating the current gaps to be filled on the basis of the gap analysis of extant S3. The S3 in the Greater Manchester Area (Northern England) and in the Calabria Region (Southern Italy) have been discussed, also through a set of informal scoping interviews with key-stakeholders, in order to find out weaknesses and potentials. This preliminary analysis showed that both in lagging behind regions and in competitive regions gaps in the current S3 still exist, and that a spatial- led approach could be supportive in filling them. Therefore, although at a preliminary stage, the conclusions in this chapter may be of interest for European planners, policy makers and stakeholders looking for effective implementation of S3.

### Setting the Overall Policy Framework for S3

The Smart Specialization Strategy (S3) is an essential component of the current Europe 2020 Strategy (EC 2010), seeking to bring Europe towards a smarter, more inclusive and sustainable growth. In particular, S3 (Midtkandal and Sörvik, 2012): “is a strategic approach to economic development through targeted support for research and innovation. It involves a process of developing a vision, identifying the place-based areas of greatest strategic potential, developing multi-stakeholder governance

mechanisms, setting strategic priorities and using smart policies to maximize the knowledge-based development potential of a region, regardless of whether it is strong or weak, high-tech or low-tech."

S3 has been introduced late 2000s as main result of the work conducted by a group of expert, the Research Commissioner Janez Potočnik's expert group, also known as the Knowledge for Growth (K4G) expert group, founded by the European Commissioner Potočnik in March 2005 with the task to address the issue of embedding innovation for promoting growth within the European Member States, legacy from the Lisbon strategy. Not only the European Commission, but also other organizations such as the OECD (2013) are highly interested in this innovative approach, that has been recently systematized in the literature (Foray 2015). A key concept underpinned in the Smart Specialization is the importance of knowledge, meant as not mere technicality, rather as *embedded knowledge* among the actors of the economic ecosystem on the regions' dynamics for growth. Stemming from this position, the methodology for developing appropriate strategies rooted in embedded knowledge couldn't be anything different from an ascending, bottom-up approach, characterized by *discovery* and *risk-taking*, and finally, leading to something *unique*. As clarified by Foray et al. (2009: 21): "It should be understood at the outset that the idea of smart specialisation does not call for imposing specialisation through some form of top-down industrial policy that is directed in accord with a pre-conceived "grand plan". Nor should the search for smart specialisation involve a foresight exercise, ordered from a consulting firm. We are suggesting an entrepreneurial process of discovery that can reveal what a country or region does best in terms of science and technology. By this we mean a learning process to discover the research and innovation domains in which a region can hope to excel. In this learning process, entrepreneurial actors are likely to play leading roles in discovering promising areas of future specialisation, not least because the needed adaptations to local skills, materials, environmental conditions, and market access conditions are unlikely to be able to draw on codified, publicly shared knowledge, and instead will entail gathering localized information and the formation of social capital assets."

Moving forward, the S3, also named Research and Innovation Strategies for Smart Specialisation (RIS3), is now "a key part of the proposed EU Cohesion Policy reform supporting thematic concentration and reinforcing strategic programming and performance orientation (EC 2014: 3)."

By overcoming a one-size-fits-all approach, "the RIS3 requires an integrated and place-based approach to policy design and delivery. Policies must be tailored to the local context, acknowledging that there are different pathways for regional innovation and development (Idem: 4)."

A key aspect of smart specialization is the emphasis on the principle of prioritisation in a *vertical* logic – to favour some technologies, fields, population of firms - *non – neutral*. Foray and Goenaga (EC 2013) suggest to summarize the principles of S3 as follows: (1) Granularity, i.e., the level should not be too high; (2) Entrepreneurial discovery, with entrepreneurs -in the broadest sense- who discover, produce information and transform the activities; (3) Priorities will not be supported forever; (4) S3 is an inclusive strategy; (5) S3 has experimental nature and risk taking is needed.

The legal basis for incorporating the RIS3 within the current programs is provided by the Regulation (EU) 1301/2013 of the European Parliament and of the Council of 17 December 2013. The implementation of RIS3 across the EU has to be ensured by managing authorities through dedicated and mandatory policy frameworks. EU

Member States and regions are required to have smart specialisation in place according to the RIS3 *ex-ante conditionality*, i.e., a mandatory requirement that, among others, if not met in the agreed timeframe, prevents managing authorities to financially implement the given EU funds. Support in putting the RIS3 forward is offered by the European Commission particularly through a specific tool, the S3 Platform (<http://s3platform.jrc.ec.europa.eu/>).

Influences on the construction of the conceptual framework of the S3 can be found in several theoretical positions and theories. On the basis of the industrial Italian experience, the concept of *industrial district* was developed in the 1980s by Becattini (1979 and 1989), drawing from the Marshall agglomeration theory (1920). In particular, he considered the local community as a sort of social glue suitable to produce economic added value. In this approach, the seeds of the communitarian root of the concept of *embeddedness* (Gravenotter, 1985) were planted. It will take about two decades for them to fully blossom.

With less emphasis on the social component of the proximity, and more attention for the scale advantages, in the 1990s Porter developed the concept of *cluster*, defined as (Porter 2003: 562): "A geographically proximate group of interconnected companies, suppliers, service providers and associated institutions in a particular field linked by externalities of various types. Examples of clusters are financial services in New York (Wall Street), medical device in Boston, and IT in Austin, Texas and Silicon Valley."

Building on this concept, recognizing the importance of the cluster structure in the US economy, huge and systematic efforts have been done even at institutional level to pursue a reliable and shared knowledge on cluster dynamics, leading to the construction of a dedicated platform, such as the Clustermapping platform (<http://www.clustermapping.us/>): "The U.S. Cluster Mapping website is a national initiative that provides open data on regional clusters and economies to support U.S. business, innovation and policy, (where) users will find interactive, robust data and tools to understand clusters and regional business environments, improve institutions, and locate appropriate partners across the country."

The relevance of clusters to the US economic success and the political awareness on the significance of this topic clearly emerge, while analysing the data contained in the platform. Clusters, far from being a theoretical concept, have become a conceptual framework to coordinate and even further activate all scales of *clusterizable* initiative, encompassing national, regional and local stakeholders, entrepreneurs, companies, associations. In theory, the potential underpinned in the US platform is that the richness of details creates an outstanding opportunity not only for advancing in terms of knowledge, but also for supporting further networks and, finally, the *entrepreneurial discovery* that S3 are seeking to promote. In practice, the impact of the US platform on reinforcing clusters has not been investigated yet (Ketels, 2016).

Following the work conducted by the Department for Competitiveness in Harvard, at the same time in the US institutional interest was growing on the topic leading to the launch of the above mentioned Clustermapping platform, on the other side of the Atlantic also the European Commission decided to introduce a similar platform, namely the Cluster European Observatory, whose architecture is similar to the US one (<http://ec.europa.eu/growth/smes/cluster/observatory/>). In Europe, the dataset made available through the Cluster Observatory platform is coupled by another platform that targets companies and is specifically aimed at eliciting clusters reinforcement and further development, namely the ECCP (European Cluster Collaboration Platform).

The common rationale behind the US and EU platforms is not only to build a structured knowledge on the cluster policy both in the States and in Europe, but also to create opportunities for making clusters work in a rationale embedding shared knowledge and entrepreneurial discovery as major triggers. This is a major aspect that makes this approach central to support successful S3 implementation, behind the simple network rationale.

The notion of *entrepreneurial discovery* was introduced by Hausman and Rodrik (2003) as a *self-discovery process* and is constantly recalled by Foray and Goenaga X. (2013), which clearly mention the legacy of the New Industrial Economy approach in discussing the 5 above mentioned principles of S3. This core feature of S3 is possibly the more important to bridge them to another key concept at the forefront of current European strategies, that is, social innovation. A strong link exists between the S3 strategy, the cluster policy and the concept of *social innovation* as developed by the European Commission, a cross-cutting approach suitable to be implemented as cross-sectoral innovation. In the Guide to Social Innovation (EC 2013) -commissioned by DG Regional and Urban Policy and a completed with DG Employment, Social Affairs and Inclusion with inputs by various other Directorates General (such as, among others, DG Enterprise and Industry and DG Research)- social innovation is defined as (EC 2013: 6): "the development and implementation of new ideas (products, services and models) to meet social needs and create new social relationships or collaborations. It represents new responses to pressing social demands, which affect the process of social interactions. It is aimed at improving human well-being. Social innovations are innovations that are social in both their ends and their means. They are innovations that are not only good for society but also enhance individuals' capacity to act."

Social innovation, as it is deeply intertwined with innovation processes happening in urban regeneration and citizenships engagement, entails the fine grain of the scale where it is more likely to happen, through typical catalysts such as shared knowledge, dynamic relationships, exchange of ideas, innovation building. The cross-fertilization between the S3 strategic vision and the social innovation trigger emerges also in the suggested method for implementing in practice social innovation. As stated in the above mentioned Guide (Idem: 59), two out of the 5 steps recognized by the EC as crucial for supporting Social Innovation are: Step 4, Develop a Smart Specialisation Strategy and Plan including SI and Step 8, Social Innovation Cluster/ Park.

The concept of social innovation may be supportive when seeking to understand some features in S3, that still lack a clear spatial definition. In particular, if the concept of *granularity*, and in particular of *spatial proximity*, is precondition to achieve cross-fertilisation across ideas and expertise, as advocated by almost all the examples suggested as good practice in the guide, what is the *metric* of proximity? Is the proximity needed for enacting social innovation processes the same scale of proximity necessary to activate effective clusters or some specific kind of clusters, perhaps those that are more relying on innovation? Can we measure this proximity?

If cooperation is based on mutual trust, personal knowledge and social reputation, in some cases the scale of proximity requested for activating successful clusters overlaps with the scale of the proximity necessary to enable successful social activation processes. Cluster theory mainly rests on the opportunity for up-scaling economic mechanisms, thus creating advantages for the participating companies, and, in addition to it, also on shared knowledge and exchange of competences within a given network, while this latter is central in social innovation mechanisms and in S3. In facts, the geography of clusters overlaps with the labour markets, and -typically- cluster

analysis and clusters data gathering are conducted at a regional scale. The innovation component, essential in the social innovation process and in S3, can be optional in clusters, ideally innovative but not necessarily. These and other similarities and differences are systematically discussed in a recent report commissioned by the DG Research of the European Commission and produced by a group of independent experts chaired by Christian Ketels. In particular, the most important differences between clusters and S3 follow (EU 2013: 4): “S3 focuses on specific innovation-intensive sectors while clusters apply to a broader set of sectors in the economy. S3 aims to exploit emerging linkages between economic activities that can cut across traditional cluster boundaries. ... The explicit goal of cluster policies is often to enhance the performance of existing clusters. (...) Clusters are potential elements of a regional innovation ecosystem, while S3 are wider policies aimed at transforming this eco-system. Clusters can come close to “smart specialisation domains” if they stimulate new types of knowledge spill overs with a high leverage effect on the growth path of the economy.”

Several attempts have been made in the cluster literature to find out possible taxonomy, however, in knowledge-intensive clusters, the triple helix concept (referred to the relationship between universities, enterprises and government) is essential. As Porter has been highlighting since 1990, four intertwined factors concur to the creation of a competitive environment for companies, depicted in form of a diamond. This combination works in two ways, since investing in public good, always seen as a typically public activity, becomes important for the private sector itself (Porter 1998). In an ecosystem approach, private vs public interests' boundaries finally blur. The same concept of producing social services as a matter of business is gaining growing interest in the private sector (Porter, 2011). The multiple actors involved with different roles in supporting the economic growth depicts the complexity of the entrepreneurial ecosystem, from which S3 should stem. As stated by Foray and Goenaga (2013: 5), those who are asked to promote S3 by discovering “the domains of R&D and innovation in which a region is likely to excel given its existing capabilities and productive assets”, are “entrepreneurs in the broader sense (innovative firms, research leaders in higher education institutions, independent inventors and innovators)”. As in S3, also in cluster policy the whole context matters.

### S3: How far do Place and Space Matter?

The importance of a site-specific and context-related approach is at the forefront of the current cohesion policy reform, since in 2009 the “Barca report” was released. Following an intense discussion, nurtured by three thematic hearings one workshop and five policy seminars involving 80 both EU and non EU experts, this report clarifies that a possible failure in the European policies is due to a lack of *place-based* approach, thus advocating for the opposite, i.e. (Barca 2009: 5): “A place-based policy is a long-term strategy aimed at tackling persistent underutilisation of potential and reducing persistent social exclusion in specific places through external interventions and multilevel governance. It promotes the supply of integrated goods and services tailored to contexts, and it triggers institutional changes. In a place-based policy, public interventions rely on local knowledge and are verifiable and submitted to scrutiny.”

By supporting a territorial based approach, the “Barca report” suggest to ground the reform on pillars, consistent with the S3 approach, such as including the promotion of a learning process, of experimentalism, of mobilisation of local actors. The similarity between the locally-grounded approach of S3 and the place-based approach stemming from the Barca position, converging toward a *non-neutral* approach, has been highlighted by Foray (2005 b). The position expressed in the “Barca report” has

been framed within the current debate between *spatially-blind vs place-based* approach in policy implementation. According to Barca et al. (2012), a spatially-blind approach is that supported by the World Bank's (2009) report, that recommends to design policies without taking in consideration space, in order to ensure efficiency, equal opportunities and improvement of the life conditions, as well as it is spatially-blind the Sapir et al. report (2004), that recommends to pay little attention to the sub-national scale. Under the second approach, the place-based one, in addition to the Barca Report and among others, it is possible to include in particular the OECD (2009) position, that recommends a region- specific capable to unleash assets and to exploit synergies. More in depth (Barca et al., 2012: 140): "(...) the place-based approach assumes that the interactions between institutions and geography are critical for development, and many of the clues for development policy lie in these interactions. In order to understand the likely impacts of a policy, the interactions between institutions and geography therefore require us to explicitly consider the specifics of the local and wider regional context."

In terms of governance, the importance of a closer level of proximity to the local assets and knowledge leads to the inadequacy of the national scale in capturing appropriate policies, more specifically (Idem: 147): "(...) by acknowledging the limits of the central state to design good local development policies, place-based strategies recognize the need for intervention based on partnerships between different levels of governance."

Since the early documents on the spatial perspective of European policies, culminating in the 1999 European Spatial Development Perspective (EC 1999), the importance of a spatially-led perspective in European policies has been advocated from different authors since long time and the debate is still current (Faludi and Waterhout 2002, Trillo 2012, Faludi 2015). The spatial perspective is the physical setting for enabling place-based policies grounded in the specific territories. A lack of territoriality even interferes with a transparent exercise of democracy (Faludi 2015), thus, far from being a merely geographic concept, space and territory are real and proper enablers of context specific policies and related implementation. Moreover, because in the current EU programming period the concept of *territoriality* is embedded within important and innovative policy instruments, such as the Integrated Territorial Investments and the Community-Led Local Development, gaps in a place-based approach would undermine the effective implementation of new instruments, with a high potential of unleashing context specific assets. A better awareness of the governance within place-based S3 could support the creation of effective network of stakeholders for the Community Local Led Development strategies implementation, an innovative approach in the ESRF and ESF programs implementation drawn from the LEADER approach and not yet fully developed outside the rural contexts. Despite on their strong root in a place-based approach, S3 are still far from being clearly spatial-led strategies. This may depend on the original conceptualisation of S3, developed from an a-spatial idea (Ekonomiaz 2013). It can be therefore problematic to translate them into genuine place-based policies, reflecting a consistent social innovation based institutional framework, particularly in those regions, still lacking in clear and updated spatial frameworks.

In order to fill this gap, a research program has been proposed and accepted for grant under the Horizon 2020 program, namely MAPS-LED (Multidisciplinary Approach to Plan Smart specialisation strategies for Local Economic Development; <http://www.cluds>). This program, run by a consortium of 6 universities in EU and in the US aims in particular at connecting three important key-factors including: (1) Governance – both in cluster



policies and in terms of embeddedness; (2) Localization – as spatial and place-based approach; (3) Territorial network – as innovative milieu supporting social innovation, also based on urban-rural links. The intends to build a novel methodology to assess and exploit the potential of different clusters, networks and chains in shaping spatially-led S3 policies for local economic development through a spatial-led approach. After having explored the potential of S3 both through spatial planning (city-region and S3) and regional economy (cluster policy, territorial milieu and S3), the project will develop and test a tailored evaluative tool suitable to capture the socio- economic spill-overs of S3. By understanding how S3 can be translated and implemented into spatially-oriented local development policies, in line with the territorial agenda of Europe 2020 incorporating a place-based dimension, the expected results are: (1) to identify and examine S3 in terms of spatial, social and environmental factors; (2) to take into account local needs and opportunities driving regional policy interventions not only to emphasize “Key Enable Technologies”, but also to empower local innovation process – tacit knowledge, embedded social networks, innovative milieu; (3) to build and test an evidence- based methodology for recognizing and assessing emerging and potential S3, corroborated by successful factors of existing clusters.

### Urban Patterns as Cognitive Infrastructures for Successful S3

Shifting from a regional perspective towards an urban perspective, the concepts of social innovation, entrepreneurial discovery and local embeddedness can be found in the recent theorisation of *innovative district* (Katz and Bradley 2013: 55). Starting for a metropolitan centred perspective, the importance of the scale and related *metric* is a recurrent concept for understating the assets of the place: “The next economy must have four characteristics: higher exports, to take advantage of rising global demand; low-carbon technology, to lead the clean-energy revolution; innovation, to spur growth through ideas and their deployment; and greater opportunity, to reverse the troubling, decades-long rise in inequality. Metros will take the lead on all four fronts. Our open, innovative economy increasingly craves proximity and extols integration, which allow knowledge to be transferred easily between, within, and across clusters, firms, workers, and supporting institutions. The vanguard of these megatrends is largely found not at the city of metropolitan scale (...) but in smaller enclaves, what are increasingly being called innovation districts.”

The scale of the innovation districts is clear. Walkable urban environment, typically featured following the current urban design tendency of creating vibrant spaces offering a variety of uses, shared places, accessibility. If we look at innovation district as the brain of an innovative cluster (Katz 2016), then, it follows that urban patterns have to be treated as cognitive infrastructure of the collective knowledge production.

What is the rationale that creates value out of the proximity? Recent studies focus on the creation of successful groups of players capable to activate cooperation on the basis of the mutual trust (Novak 2011). Building on this concept, an extensive literature is blossoming in support of mutual trust and cooperation as triggers for successful social dynamics (for example, Rand et al., 2014). What cluster does is that it increases the roles of reputations by increasing the frequency of interaction and also how observable actions are (Yoeli 2016). Therefore, innovative urban spaces, in order to be supportive for a specific kind of entrepreneurs, those who are willing to cooperate in producing shared knowledge, has to support density, accessibility, and also shared spaced that makes good and cooperative actions *frequent and observable* (Yoeli 2016).

A first attempt to corroborate this research hypothesis has been done through the investigation of the hidden mechanisms supporting the outstanding competitiveness of a US based innovative district, the Kendall Square area in Cambridge, MA. The history of Kendall Square is intrinsically related with the presence of the Massachusetts Institute of Technology, which makes this case study, obviously, almost unique. However, because of this uniqueness, it can well explain how, even in an outstanding context in terms of innovation, still spatial factors play a significant role and are considered relevant both by public and private actors. Kendall Square is a former brownfield located in Cambridge (MA), opposite side of Charles River. It started in 1868 as an industrial district and consolidated this function with the opening of the first underground line nearby. The presence of the Massachusetts Institute of Technology dates back to 1916. Following the Second World War, the area entered an era of decline, which the Cambridge Redevelopment Authority (CRA), established in 1955, sought to reverse also through the clearance of 29 acres of land for the accommodation of NASA. Because of a change in the federal government strategies, the plan was no longer implemented, and the vacant land was partly redirected to the Department of Transportation. A shift in the approach to the redevelopment of the area, managed as a detached industrial estate, happened first with the implementation of the East Cambridge Riverfront Plan, then with the 2001 Citywide Rezoning. Walkability, quality of open spaces and mixed-use real became the norm in the area (CDD 2013, Blanding 2015). Recent massive capital investments confirm the tendency to invest in the area with high quality interventions (Logan 2015). The importance of the urban structure as catalyst for local development is very clear both to public and private actors (Farooq 2016, Conway 2016). As emerges from the current planning main document, the connection between urban fabric and attractiveness of the area for private companies is evident (CDD 2013: 51): *"A dynamic public realm connecting diverse choices for living, working, learning, and playing to inspire continued success of Cambridge's sustainable, globally-significant innovation community."*

Furthermore, recent studies on the companies' behaviour in this area proved how the cluster traditional approach of supporting to settle a major anchor to attract smaller companies in a certain area is now coupled by a more bottom-up oriented perspective, in which a significant number of small, dynamic, highly innovative companies create the favourable ecosystem for attracting big companies, interested in having an interaction with young talents and possibly in incorporating smaller (and cheap) companies with higher potential for growth (Bluestone 2016). Therefore, public policy makers should support the creation of a cluster of innovative and cutting-edge start-up companies, rather than seeking to attract a big one to make them follow. This creates the need for urban environments that are attractive, as Florida (2002) suggests, for young talents. How much companies value the competitive advantage of being in this kind of environment is testified by what recently happened to a leading pharmaceutical company in the Kendall area. Biotech is one of the historical companies located in Kendall Square, founded by a MIT professor, Sharp, who at the time he launched the company, wanted to work close to his laboratory. Despite of its roots in the area, in recent years a controversial decision was made, to move the Biotech headquarters to the suburb of Weston. In a few years, this decision was questioned and the willingness to return to the area prevailed (Timmerman 2011). The reasons are clear (Schroeder 2014): *"Other biotech companies have come to the neighborhood to take advantage of the healthy infrastructure in Cambridge and its vibrant bioscience community. While there were many individuals and organizations*

involved, MIT faculty members and administrators indeed played a major role in reviving Kendall Square, because they understood that in order to build a thriving bioscience program, they would have to build a thriving community of talented people — at MIT and beyond."

Private companies perceive the economic benefit of being localized in an innovative district, and are willing to pay the extra costs associated with a more expensive location in order to get extra benefits in return, including the well-being (and related increase of productivity) of their employees and the opportunity to benefit from the powerful network of informal and multi-disciplinary connections, made possible by the specific features of the urban fabric.

Further research development includes the effort to quantify with monetary proxy the extra benefits above mentioned, incorporating in the assessment the public services and facilities in the area. This goal will be achieved by spatializing clusters first, then companies at the urban scale, then mapping the network of spaces that are supportive of social innovation and entrepreneurial discovery.

Figure 57. MIT-founded biotech companies (red), MIT-affiliated institutes (orange), MIT departments and institutes (yellow), and other biotech and high-tech companies (blue). Source: <http://news.mit.edu/2014>



Figure 58. Kendall Square Open Spaces (CDD, 2013: 28)



Figure 59. Open Spaces and Public services around the Kendall square Areas (authors' picture)



Figure 60. Companies located in the Kendall's immediate surroundings: Akamai (authors' picture)



Figure 61. Companies Located in the Kendall's immediate surroundings: Biogen (authors' picture)



Figure 62. Restaurant, coffee shops, in the Kendall's surrounding (authors' picture)



Figure 63. Amenities in the Kendall's immediate surrounding (author's picture)



Figure 64. Companies located in the Kendall's immediate surrounding: Genzine (author's picture)



Figure 65. Companies located in the heart of Kendall: Microsoft (author's picture)



Figure 66. Bike sharing facilities in Kendall (author's picture)



Figure 67. Transit station, bicycles, pedestrians: a walkable environment (author's picture)



Figure 68. Large sidewalks, benches, bustops.: a pedestrian friendly place (authors' picture)





Interview with Barry Bluestone, Dukakis Centre, Northeastern University Boston, 4<sup>th</sup> April 2016

Interview with Bruce Katz, Brookings Institute, Washington D.C., 5<sup>th</sup> April 2016

Interview with Christian Ketels, Harvard Business School, 6<sup>th</sup> April 2016 2016

Interview with Erez Yoeli, Harvard, 7<sup>th</sup> April 2016

Interview with Iram Farooq, Cambridge Community Development Department, 11<sup>th</sup> April 2016

Interview with Jennifer Conway, MIT Investment Management Company, 14<sup>th</sup> April 2016

#### *Case study*

Logan T. (2015) A new Kendall Square envisioned in \$1.2b MIT plan, 28<sup>th</sup> July, <https://www.bostonglobe.com> (Retrieved: March 2016)

Blanding M. (2015) The Past and Future of Kendall Square. A transformation in five acts, MIT Technology Review, 18<sup>th</sup> August, <https://www.technologyreview.com> (Retrieved: March 2016)

CDD (Cambridge Community Development Department) (2013) Kendall Square Final Report. <http://www.cambridgema.gov> (Retrieved: March 2016)

Timmerman L. (2011) Biogen Idec CEO on Move Back to Cambridge: "We're Working on It". 16<sup>th</sup> June, <http://www.xconomy.com>

Schroeder B. (2014) How to build a biotech renaissance: MIT in Kendall Square. A look back at how Institute Professor Phillip Sharp, his startup Biogen, and MIT's biotech community helped revive Kendall Square. 27<sup>th</sup> March, MIT news, <http://news.mit.edu> (Retrieved: March 2016)

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## References

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- Aldrich H. E. and Fiol C. M. (1994). Fools rush in? The institutional context of industry creation, *Academy of Management Review* 19(4), 645–670
- Aranguren, M. J., Franco, S., Ketels, C., Murciego, A., Navarro, M. and Wilson, J. R. (2010). Benchmarking Regional Competitiveness in the European Cluster Observatory, [On-line] <http://www.clusterobservatory.eu/eco/uploaded/pdf/1288016756795.pdf>
- Armondi, S. (2014). "Equivoci e possibilità del paradigma delle smart city. Quale narrazione nell'agenda urbana italiana", in Calafati, A. (Ed.), *Città tra sviluppo e declino. Un'agenda urbana per l'Italia*. Roma: Donzelli Editore.
- Asheim, B., Cooke, P. and Martin, R. (2006, Eds.), *Clusters and regional development: critical reflections and explorations*, London: Routledge
- Atkinson R. (2014) The Urban Dimension in Cohesion Policy: Past developments and Future Prospects. Paper presented at a RSA workshop on "The New Cycle of the Cohesion Policy in 2014-2020", Institute of European Studies, Vrije Universiteit Brussels, 24/03/2014.
- Bagnasco, A., (1977). *Tre Italie. La problematica territoriale dello sviluppo italiano*. Bologna: Il Mulino
- Barca, F. (2009). *An agenda for a reformed cohesion policy: a 'place-based' approach to meeting European Union challenges and expectations*, [On-line] [http://www.europarl.europa.eu/meetdocs/2009\\_2014/documents/regi/dv/barca\\_report\\_barca\\_report\\_en.pdf](http://www.europarl.europa.eu/meetdocs/2009_2014/documents/regi/dv/barca_report_barca_report_en.pdf)
- Barca F. et al. (2012) The Case for Regional Development Intervention: Place-Based versus Place-Neutral approaches, in: *Journal of Regional Science*, Vol. 52, No. 1, pp. 134-152.
- Bathelt, H, Malmberg, A and Maskell, P. (2004) Clusters and Knowledge: Local Buzz, Global Pipelines and the Process of Knowledge Creation, *Progress in Human Geography*, 28(1): 31-56
- Battaglini, E., Davico, L., De Santis, G. and Palazzo, A.L. (2014). *Non tutte le strade portano a Roma*, I Rapporto della Fondazione G. Rota sull'Innovazione territoriale sostenibile del Lazio, Torino, Guerini.
- Becattini, G., (1966). *Aspetti dell'economia industriale lucchese : con particolare riguardo alla localizzazione delle unità produttive*. Lucca: ITRES
- Becattini, G. (1979). *Scienza economica e trasformazioni sociali*. Firenze: La Nuova Italia
- Becattini, G., (1987, Ed.). *Mercato e forze locali: il distretto industriale*. Bologna: il Mulino
- Becattini, G. (1989). Riflessioni sul distretto industriale marshalliano come concetto socio-economico. *Stato e mercato*, 25(111), 28.
- Becattini, G. (1998). *Distretti industriali e made in Italy*. Torino: Bollati Boringhieri
- Becattini, G. (2000). *Dal distretto industriale allo sviluppo locale, svolgimento e difesa di un'idea*. Torino: Bollati Boringhieri
- Belussi, F. and Sedita, S. R. (2009). Life cycle vs. multiple path dependency in industrial districts. *European Planning Studies*, 17(4), 505-528.
- Bengs, C. (2015), "The Spatial Dimension in Smart Specialisation Strategies", Presentation for MAPS-LED Open Panel Discussion, Reggio Calabria, March 28th 2015

- Bignante, E., Celata, F., and Vanolo, A. (2014). *Geografie dello sviluppo: una prospettiva critica e globale*. Torino: UTET università.
- Böhme K., Doucet P., Komornicki T., Zauzha J., Świątek D. (2011) How to strengthen the territorial dimension of "Europe 2020" and EU Cohesion Policy. Warsaw
- Bonomi, A. and Masiero, R. (2014). *Dalla Smart City alla Smart Land*. Venezia: Marsilio Editori.
- Boschma, R. (2005). Proximity and innovation: a critical assessment. *Regional studies*, 39(1), 61-74.
- Boschma, R. and Frenken, K. (2015), *Evolutionary Economic Geography, Papers in Evolutionary Economic Geography*, #15.18
- Boschma, R. and Frenken, K. (2011) "Technological relatedness and regional branching", in: H. Bathelt, M.P. Feldman and D.F. Kogler (eds.), *Beyond Territory. Dynamic Geographies of Knowledge Creation, Diffusion and Innovation*, Routledge, London and New York, pp. 64-81
- Brenner, T. (2004). *Local industrial clusters: existence, emergence and evolution*. London: Routledge.
- Breschi, S., and Malerba, F. (2001). The geography of innovation and economic clustering: some introductory notes. *Industrial and corporate change*, 10(4), 817-833.
- Brettel, M., Friederichsen, N., Keller, M. and Rosenberg, M. (2014). How virtualization, decentralization and network building change the manufacturing landscape: An Industry 4.0 Perspective. *International Journal of Mechanical, Industrial Science and Engineering*, 8(1), 37-44.
- Brusco S. and Paba S., (2010). "Per una storia dei distretti industriali, dal secondo dopoguerra agli anni 90" in Barca F. (Ed), *Storia del Capitalismo italiano dal dopoguerra ad oggi*. Roma: Donzelli, p. 265-333
- Brusco, S., and Sabel, C. (1981). "Artisan production and economic growth" in Wilkinson, F. (Ed) *The dynamics of labour market segmentation*, London, 99-114.
- Calafati, A.G. (2009). *Economie in cerca di città*, Roma: Donzelli
- Camagni, R. and Capello, R. (2013). Regional innovation patterns and the EU regional policy reform: toward smart innovation policies. *Growth and change*, 44(2), 355-389.
- Camera di Commercio di Roma (2013). *Il sistema produttivo culturale nella provincia di Roma: ruolo e capacità di attivazione economica*. [On-line] [http://www.rm.camcom.it/archivio59\\_comunicati-stampa\\_0\\_594\\_0\\_1.html](http://www.rm.camcom.it/archivio59_comunicati-stampa_0_594_0_1.html)
- Capello, R. (2014). Smart Specialisation Strategy and the New EU Cohesion Policy Reform: Introductory Remarks. *Scienze Regionali*, 13 (1), 5-14.
- Capello, R., Cappellin, R., Ferlaino, F. and Rizzi, P. (2012). *Territorial patterns of innovation*. Milano: Franco Angeli.
- Caracciolo, A. (Ed). (1991). *Il Lazio, della serie Storia d'Italia, le regioni dall'unità ad oggi*, Torino: Einaudi.
- Caramis, A. and Lucianetti, L.F. (2014). "Le strategie di smart specialisation delle regioni italiane". XXXV Conferenza italiana di scienze Regionali. p. 1-22 [On-line] [http://www.grupposervizioambiente.it/aisre\\_sito/doc/papers/Lucianeti\\_Caramis\\_2014.pdf](http://www.grupposervizioambiente.it/aisre_sito/doc/papers/Lucianeti_Caramis_2014.pdf)
- Castells, M. (2000). *The Rise of the Network Society*. Oxford: Blackwell.

- Centro Studi Sintesi, (2015). *La mappa dell'economia e le nuove direttrici dello sviluppo*. Milano: F. Angeli
- CER-Unindustria (2012). *Un progetto per lo sviluppo del Lazio. La discontinuità per tornare a crescere*, Mimeo.
- Cerrito, E. (2010). La politica dei poli di sviluppo nel Mezzogiorno. Elementi per una prospettiva storica, in Banca d'Italia – Eurosystema, "Quaderni di Storia Economica (Economic History Working Papers)", n. 3.
- Clementi, A., Dematteis, G. and Palermo, P.C. (Eds). (1996). *Le forme del territorio italiano*, Roma-Bari: Laterza.
- CNA Roma e Lazio - Centro Europa Ricerche (2013). *Indagine congiunturale sulle piccole imprese della Regione Lazio*, [On-line] <http://www.cnapmi.org/News/Presto-un-tavolo-tra-imprese-e-Regione-su-credito-export-reti-e-infrastrutture>
- Coffano, M. and Foray, D. (2014). The Centrality of Entrepreneurial Discovery in building and implementing a Smart Specialization Strategy. *Scienze Regionali*, 13(1), 33-50
- Commissione Europea (2010). *Europa 2020. Una strategia per una crescita intelligente, sostenibile e inclusiva*, Bruxelles.
- Cooke, P. N., and Lazzeretti, L. (2008, Eds.). *Creative cities, cultural clusters and local economic development*. Cheltenham: Edward Elgar
- Crescenzi, R., Rodríguez-Pose, A., and Storper, M. (2007). The territorial dynamics of innovation: a Europe–United States comparative analysis. *Journal of Economic Geography*, 7(6), 673-709.
- Cumbers, A. and McKinnon, D. (2013). *Clusters in urban and regional development*. London: Routledge.
- Curien, N. (2000). *Économie des réseaux*. Paris: La Découverte
- Dąbrowski M. (2014) Towards Place-Based Regional and Local Development Strategies in Central and eastern Europe?. In: "(Re)appraising place-based economic development strategies" *Journal of Local Economy*. Vol. 29 Issue 4-5..
- Dahl, M. S. and Sorenson, O. (2012). Home sweet home: Entrepreneurs' location choices and the performance of their ventures. *Management science*, 58(6), 1059-1071.
- Das, S. K. and Panayiotopoulos, P. (1996). Flexible Specialisation: New Paradigm for Industrialisation for Developing Countries?. *Economic and Political Weekly*, L57-L6, 1.
- De Martino, U. (2008). *Il governo delle aree metropolitane*, Roma: Officina.
- Delgado, M., Bryden, R. and Zyontz, S. (2014a). *Categorization of traded and local industries in the US economy*. [On-line] <http://goo.gl/7qB7ve>
- Delgado, M., Porter, M. E. and Stern, S. (2014b). Clusters, convergence, and economic performance. *Research Policy*, 43(10), 1785-1799..
- Delgado, M., Porter, M. E. and Stern, S. (2015). Defining clusters of related industries. *Journal of Economic Geography*, lbv017.
- Dematteis, G. (1994). *Possibilità e limiti dello sviluppo locale. Sviluppo locale n.1*. Torino: Rosenberg and Sellier
- Dematteis, G. and Governa F., (1999). *Il milieu urbano. L'identità territoriale nei processi di sviluppo*. Milano: F. Angeli
- Dessein, J., Battaglini, E. and Horlings, L. (2015, Eds.). *Cultural Sustainability and Regional Development. Theories and practices of territorialisation*, London: Routledge.

- Doloreux, D. (2003). Regional innovation systems in the periphery: The case of the Beauce in Québec (Canada). *International Journal of innovation management*, 7(01), 67-94.
- Doloreux, D. and Parto, S. (2005). Regional innovation systems: Current discourse and unresolved issues. *Technology in society*, 27(2), 133-153.
- Dossena, C. (2013). *Distretti culturali evoluti, tra teoria e empiria. L'organizzazione dei distretti culturali evoluti*. Milano: F. Angeli
- DPS, PON GAT 2007-2013 asse I – Obiettivo Operativo I.4, Torino 2014
- Drath, R. and Horch, A. (2014). Industrie 4.0: Hit or hype?[industry forum].*Industrial Electronics Magazine, IEEE*, 8(2), 56-58.
- Dti (2001). *Business Clusters in the UK – A First Assessment*. London: Department of Trade and Industry (Dti)
- Dupuy, G. (1985). *Systèmes, réseaux et territoires. Principes de réseautique territoriale*. Paris: Presses de l'ENPC
- Dupuy, G. (1988). *Réseaux territoriaux*. Caen: Paradigme
- Dupuy, G. (1991). *L'urbanisme des réseaux. Théories et methods*. Paris: Colin
- Dupuy, G. and Offner, J.M. (2005). Réseau : bilans et perspectives. *Flux* 62, 4, p. 38-46
- EC - Commission of the European Communities, *Regional policy contributing to smart growth in Europe*, COM(2010)553, Brussels, 2010
- Economic and Social Committee and the Committee of the Regions, *A resource-efficient Europe – Flagship initiative under the Europe 2020 Strategy* COM (2011) 21, Brussels, 2011
- EKONOMIAZ (2013) SPECIAL ISSUE ON SMART SPECIALISATION STRATEGIES. N°84.
- EUROPEAN COMMISSION (CEC) (1999) *EUROPEAN SPATIAL DEVELOPMENT PERSPECTIVE: TOWARDS BALANCED AND SUSTAINABLE DEVELOPMENT OF THE TERRITORY OF THE EU*. LUXEMBOURG: OFFICE FOR OFFICIAL PUBLICATIONS OF THE EUROPEAN COMMUNITIES.
- European Commission (2012) "Guide to Research and Innovation Strategies for Smart Specialization (RIS3)", Smart Specialization Platform, EU Regional Studies
- Erken, U. and van Es, F. (2007). Disentangling the R&D shortfall of the EU vis-à-vis the US. *Jena economic reserah papers*, 2007(207).
- Eures (2012). *Rapporto sullo stato delle province del Lazio*, [On-line] [http://www.eures.it/dettaglio\\_ricerca.php?id=94](http://www.eures.it/dettaglio_ricerca.php?id=94)
- European Commission – Research Executive Agency. (2014). Grant agreement n. 645651 for: Marie Skłodowska-Curie Research and Innovation Staff Exchange (RISE) "Multidisciplinary approach to Plan Smart Specialisation Strategies for Local Economic Development"
- European Commission (2013). *Innovation Union A pocket guide on a Europe 2020 initiative*, Brussels: European Commission
- European Commission. (2010). *Europe 2020 Flagship Initiative Innovation Union*. COM (2010), 546.
- European Commision (2012), *Europe 2020 - Europe's growth strategy*. European Communities, Brussels, Belgium. [On-line] <http://ec.europa.eu/europe2020>
- European Commission (2014), *Strategie di innovazione nazionali o regionali per la specializzazione intelligente (RIS3), Italia accordo di partenariato 2014-2020*

European Commission. (2010). A strategy for smart, sustainable and inclusive growth, COM (2010) 2020 final, Bruxelles.

European Commission. (2010). Communication from the commission to the European Parliament, the council, the European Economic and Social Committee and the Committee of the Regions, Regional Policy contributing to smart growth in Europe 2020, COM (2010) 553 final. Brussels.

European Commission. (2012). Guide to Research and Innovation Strategies for Smart Specialisations (RIS 3).

European Commission. (2013). "Digital Agenda: European Commission gives €77 million boost to high-tech manufacturing sector SMEs". Press Release. Brussels, 13 June.

European Council (2006). Regulation No 1893/2006 of the European Parliament and of the Council [On-line] [http://en.istat.it/strumenti/definizioni/ateco/1893\\_2006.pdf](http://en.istat.it/strumenti/definizioni/ateco/1893_2006.pdf)

European Council (2010). Conclusions – 17 June 2010, EUCO 13/10 of 17 June 2010

European Union (2014). Regional Innovation Scoreboard 2014. Belgium.

European Parliament and Council (2013) Regulation No 1303/2013 of the European Parliament and of the

Council of 17 December 2013 laying down common provisions on the European Regional Development

Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural

Development and the European Maritime and Fisheries Fund and laying down general provisions on the

European Regional Development Fund, the European Social Fund, the Cohesion Fund and the European

Maritime and Fisheries Fund and repealing Council Regulation (EC) No 1083/2006.

European Parliament (2000), Presidency Conclusions of the Lisbon European Council 23 and 24 March 2000

European Parliament (1997), Treaty of Amsterdam, amending The Treaty on European Union, The Treaties

Establishing The European Communities and Certain Related Acts.

European Commission (2012) Guide to Research and Innovation Strategies for Smart Specialisation (RIS3), Available online: <http://s3platform.jrc.ec.europa.eu/s3pguide>.

European Commission (2011), Territorial Agenda of the European Union 2020. Towards an Inclusive, Smart and Sustainable Europe of Diverse Regions. Agreed at the Informal Ministerial Meeting of Ministers responsible for Spatial Planning and Territorial Development on 19th May 2011, Hungary.

European Commission (2010), Regional Policy contributing to smart growth in Europe 2020. COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS. Brussels, 6.10.2010 COM(2010) 553 final

European Commission (2008), Communication From The Commission To The Council, The European Parliament, The Committee Of The Regions And The European Economic And Social Committee. Green Paper on Territorial Cohesion Turning territorial diversity into strength {SEC(2008) 2550}. Brussels, 6.10.2008 COM (2008) 616 final.

European Commission (2007), Territorial Agenda of the European Union. Towards a More Competitive and sustainable Europe of Diverse Regions. Agreed on the occasion of the Informal Meeting on Urban Development and Territorial Cohesion in Leipzig on 24/25 May 2007. European Commission (1999), ESDP. European Spatial Development Perspective. Towards Balanced and Sustainable Development of the Territory of the European Union- Agreed at the Informal Council of Ministers responsible for Spatial Planning in Postdam, May 1999. Published by the European Commission

European Commission (2007), Leipzig Charter on Sustainable European Cities. Final Draft, 02 May 2007

Eurostat (2008). NACE Rev. 2. Statistical classification of economic activities in the European Community. Luxembourg, Office For Official Publications Of The European Communities.

Fabbro, S. (2007). *Il progetto della Regione Europa: Regole e strategie del territorio di fronte all'European Spatial Planning*. Milano: FrancoAngeli.

Falk, M. (2007). What Drives Business R&D Intensity Across OECD Countries?. *Applied Economics*, 38(5).

Faludi A. (2015) Place is a no-man's land. *Geographia Polonica* Vol. 88, Issue 1, pp 5-20

Faludi A. (2015) S3 place-based: Look who is talking. International Open Panel Discussion – MAPS-LED Research Project H2020 – Marie Slowdoswka Curie - RISE Actions, Reggio Calabria, Italy 27-28 May 2015. <https://www.youtube.com/watch?v=Dg9rzne-Jme> (Retrieved March 2016)

Faludi A., Waterhout B. (2002) *The Making Of The European Spatial Development Perspective: No Masterplan*. London And Ny: Routledge.

Florida R. (2002) *The Rise Of The Creative Class. And How It's Transforming Work, Leisure And Everyday Life*. Ny: Basic Books.

Feldman, M. P. and Audretsch, D. B. (1999). Innovation in cities:: Science-based diversity, specialization and localized competition. *European economic review*, 43(2), 409-429.

Filas (2010), Settimo Quadro Regionale di Valutazione dell'Innovazione. Innovation Scoreboard Regione Lazio, [On-line] [http://www.filas.it/downloads/documentazione/Scoreboard\\_2010.pdf](http://www.filas.it/downloads/documentazione/Scoreboard_2010.pdf)

Filas (2012). Ottavo Quadro Regionale di Valutazione dell'Innovazione. Innovation Scoreboard Regione Lazio 2012

FLC CGIL, "Fondi Europei 2014-2020: aggiornamento sui Programmi Operativi Nazionali e Regionali approvati dalla Commissione Europea" [On-line] <http://www.flcgil.it/attualita/fondi-europei-2014-2020/fondi-europei-2014-2020-aggiornamento-sui-programmi-operativi-nazionali-e-regionali-approvati-dalla-commissione-europea.flc>

Fontana, G. (2004). *Rapporto dal Territorio*, Relazione alla "Conferenza informale dei Ministri sulla coesione territoriale e le politiche urbane" (Rotterdam 29-30 novembre)

Foray, D. (2015) On the economic fundamentals of smart specialization. International Open Panel Discussion – MAPS-LED Research Project H2020 – Marie Slowdoswka Curie - RISE Actions, Reggio Calabria, Italy 27-28 May 2015

Foray, D. (2015) *Smart specialisation: opportunities and challenges for regional innovation policy*, Routledge: Abingdon.

Foray, D., David, P. A. and Hall, B. H. (2011). Smart Specialization. From academic idea to political instrument, the surprising career of a concept and the difficulties involved in its implementation. *METEI-working paper*, November 2011, Lausanne.

Foray, D., Goddard, J., and Beldarrain, X. G. (2012). Guide to research and innovation strategies for smart specialisation (RIS 3) EU, [On-line] <http://goo.gl/XRuSX7>

Fratesi, U. and Pellegrini, G., (2013, Eds.). Territorio, Istituzioni, Crescita. Scienze Regionali e sviluppo del paese, Milano: F. Angeli

Frenken, K., Van Oort, F. and Verburg, T. (2007). Related variety, unrelated variety and regional economic growth. *Regional studies*, 41 (5), 685-697.

Frost-Kump, A. (1998). Cultural Districts: The Art sas a Strategy for Revitalizing our Cities. Americans for the Arts. [On-line] [http://www.americansforthearts.org/sites/default/files/pdf/2013/by\\_topic/cultural\\_districts/Cultural%20Districts.pdf](http://www.americansforthearts.org/sites/default/files/pdf/2013/by_topic/cultural_districts/Cultural%20Districts.pdf)

Giuliani, E. and Bell, M. (2005). The micro-determinants of meso-level learning and innovation: evidence from a Chilean wine cluster. *Research policy*, 34(1), 47-68.

Grabher, G. (1993). The weakness of strong ties: the lock-in of regional development in the Ruhr area. *The embedded firm*. London: Routledge

Hausmann, R., & Rodrik, D. (2003). Economic development as self-discovery, *Journal of development Economics*, 72(2), 603-633.

Helbing, D. (2014). Economy 4.0 and Digital Society: The Participatory Market Society is Born (Chapter 8 of Digital Society). Available at SSRN 2539330.

Herman, M., Pentek, T. and Otto, B. (2015). "Design principles for Industrie 4.0 scenarios: a literature review". Technische Universität Dortmund, Fakultät Maschinenbau Working Paper.

Iacobucci, D. (2014). Designing and implementing a Smart Specialization Strategy at a Regional level: some open question. *Scienze Regionali*, 13(1).

Iacobucci, D. and Guzzini E. (2015). "La 'Smart Specialisation Strategy' delle regioni italiane e le politiche nazionali per la ricerca e l'innovazione", c.MET, 05, working paper. pp. 1-18

Iammarino, S. (2005). An evolutionary integrated view of regional systems of innovation: concepts, measures and historical perspectives. *European planning studies*, 13(4), 497-519.

Iammarino, S. and McCann, P. (2006). The structure and evolution of industrial clusters: Transactions, technology and knowledge spillovers. *Research policy*, 35(7), 1018-1036.

Imbruglia, R. and Quarto, A. (2014). Reti di impresa e distretti industriali. *Rivista di Scienze del Turismo* 2/2014. [On-line] <http://www.ledonline.it/Rivista-Scienze-Turismo/>

Invitalia. (2014). *La mappa delle specializzazioni tecnologiche. Il quadro regionale*. Rome

Istat, (2001). *I sistemi locali del lavoro, Censimento 2001*. Roma: Istat

Katz, B., Bradley, J (2011) Metro Connection, [Democracy 20](#) (Spring 2011): 53-63.

Katz, B., Bradley, J (2013) *The Metropolitan Revolution: How Cities and Metros Are Fixing Our Broken Politics and Fragile Economy*. Washington, D.C.: Brookings Institution Press 2013



- Keeble, D. and Wilkinson, F. (2000, Eds.). *High-technology clusters, networking and collective learning in Europe*. Ashgate Publishing.
- Kerr, W. R. and Kominsers, S. D. (2015). Agglomerative forces and cluster shapes. *Review of Economics and Statistics*, 97(4), 877-899.
- Ketels, C. (2005). *Cluster Mapping in Europe and the United States*. 2005, Trend Chart Workshop Brussels, Belgium 15 November.
- Ketels, C. (2015). *Competitiveness and Clusters: Implications for a New European Growth Strategy*. Work Package 301. MS48 "Policy paper: Role of clusters, competitiveness in the new orientation of the European growth strategy", Working Paper no 84.
- Ketels, C. and Protsiv S. (2014). *European Cluster Panorama: New Perspectives on Emerging Industries*. European Cluster Observatory Report.
- Ketels, C. and Protsiv, S. (2014). *Methodology and Findings Report for a Cluster Mapping of Related Sectors*. European Cluster Observatory Report No d1.2.
- Koehler, T. and Bovenschulte, M. (2014). *European Cluster Trends Methodological Report*. European Cluster Observatory Report.
- Krugman, P. (1997). *Pop internationalism*, Cambridge, MA: MIT Press.
- Krugman, P. (1991). *Geography and Trade*, Cambridge MA: MIT Press
- Lasi, H., Kemper, H. G., Fettke, P., Feld, T. and Hoffmann, M. (2014). *"Industry 4.0"*. Springer Fachmedien Wiesbaden.
- Lazzeretti, L., Capone, F. and Boix, R. (2012). Reasons for clustering of creative industries in Italy and Spain. *European Planning Studies*, 20(8), 1243-1262.
- Lee, J., Kao, H. A. and Yang, S. (2014). "Service innovation and smart analytics for Industry 4.0 and big data environment". *Procedia CIRP*, Proceedings of the 6th CIRP Conference on Industrial Product-Service Systems.
- Lefebvre, H. (1968). *Le Droit à la ville*, Paris: Anthropos
- Lindqvist, G., Malmberg and A., Sölvell, Ö. (2003). *Swedish Cluster Maps: A Statistical Inventory of Clusters in Sweden. 2002*. Stockholm, Center for Strategy and Competitiveness at Stockholm School of Economics, 2008. (Swedish edition).
- Lundvall, B. A. (1992). *National Systems of Innovation: towards a theory of innovation and interactive learning*. London: Printer.
- Maggioni, M. A. (2002). *Clustering dynamics and the location of high-tech-firms*. Springer Science and Business Media.
- Magnaghi, A. (2000). *Il progetto locale. Verso la coscienza di luogo*. Torino: Bollati Boringhieri editore.
- Maps-Led (2015), First Scientific Report, [On-line] [http://www.cluds-7fp.unirc.it/cont%20maps-led/1\\_First-Scientific-Report-WP1-Draft-1.pdf](http://www.cluds-7fp.unirc.it/cont%20maps-led/1_First-Scientific-Report-WP1-Draft-1.pdf)
- Markusen, A. (1996). Sticky places in slippery space: a typology of industrial districts. *Economic geography*, 293-313.
- Markusen, J. (2005). Modelling the offshoring of white-collar services: from comparative advantage to the new theories of trade and FDI (No. w11827). *National Bureau of Economic Research*.
- Marshall, A. (1920). *Principles of Economics*. London: Macmillan.

- Martin, R. and Sunley, P. (2003). Deconstructing clusters: chaotic concept or policy panacea?. *Journal of economic geography*, 3(1), 5-35.
- Martin, R. and Sunley, P. (2011). Conceptualizing cluster evolution: beyond the life cycle model?. *Regional Studies*, 45(10), 1299-1318.
- Martinotti, G. (1993). *Metropoli. La nuova morfologia sociale della città*. Bologna: Il Mulino.
- Maskell, P. and Malmberg, A. (1999). Localised learning and industrial competitiveness. *Cambridge journal of economics*, 23(2), 167-185.
- McCann, P. and Ortega-Arglès, R. (2011). *Smart Specialization, regional Growth and application to EU Cohesion Policy*. Economic Geography Working Paper, Faculty of Spatial Science, University of Groningen.
- Midtkandal I. and Sörvik J. (2012) What is Smart Specialisation?, in: [Nordregio News Issue 5. http://www.nordregio.se](http://www.nordregio.se) (Retrieved March 2016)
- Navarro M. et al. (2014) Regional benchmarking in the smart specialisation process: Identification of reference regions based on structural similarity. S3 Working Paper Series No. 03/2014. Technical Report by the Joint Research Centre of the European Commission
- Novak M.A. (2011) *Supercooperators. Altruism, Evolution and Why We Need Each Other to Succeed*. NY and London: Free Press.
- Millennium Ecosystem Assessment (2005). *Ecosystems and Human Well-being*, Washington DC: Synthesis Island Press
- Ministero per le Infrastrutture, Dicoter (2007). *Reti e territori al futuro. Materiali per una visione*, Roma: Mimeo.
- Montalbano, P. and Triulzi U. (2006). *L'internazionalizzazione della cultura: verso un nuovo paradigma di sviluppo locale e competitività internazionale. Europa e Mezzogiorno. Cultura e Sviluppo*. Roma: Formez
- Montresor, S., & Quatraro, F. (2015). *Key Enabling Technologies and Smart Specialization Strategies. European Regional Evidence from patent data* (No. 2015-05). Institute of Prospective Technological Studies, Joint Research Centre.
- Musci, L. (1996). *Il Lazio contemporaneo: Regione definita, Regione indefinibile, in Regione Lazio, Atlante storico-politico del Lazio*, Bari: Laterza, pp. 125-166.
- Musso, P. (2003, Ed.), *Réseaux et société*. Paris: PUF
- Nam, T. and Pardo, A. (2011). "Conceptualizing Smart City with Dimensions of Technology, People, and Institutions". 12th Annual International Digital Government Research Conference: Digital Government Innovation in Challenging Times, State University of New York.
- Nelson, R. R. and Winter, S. G. (1982). The Schumpeterian tradeoff revisited. *The American Economic Review*, 72(1), 114-132.
- O'Mahony, M. and Vecchi, M. (2005). Quantifying the Impact of ICT Capital on Output Growth: A heterogeneous Dynamic Panel Approach. *Economica*, 72.
- Oecd, (2005). *Culture and Local Development*. OECD Publishing [On-line] [http://www.paca-online.org/cop/docs/OECD\\_Culture\\_and\\_Local\\_Development.pdf](http://www.paca-online.org/cop/docs/OECD_Culture_and_Local_Development.pdf)
- OECD (2009a) How regions Grow: Trend and Analysis.
- OECD (2009) *Regions Matter: Economic Recovery, Innovation and Sustainable Growth*. Paris: Organisation for Economic Growth and Development.

- OECD (2013). *Innovation Driven Growth in Regions. The Role of Smart Specialisation*. Paris: Organisation for Economic Growth and Development.
- Offner, J. M. and Pumain, D.(1996, Eds.), *Réseaux et territoires. Significations croisées*, Aube. Saint-Etienne
- Offner, J.M. (1994). *Réseaux, territoires et organisation sociale*. Paris: La Documentation Française
- Paladini, E. (2007). *Distretti industriali e sistemi produttivi locali nel Lazio*, "QUER - Quaderni di Economia Regionale", n. 5, Collana del Servizio Studi di Sviluppo Lazio, Anno I.
- Pauli G. (2010) *The Blue Economy*. Paradigm Publishers
- Piore, M. J. and Sabel, C. F. (1984). *The second industrial divide: possibilities for prosperity*. New York: Basic books.
- Pommier, P. and Boilève M. (2002). *Les systèmes productifs locaux*. Paris: Datar
- Porter, M. E. (1990). *The Competitive Advantage of Nations*. NY: The Free Press
- Porter, M. E. (1995). The competitive advantage of the inner city. *Harvard Business Review*, 73(3), 55-71.
- Porter, M. E. (1996). Competitive advantage, agglomeration economies, and regional policy. *International Regional science review*, 19(1-2), 85-90.
- Porter, M. E., (1998a), Clusters and Competition: New Agendas for Companies, Governments, and Institutions in Porter, M. E. (Ed.). *On Competition (A Harvard Business Review Book)*. Boston: Harvard Business School Press, pp. 197-299.
- Porter, M. E. (1998b). *On Competition (A Harvard Business Review Book)*. Boston: Harvard Business School Publishing.
- Porter, M. E. (1998c). Clusters and the New Economics of Competition. *Harvard Business Review*, 76, 77-90.
- Porter, M. (2003). The economic performance of regions. *Regional studies*,37(6-7), 545-546.
- Porter, M. E. and Ramirez-Vallejo, J. (2012). The New Carolina Initiative. MOC Special Version, Harvard Business School, July, 19.
- Potter, A. and Watts, H. D. (2011) Evolutionary agglomeration theory: increasing returns, diminishing returns, and the industry life cycle, *Journal of Economic Geography* 11, 417-455.
- Pouder, R. and John, C. H. S. (1996). Hot spots and blind spots: geographical clusters of firms and innovation. *Academy of Management Review*, 21(4), 1192-1225.
- Raffaelli, T., Becattini, G. and Dardi, M. (2006). *Industrial district and development economic*. *Elgar Companion to Alfred Marshall*. Camberley: Edward Elgar
- Rand D. G., Yoeli E. and Hoffman M. (2014) Harnessing Reciprocity to Promote Cooperation and the Provisioning of Public Goods, in: *Policy Insights from the Behavioral and Brain Sciences*, Vol. 1(1) 263 –269.
- Regione Lazio (2014). *Smart Specialisation Strategy*, <http://www.Regione.lazio.it>
- Regione Lazio, Roma Tre and Censis (2010). *Atlante e scenari del Lazio metropolitano*, Roma, Alinea, pp. 13-21.
- Regione Lazio, Sviluppo Lazio (2013). *Rapporto 2012 sull'economia del Lazio*, [On-line] [http://www.sviluppo.lazio.it/files/6/sviluppo\\_lazio\\_rapporto\\_2012\\_pdf\\_sito\\_02.pdf](http://www.sviluppo.lazio.it/files/6/sviluppo_lazio_rapporto_2012_pdf_sito_02.pdf)

- Resmini, L. and Torre, A. (2011). *Competitività territoriale: determinanti e politiche*, Milano: Franco Angeli.
- Rigby, D. L., and Brown, W. M. (2015). Who benefits from agglomeration? *Regional Studies*, 49(1), 28-43.
- Rigby, D. L. and Essletzbichler, J. (1997). Evolution, Process Variety, and Regional Trajectories of Technological Change in US Manufacturing, *Economic Geography*, 73(3), 269-284.
- Rodrik, D. (2004). *Industrial policy for the twenty-first century*. London: Centre for Economic Policy Research. CEPR Discussion Paper No. 4767.
- Sacco, S. and Pedrini, P., (2003). Il Distretto culturale: mito o opportunità?. *Il Risparmio*, 51(3)
- Santagata, W., (2002). Cultural Districts, Property Rights and Sustainable Economic Growth. *International Journal of Urban and Regional Research*, n. 26.
- Saxenian, A. (1994). *Regional Advantage: culture and competition in Silicon Valley and Route 128*. Harvard University Press.
- Sapir A., Aghion P., Bertola G., Hellwig M., Pisani-Ferry J., Rosati D., Vinals J. and Wallace H. (2004). *An Agenda for a Growing Europe: The Sapir Report*. Oxford: Oxford University Press.
- Schaffers, H., Ratti C. and Komninos N. (2012). Special Issue on Smart Applications for Smart Cities – New Approaches to Innovation: Guest Editors. *Journal of Theoretical and Applied Electronic Commerce Research*, 7, Issue 3, Tacla
- Schmitt P. (2011) The Territorial Agenda of the European Union 2020 – A turning point in striving for Territorial Cohesion? In: Europe's strive for Territorial Cohesion. Nordregio News Issue 1, October 2011
- Sörvik J. and Kleibrink A. (2015) Mapping innovation Priorities and Specialisation Patterns in Europe. S3 Working Paper Series No. 08/2015. JRC Technical Reports - IPTS
- Schierenbeck, C. (2015). "Five motivations for using Cluster Mapping Portals". Boston, U.S.-EU Workshop on Cluster Mapping and Cluster-based Economic Policy, 17 November.
- Schmitz, H. (1989). *Flexible specialisation: a new paradigm of small-scale industrialisation?*, Brighton: Institute of Development Studies.
- Schuh, G., Reuter, C., Hauptvogel, A. and Dölle, C. (2015). "Hypothesis for a theory of production in the context of Industrie 4.0". *Advances in Production Technology*. Aachen: Christian Brecher Editor. pp.11-23
- Scott, A. J., Agnew, J., Soja, E. W. and Storper, M. (2001). *Global city-regions: an overview*. Oxford: Oxford University Press
- Sforzi, F. (2008). *Il distretto industriale da Marshall a Becattini*. *Il Pensiero economico italiano*, XVI/2008/2, Pisa: F. Serra Editore
- Shiva, V. (2013). Will Green be the Colour of Money or Life? Paradigm Wars and the Green Economy. *Scienze del Territorio*. 1, Firenze. pp. 119-128
- Sölvell, O. and Ketels, C. (2005). Clusters in the EU-10 new member countries. Europe INNOVA Cluster Mapping Report No 1.
- Sölvell, O., Ketels, C. and Lindqvist G. (2009). *The European Cluster Observatory. EU Cluster Mapping and Strengthening Clusters in Europe*. Luxembourg: Publications Office of the European Union.

- Sorenson O. and Audia P. G. (2000) The social structure of entrepreneurial activity: Geographic concentration of footwear production in the United States, 1940–1989, *American Journal of Sociology* 106, 424–462.
- Stam, E. (2007). Why butterflies don't leave: Locational behavior of entrepreneurial firms. *Economic Geography*, 83(1), 27-50.
- Storper, M. (1997). *The Regional world: territorial development in a global economy*. Guilford Press.
- Storper, M., & Scott, A. J. (1995). The wealth of regions: market forces and policy imperatives in local and global context. *Futures*, 27(5), 505-526.
- Swann, G. M. P. (2002), "The implications of clusters: some reflections". Paper presented at the Clusters Conference, Manchester Business School, 18 April.
- Symbola, (2012). *Rapporto 2012. L'Italia che verrà. Industria culturale, made in Italy e territori*, [On-line] [http://www.symbola.net/assets/files/Italia che verr%C3%A0 2012 COMPLETA 1343211887.pdf](http://www.symbola.net/assets/files/Italia%20che%20verr%C3%A0%202012%20COMPLETA%201343211887.pdf)
- Symbola, (2015). *Rapporto 2015. Io sono cultura L'Italia della qualità e della bellezza sfida la crisi*, [On-line] [http://www.symbola.net/assets/files/lo%20sono%20cultura%20COMPLETA%20210715\\_1437473737.pdf](http://www.symbola.net/assets/files/lo%20sono%20cultura%20COMPLETA%20210715_1437473737.pdf)
- Taylor, P., Beaverstock, J., Cook, G. and Pandit, N. (2003) *Financial Services Clustering and Its Significance for London*. The Corporation of London.
- Ter Wal, A. L. and Boschma, R. (2011). Co-evolution of firms, industries and networks in space. *Regional Studies*, 45(7), 919-933.
- Trigilia, C. (1985). *La regolazione localistica: economia e politiche nelle aree di piccole imprese*. Stato e Mercato n.13. Bologna: Il Mulino
- Unioncamere Lazio, Censis (2010). *Impresa, territorio e direttrici di sviluppo nel Sistema Lazio. Una mappa ragionata del capitale produttivo Regionale*, [On-line] <http://www.comune.roma.it/PCR/resources/cms/documents/UCLraplazio.pdf>
- Trillo C. (2012) Territorial dimension and spatial planning, in: Bevilacqua C. & Trillo C. (2012) *Spatial planning and territorial development. Territorial dimension, development policies, planning*. Napoli: Giannini Editore, pp. 59 – 98
- Unioncamere Lazio, Censis (2011). *Scenari evolutivi e strategie operative per i poli produttivi del Lazio*.
- Valentino, P., (2001). *I Distretti Culturali: nuove opportunità di sviluppo del territorio*, Roma: Associazione Civita
- Van Pottelsberghe de la Potterie, B. (2010). A Note on the Drivers of R&D Intensity. *Research in World Economy*. 1(1).
- Venables, A. J. (1996). Localization of industry and trade performance. *Oxford Review of Economic Policy*, 12(3), 52-60.
- Vicente, J. and Suire, R. (2007). Informational cascades versus network externalities in locational choice: evidence of 'ICT clusters' formation and stability. *Regional Studies*, 41(2), 173-184.
- Vinci I. and Dematteis G. (2005). *Il radicamento territoriale dei sistemi locali*. Milano: FrancoAngeli
- VV.AA. (1967), *Progetto 80, Urbanistica*, 49.

- Wang S., Wan J., Li D. and Zhang C. (2015). Implementing smart factory of Industrie 4.0: an outlook. *International Journal of Distributed Sensor Networks*, pp. 1
- Waterhout B. (2008) The Institutionalisation of European Spatial Planning. Series: Sustainable Urban Areas. TU Delft.
- World Bank Group (2009) World Development Report 2009: Reshaping Economic Geography
- Wenting, R. and Frenken, K. (2011). Firm entry and institutional lock-in: an organizational ecology analysis of the global fashion design industry. *Industrial and Corporate Change*, 20(4), 1031-1048.
- Wolfe, D. A. and Gertler, M. S. (2004). Clusters from the Inside and Out: Local Dynamics and Global Linkages. *Urban Studies*, 41(5/6), 1071-1093.
- Woodward, D. and Guimarães, P. (2009). Porter's cluster strategy and World Bank (2009) *World Development Report 2009: Reshaping Economic Geography*. Washington, DC: World Bank
- industrial targeting. *Targeting Regional Economic Development*, 68-83.

## Webliography

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- ❖ The [EU Cluster Portal](#) complements the [Smart Specialisation Platform](#) that assists Regional and national policy-makers to develop, implement and review their Research and Innovation Strategies for Smart Specialisation (RIS3) such as through guidance documents and tools to identify Regions with similar policy priorities. It is composed by:
  - [The European Cluster Observatory](#)– providing information, *mapping tools* and analysis of EU clusters and cluster policy; also informing about events and activities for clusters.
  - [The European Cluster Observatory](#), hosted at DG Enterprise and Industry
  - [Cluster Excellence](#)– supporting benchmarking and training tools for cluster organisations.
  - [Cluster Internationalisation](#)– enabling EU clusters to profile themselves, exchange experience and search for partners for cooperation within and beyond the EU.
  - [Clusters and Emerging Industries](#)– providing background information on EU initiatives which support [Emerging Industries](#).
- ❖ [North American Industry Classification System, Concordance Tables'](#) list.
- ❖ US Cluster Mapping [Methodology](#) along with insights about [US-EU collaboration](#)
- ❖ The [Cluster Observatory](#), privately run by [CSC](#) in Stockholm since 2012, provides:
  - Cluster Observatory [Methodology](#)
  - Cluster Observatory [Sector Definitions](#)
  - Cluster Observatory [Indicators](#)

- ❖ ESPON [database](#)
- ❖ [GCIS Global Cluster Initiative Survey](#) - with materials on Cluster Initiative at its starts.
- ❖ [Cluster Collaboration Platform](#) - the leading web platform for European clusters.
- ❖ German Trade and Invest, Economic Development Agency of the Federal Republic of Germany, [www.gtai.de](http://www.gtai.de)
- ❖ [www.ec.europa.eu](http://www.ec.europa.eu)
- ❖ [www.agenziacoesione.gov.it](http://www.agenziacoesione.gov.it)
- ❖ [www.researchitaly.it](http://www.researchitaly.it)
- ❖ [www.agriregionieuropa.univpm.it](http://www.agriregionieuropa.univpm.it)
- ❖ [www.invitalia.it](http://www.invitalia.it)
- ❖ <http://epthinktank.eu/>

## Annex 1 Literature Review

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Marie Skłodowska-Curie RISE  
**MAPS-LED Project**



### **MAPS-LED**

Multidisciplinary Approach To Plan Smart Specialisation Strategies for  
Local Economic Development

WP1

“Research and Innovation Strategies in Cluster Policy”

**Literature Review**



<b>Title</b>	<b><i>How Do Regions Diversify over Time? Industry Relatedness and the Development of New Growth Paths in Regions</i></b>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/> (i.e. web, report study, etc..) if yes specified		
Author(s) name (s) (full)	Frank Neffke, Martin Henning and Ron Boschma		
Year	2011		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Economic Geography, Volume 87, Issue 3, pages 237–265		
Link to Publication	<a href="http://onlinelibrary.wiley.com/doi/10.1111/j.1944-8287.2011.01121.x/abstract">http://onlinelibrary.wiley.com/doi/10.1111/j.1944-8287.2011.01121.x/abstract</a>		
Keywords as they appear in the document	Technological relatedness Related variety Regional branching Regional diversification Evolutionary economic geography		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	<ul style="list-style-type: none"> <li>– Relatedness and the economic evolution of regions p. 239-242</li> <li>– Measuring relatedness: the revealed relatedness method, p. 242-244</li> <li>– Relatedness and Structural Change in Regions, p. 245-250</li> <li>– Portfolio Membership, Entry, and Exit, p. 250-257</li> <li>– Revealed Relatedness in Case Study Research: Linköping's Industrial Transformation, p. 257-260</li> </ul>		
Level	National	Regional	Local
	✓	✓	
Case Study if indicated in the paper (Y)	-Linköping region, Sweden		
Research Method applied	<input type="checkbox"/> Quantitative Method		
	<input type="checkbox"/> Qualitative Method		
	<input checked="" type="checkbox"/> Mixed approach The research method is both exploratory and explanatory. While the first paragraph set the theoretical relevance of industrial relatedness (p. 239-242), the other selected paragraphs present a method for measuring revealed relatedness (p. 242-244) and verify its consistence at the Swedish national level (p. 245-250), and at the regional level when presenting the Linköping region case study (p. 257-260).		
<b>Key sectors</b>			

	Smart Specialisation Strategies
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.
✓	Cluster Economic Development
✓	Cluster Policy
	Social Innovation
	Place-Based Approach
	Territorial milieu
✓	Spatial Planning
	Urban Cluster
	Urban Regeneration and Economic Development
	Metropolitan city
	Urban network
	Urban competitiveness
✓	Governance and Cluster
Note:	The paper investigates the structural change in the industrial portfolio of 70 Swedish regions between 1969-2002. The authors sustain that regions diversify by branching into industries that are related to their current industries. In particular, industries are more likely to enter in the regional portfolio if they are technologically close to the regional portfolio (Technological Cluster). Reveal relatedness and industry space are useful tools for case study analysis and regional policymaking.
<b>Reference Typology</b>	
✓	Theory
✓	Methodology
	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	Building on an Evolutionary Economic Geography framework, the authors explain how regions achieve structural change by branching out on technological related industries rather than diversify in new industry. The authors provide a methodology for analysing the regional technological cohesion using a novel indicator of inter-industry relatedness proposed by Neffke and Henning (2008) called Revealed Relatedness index. The Linköping region case study validates theory and methodology.
<b>Reference Field of interest</b>	
✓	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
	Governance
✓	Local innovation process

✓	Public Policy
	Others
Note:	The study is relevant for the selected fields of interest. It provides the definition of regional technological cohesion that refers to the technological closeness, called “reveal relatedness”, of certain industry inside the regional portfolio (p.247-251). It suggests that new economic activities tend to be attracted in a certain region when the incoming industries are technologically related to those already existing. The definition of the “industry space” helps to describe which industries are technologically closer each other. Between them is more likely to happen future innovative processes. Public policies may benefit from the tools presented.
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
	Social networks
✓	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
✓	Supply chains
	Governance schemes
	Innovation
	Smart technologies
✓	Local value chain
	PPP
✓	Others: Reveal Relatedness
✓	Others: Industry space
Notes:	
The “reveal relatedness” is a co-occurrence-based measure to estimate relatedness. It revealed the existence of economies of scope between industries. It is focus at the plant level rather than the firm level because it reflects the technological relatedness between industries. It allows quantifying the amount of structural change that the entry or exit of an industry represents to a particular region. The “industry space” is the network of industries that are linked by their degree of technological relatedness.	
<b>Synthesis and Comments</b>	
Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.	<p>The paper provides solid theoretical and methodological findings for understanding the regional diversification of industrial space. It might be useful for the project in order to identify new domains of intervention for Smart Specialisation strategies.</p> <p>In the first paragraph, it addresses the theory underpinning the concept of relatedness in an Evolutionary Economic Geographic framework. The authors explain how regions diversify in the industry space discussing the Schumpeter’s creative destruction and Jacob’s positive externalities concepts.</p>

	<p>The Swedish context demonstrates the validity of the methodology proposed in the study. The findings are mainly four. First, the relatedness among industries plays a role in determining which new industries enter the region and which existing industries might leave a region. Second, the rise and fall of industries are conditioned by regional industrial structures that have been laid down in the past. Third, this process implies that there is some degree of cohesion in the industrial profile of a region that is constantly being redefined through the process of creative destruction. Fourth, the entry or exit of an industry into a region is likely to increase or decrease the variety of the region and inversely lower or increase technological cohesion.</p> <p>The Reveal Relatedness method presented is useful to understand the structural change of a region and to identify new interaction between industries. The case study applies the methodology and show how structural change occur over the time and shows that the concepts of industry space and revealed relatedness are useful to identify new potentials domain of interaction between industries which leave space for future policies.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>In the study, the main definition for agglomeration's phenomenon is related to the degree of technological cohesion between industries of a same region defined as "Technological Cluster". This concept might be useful for the project because it allows exploring and finding potential structural change in the regional economy that might be targeted with Smart Specialisation strategies. The study does not address any social dimension.</p>

<b>Title</b>	<b><i>Related variety and regional growth in Spain</i></b>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/> (i.e. web, report study, etc..) if yes specified		
Author(s) name (s) (full)	Ron Boschma, Asier Minondo and Mikel Navarro		
Year	2012		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Papers in Regional Science, Vol. 91, No. 2, 241–257		
Link to Publication	<a href="http://doi:10.1111/j.1435-5957.2011.00387.x">http://doi:10.1111/j.1435-5957.2011.00387.x</a>		
Keywords as they appear in the document	Related variety Porter's cluster Product proximity Regional growth Spain		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	<ul style="list-style-type: none"> <li>- Spatial externalities, related variety and new relatedness indicators, p. 242-245</li> <li>- Empirical framework, p. 245-250</li> <li>- Empirical findings, p. 250-252</li> </ul>		
Level	National	Regional	Local
	✓	✓	
Case Study if indicated in the paper (Y)	-This is a case study that investigates whether related variety affected regional growth in Spain during the period 1995–2007.		
Research Method applied	<input checked="" type="checkbox"/> Quantitative Method. The research method is mainly explanatory and the authors test which indicator for relatedness, either ex ante (i.e. Frenken's related variety index) or ex post (i.e. Porter's cluster classification and Hidalgo's proximity index), is a more refined relatedness indicator to analyse the relationship between related variety and regional growth.		
	<input type="checkbox"/> Qualitative Method		
	<input type="checkbox"/> Mixed approach		
<b>Key sectors</b>			
	Smart Specialisation Strategies		

	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.
✓	Cluster Economic Development
✓	Cluster Policy
	Social Innovation
	Place-Based Approach
	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and Economic Development
	Metropolitan city
	Urban network
✓	Urban competitiveness
✓	Governance and Cluster
Note:	This study sheds a critical light on relatedness indicators to analyse the relationship between related variety and regional growth.
<b>Reference Typology</b>	
✓	Theory
✓	Methodology
	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	In the first selected paragraph, the authors explain the main theoretical ideas behind related variety then they discuss a number of existing empirical studies on this topic and present the advantages of the new relatedness indicators used in the paper. The second selected paragraph presents the methodology followed in the empirical analysis and the dataset.
<b>Reference Field of interest</b>	
✓	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
	Governance
	Local innovation process
	Public Policy
	Others
Note:	The study is relevant for the selected fields of interest. It investigates relatedness indicators to analyse the relationship between related variety and regional growth in 50 Spanish provinces during the period 1995-2007. This is in line with an expanding literature that suggests that technological relatedness is a major asset for economic growth in regions, and for regional diversification in particular (Boschma and Frenken 2011; Neffke et al. 2011).

<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
✓	Territorial milieu
	Social networks
	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
✓	Supply chains
	Governance schemes
	Innovation
	Smart technologies
✓	Local value chain
	PPP
✓	Others: Relatedness
✓	Others: Product proximity
Note :	<p>Relatedness principle considers technological closeness between industries. The indicators discussed in the article, in contrast to ex-ante conventional measured based on industry classification are ex post indexes of relatedness, are able to capture a larger range of factors affecting similarities across products and industries. The indicators presented follow Porter's cluster classification and Hidalgo's product proximity.</p> <p>The authors discuss the advantage of these indicators. Porter's index overcome conventional industrial classification systems based primarily on product type and similarities in production while Hidalgo's index calculate the degree of proximity between products that help defying region with higher learning opportunities.</p>
<b>Synthesis and Comments</b>	
<p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>The paper provides solid theoretical and methodological findings for understanding the relationship between variety and regional growth. It might be useful for the project in order to identify learning opportunities for Smart Specialisation strategies.</p> <p>The authors present a new theoretical framework that build on top of the related variety theory in order to analyse regional growth. They discuss different indicators in order to find which the more refined indicator of related variety is. The first indicator follows Porter's cluster classification and defines related industries on the basis of the geographical correlation of employment across traded industries (Porter 2003). The second indicator rests on the products' proximity index developed by Hidalgo et al. (2007), which is based on the probability that a country develops comparative advantage in two products.</p> <p>The authors test whether the new relatedness indicators are positively related with economic growth in 50 Spanish provinces during the period 1995–2007. The Spanish case is relevant because there the economy experienced an economic boom</p>

	<p>during the period of analysis and if related variety also contributed to regional economic growth it might constitute an important strategy to resurrect value added and employment during the present recession in some Spanish regions.</p> <p>To analyse the relationship between related variety and growth the authors estimate a equation where regional growth, estimated as the value added growth in a region, is the dependent variable while related variety and unrelated variety are the independent variables. Regions with a productive structure characterized by related industries will have higher value-added growth rates than other regions. The authors control for the effect of urbanization economies, measured by population density, on growth and they include a vector which include other factors that may influence regional growth, such as human capital and labour-productivity.</p> <p>The results confirm authors' expectation that <i>ex post</i> relatedness indicators better capture the economic effects of relatedness across industries, as witnessed by a stronger relationship between related variety and regional growth. The results show that proximity-based measure (i.e. Hidalgo's index) perform better than the cluster-based measure (i.e. Porter's index) when the regressions is run without control variables, but it is not true for the regressions that include control variables. In conclusion the authors found that the effect of related variety on value-added growth and employment growth at the regional level becomes stronger when we used the related variety measures based on cluster and proximity indicators.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>The article expands the knowledge on the relationship between related variety and growth. It has potential implications for regional policy initiatives because one important part of the Smart Specialisation concept holds that regions should build on related variety to support regional development.</p> <p>Using Hidalgo's index and network displaying techniques it might be possible to draw maps where products are not evenly distributed in order determine learning opportunities. If a region specializes in products that are close to other products, learning opportunities will be larger. In contrast, if a region specializes in products that are far from each other, learning opportunities will be scant.</p> <p>In the paper, the local dimension is defined by administrative bounder and it does not address any social dimension.</p>



<b>Title</b>	<b><i>Transforming European regional policy: a results-driven agenda and smart specialization</i></b>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/> (i.e. web, report study, etc..)		
Author(s) name (s) (full)	Philip McCann and Raquel Ortega-Argilés		
Year	2013		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Oxford Review of Economic Policy, Volume 29, Number 2, pp. 405–431		
Link to Publication	<a href="http://oxrep.oxfordjournals.org/content/29/2/405.short">http://oxrep.oxfordjournals.org/content/29/2/405.short</a>		
Keywords as they appear in the document	Regions Policy Europe Innovation Growth		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	<ul style="list-style-type: none"> <li>– The rethinking of the policy (pag. 409-412)</li> <li>– The policy reforms (pag. 412-416)</li> <li>– Smart specialization and EU regional innovation policy (pag. 416-420)</li> </ul>		
Level	National	Regional	Local
		✓	✓
Case Study if indicated in the paper (Y)	<p>The authors enlist three regions which have already been promoting local development strategies containing some or all of the elements in the smart specialization approach (page 420):</p> <ul style="list-style-type: none"> <li>– Navarra in Spain: Moderna Plan</li> <li>– West Midlands in England: Accelerate and PARD programmes</li> <li>– Limburg in Netherlands: Regional Technology Plan</li> </ul>		
Research Method applied	<input type="checkbox"/> Quantitative Method		
	<input checked="" type="checkbox"/> Qualitative Method <p>The research method is primarily exploratory. The objective of the study is to gain an understanding of underlying reasons, opinions and motivations on smart specialisation.</p>		

	<input type="checkbox"/> Mixed approach
<b>Key sector</b>	
✓	Smart Specialisation Strategies
✓	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.
	Cluster Economic Development
	Cluster Policy
	Social Innovation
✓	Place-Based Approach
	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and Economic Development
	Metropolitan city
	Urban network
	Urban competitiveness
	Governance and Cluster
Note:	<p>The paper explains the thinking behind the EU Cohesion Policy reform. A particular focus of the paper is on the concept of smart specialization and the use it to help facilitate a results-oriented policy agenda.</p> <p>The place-based approach, underpinning the EU Cohesion Policy reforms, is introduced to facilitate regional transformation and adjustment towards a stronger local development path across a range of economic, environmental, and social dimensions.</p>
<b>Reference Typology</b>	
	Theory
	Methodology
	Best Practices
	Guidelines
✓	Policy Analysis
	Others
Note:	The paper examines the nature, rationale, and logic of the reforms to EU Cohesion Policy
<b>Reference Field of interest</b>	
	Spatial dimension
✓	Social context
	Environmental aspects
✓	Economic Development
✓	Governance
✓	Local innovation process
✓	Public Policy

	Others
Note:	<p>The paper focuses on the concept of smart specialization and the use of this concept to help facilitate a results-oriented policy agenda. The arguments underpinning the reforms relate to modern thinking regarding the role of industrial policy and they relate to advances in our understanding of the relationships between economic geography, technology, and institutions.</p> <p>The study presents the elements of the place-based approach advocated by Barca (i.e. results-orientated, smart specialization, common strategic framework, explicit partnership principle, conditionalities) that has been designed to facilitate regional development towards a stronger local development path across a range of economic, environmental, and social dimensions. This is to be achieved by reorienting EU Cohesion Policy as an explicit vehicle for fostering multi-level governance improvements and capacity building in the regions which need this the most. Unsuccessful policy outcomes are not sanctioned whether government and regional authorities conform to the conditionalities and guidelines principles during the design, implementation, monitoring, and evaluation processes.</p>
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
	Social networks
	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
✓	Supply chains
✓	Governance schemes
✓	Innovation
	Smart technologies
	Local value chain
✓	PPP
	Others:
Note :	<p>The features of the place-based approach are results-orientated, smart specialization, common strategic framework, explicit partnership, and conditionalities. In the EU Cohesion policy, regions in order to receive development funding must establish results-oriented programs and projects aimed at fostering entrepreneurship and innovation on the basis of a strategy based on detailed baseline data, clear ex ante goals, and the provision for ongoing and ex post monitoring and evaluation (conditionality's principle).</p> <p>The study suggests some actions that fit the Smart Specialisation agenda and use a place based approach. They are linking of skills-training strategies to employer demands, the supply-chain upgrading programs linking SMEs with large firms, the customized loan finance facilities for SME R&amp;D initiatives, and university-industry collaboration programs.</p>
<b>Synthesis and Comments</b>	

<p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>The paper provides a solid basis for the project. While the first and second selected paragraphs mainly addressed the rationale and the logic of the European Cohesion Policy reform, the third paragraph focus primarily on the concept of smart specialization and its use to help facilitate a results-oriented policy agenda and it is following synthetized.</p> <p>In order to tackle the "transatlantic productivity gap" of the European industries in adapting to new technologies and innovation from other sector in comparison with industries located in North American the Knowledge for Growth Group promoted in 2009 a Smart Specialization agenda focused on fostering entrepreneurial search processes. The group argues the need of (i) exploiting knowledge networks and scale effects in domains where regions have strengths and potential for diversification, (ii) advocating experimentalism, (iii) monitoring and evaluating, (iv) fostering diversification around a core set of activities and themes rather than sectorial specialization, (v) exploiting related variety and developing inter-regionally and intra regionally connectivity between firms and institutions.</p> <p>These ideas moved from an aspatial sectoral thinking regarding spillovers and the development of value in R&amp;D adapted to the context of the EU regional reform agenda. Regions in order to receive development funding must establish results-oriented programmes and projects aimed at fostering entrepreneurship and innovation on the basis of a strategy based on detailed baseline data, clear ex ante goals, and the provision for ongoing and ex post monitoring and evaluation (conditionalities principle).</p> <p>The fundamental logic behind the place based approach and the smart specialization agenda is that the selection process of innovation policies should move from 'picking winners' to 'choosing races and placing bets'. Rather than fostering social rates above private rates of return in the context of infant industries, agglomeration and spillovers, policy makers must target policy as precise as possible, guided in advance by evidence and appropriate for the context, and then the outcomes must be monitored and evaluated using as much quantitative and qualitative data as is possible.</p> <p>In order to help regions and countries prepare their innovation strategies the European Commission has set up a 'Smart Specialization Platform' facility to provide policy-makers with up-to-date relevant information and guidance and in order to allow for interactive peer-review activities between regional policy-makers.</p> <p>The design of the EU smart specialization policy approach has been informed by the experience of a range of regions which have already been promoting local development strategies containing some or all of the elements in the smart specialization approach, and the authors offer three brief illustrative examples (page 420).</p>
<p>Comments about the possible connection with</p>	<p>Smart Specialization agenda appears to be a serious attempt to integrate various elements into a workable policy-prioritization</p>

<p>the specific objectives of the WP1.</p>	<p>framework appropriate to the regional context equally applicable to all types of regions.</p> <p>The intention of the place based approach and of the smart specialization agenda is to shift the policy prioritization process away from political or sectoral rent-seeking influences, and to focus the prioritization on explicit publicly agreed goals that are closely related to the local context and challenges. In addition, there is a strong emphasis on countering localized problems of deprivation and social exclusion. The study does not focus much on agglomeration phenomenon and economies of scale.</p>
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<b>Title</b>		<b>Regional Branching and Smart Specialisation Policy</b>		
Source Typology	Book <input type="checkbox"/>			
	Paper <input type="checkbox"/>			
	Other <input checked="" type="checkbox"/> report study			
Author(s) name (s) (full)	Ron Boschma and Carlo Gianelle			
Year	2014			
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Joint Research Centre, Institute for Prospective Technological Studies, S3 Policy Brief Series No. 06/2014, Publications Office of the European Union, 26 pages			
Link to Publication	doi:10.2791/65062			
Keywords as they appear in the document	Regional Branching Technological Relatedness Related Variety Related Diversification Entrepreneurial Discovery Process			
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	<ul style="list-style-type: none"> <li>- Technological relatedness, related variety and regional development (pages 5-8)</li> <li>- Possibilities to intervene publicly in the process of regional diversification (pages 8-12)</li> <li>- Related diversification policy and the entrepreneurial process of discovery (pages 12-15)</li> <li>- Potential policy targets for regional diversification (pages 15-17)</li> </ul>			
Level	National	Regional	Local	
		✓		
Case Study if indicated in the paper (N)	-			
Research Method applied	<input type="checkbox"/> Quantitative Method			
	<input checked="" type="checkbox"/> Qualitative Method			
	The research method is primarily exploratory. The objective of the study is to gain an understanding of underlying reasons, opinions and motivations on regional branching and smart specialisation. It provides policy targets for regional diversification.			
	<input type="checkbox"/> Mixed approach			
<b>Key sectors</b>				
✓	Smart Specialisation Strategies			
✓	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.			

✓	Cluster Economic Development
	Cluster Policy
	Social Innovation
✓	Place-Based Approach
	Territorial milieu
✓	Spatial Planning
	Urban Cluster
	Urban Regeneration and Economic Development
	Metropolitan city
	Urban network
	Urban competitiveness
✓	Governance and Cluster
Note:	<p>The report integrates insights from the relatedness approach, in which economic activities with greater potentials in regions are identified with relatedness methods, after which the entrepreneurial discovery process will identify actual bottlenecks to growth and opportunities for knowledge-oriented development through a bottom-up process based on the mobilization and use of entrepreneurial knowledge.</p> <p>In addition, it discusses a number of potential targets on which smart specialisation policy could concentrate that may enhance the effect of connecting related industries for regional development (i.e. spinoff activity, labour mobility and knowledge networks).</p>
<b>Reference Typology</b>	
✓	Theory
	Methodology
	Best Practices
✓	Guidelines
✓	Policy Analysis
	Others
Note:	<p>The second paragraph (pages 5-8) addresses the theoretical question of how much growth and innovation depend from knowledge creation and its utilisation by firm. The authors report that the role of entrepreneurship seems to be crucial for the process of regional branching that ensure territory will ultimately expand and diversify into industries that are closely related to their existing activity.</p> <p>The typology of the others paragraphs refers to policy analysis and guidelines. The third and fourth paragraphs (pages 8-15) contribute to explain how the relatedness approach is in line with the smart specialisation approach described in the guidelines developed by the European Commission and suggest that the approach could be combined with the entrepreneurial discovery process into an integrated, place-based framework for regional policy called sequential approach (page 14). In order to make new connections across any set of industries the authors suggest a “platform policies” (page 15). The fifth paragraph (pages 15-17) contains three knowledge transfer mechanisms through which related industries may be connected at the regional level, and it identifies the targets for smart specialisation strategies (i.e. spinoff activity, labour mobility and knowledge networks).</p>
<b>Reference Field of interest</b>	

✓	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
✓	Governance
✓	Local innovation process
✓	Public Policy
	Others
Note:	The report discusses many fields of interests. The relatedness approach refers to the regional scale. The diversification process that involve new industries technological related to the old industrial structure (Regional branching) is related with the economic development field. The field of local innovation process is oriented when discussing the entrepreneurial discovery process. The report describes three potential policy target for regional diversification.
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
	Social networks
✓	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
✓	Governance schemes
✓	Innovation
	Smart technologies
	Local value chain
	PPP
✓	Others: Entrepreneurial discovery
✓	Others: Relatedness
Note:	The report presents a way to merge the relatedness approach and the entrepreneurial discovery process and profit from both. Adopting a sequential approach, it will be possible to identify, with relatedness methods, the first economic activities with greater potential after which an entrepreneurial discovery process will be activated and harvested within the boundaries of these pre-defined areas. This approach will reduce the monitoring effort of policy makers. Entrepreneurial discovery will allow identification of actual bottlenecks to growth and opportunities for knowledge-oriented development through a bottom-up process based on the mobilization and use of entrepreneurial knowledge.
<b>Synthesis and Comments</b>	
Synthesis of the document with the	The report explains the importance for regions to have a variety of related industries that have similar competences in common.



<p>indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>Indeed, the authors sustain that the ability of a region in starting new growth paths and diversifying into new complementary fields of activity is crucial for long-term economic development (regional branching).</p> <p>The authors explore how the process of related diversification may serve and how it might be underpinning an effective smart specialisation policy. They argue that the objective of such policy is to stimulate specialized diversification into related technologies, that is, to develop new economic activities that can draw on local related resources. Instead of copying best practices taken from elsewhere, smart specialisation policy should take the history of the region as a point of departure, and identify regional potentials and bottlenecks that prevent connections and recombination between related activities to occur. In order to that the authors suggest a sequential approach to identify, with relatedness methods, the first economic activities with greater potential after which an entrepreneurial discovery process will be activated and harvested within the boundaries of these pre-defined areas.</p> <p>The authors rise a policy dilemma. Policy scheme based on relatedness and on entrepreneurial discovery does not consider whether the long-term economic development of regions requires related or unrelated diversification. Indeed, there is a lack of systematic empirical evidence to say to what extent long-term economic development can be secured by a long sequence of rounds of related diversification in regions, and to what extent unrelated diversification in completely new techno-economic fields is needed. The authors take as example of technologically unrelated activities that made new combinations and led to new growth impulses the tourist industry that is making new connections between unrelated activities, like ICT, design, art and gastronomical activities.</p> <p>The last part of the report discuss potential targets on which smart specialisation policy could concentrate on that may enhance the effect of connecting related industries on regional development. These mechanisms will leverage on experienced entrepreneurs, labour mobility between related industries, and collaborative networks between related partners (pages 15-17).</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>Investigating the relationship between relatedness approach and the entrepreneurial discovery process, the report adds to the concept of the technological cluster, defined by the technological relatedness between industries in a region, the roles of knowledge and entrepreneurial activity as main drivers for regional growth. This combination might be useful for the project because it allows exploring structural change in the regional economy that might be targeted with Smart Specialisation strategies. The public choice should shift from “picking victory”, targeting the strongest industries or those more in difficulty, to “picking potential winner”, targeting related industries from which the whole economic structure might benefit, addressing smart specialisation policy that will identify opportunities for knowledge-oriented development through a bottom-up process based on the mobilization and use of entrepreneurial knowledge.</p>



<b>Title</b>	<b><i>Agents of structural change. The role of firms and entrepreneurs in regional diversification</i></b>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/> (i.e. web, report study, etc..) if yes specified		
Author(s) name (s) (full)	Frank Neffke, Matté Hartog, Ron Boschma, Martin Henning		
Year	2014		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Papers in Evolutionary Economic Geography (PEEG), Section of Economic Geography, Utrecht University, No. 1410, p. 56		
Link to Publication	<a href="http://econ.geo.uu.nl/peeg/peeg1410.pdf">http://econ.geo.uu.nl/peeg/peeg1410.pdf</a>		
Keywords as they appear in the document	Structural change Entrepreneurship Diversification Relatedness Regions Resource-based view		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	<ul style="list-style-type: none"> <li>- Theory, p. 4-11</li> <li>- Measurement, p. 12-18</li> <li>- Results, p. 18-25</li> </ul>		
Level	National	Regional	Local
	✓	✓	
Case Study if indicated in the paper (Y)	-This is a case study that investigates how much agent type diversifies the regional capability base analyzing employment dynamics in 110 labor market regions in Sweden between 1994 and 2010. The authors distinguish between two different types of economic agents that are existing establishments and new establishments. New establishments can be set up by existing firms or by entrepreneurs, who themselves originate from either inside, local agents, or outside the region, non-local agents.		
Research Method applied	<input checked="" type="checkbox"/> Quantitative Method. The research method is mainly explanatory and the authors test which agent type affect the capability base of a region by creating, expanding and destroying economic activities.		
	<input type="checkbox"/> Qualitative Method		

	<input type="checkbox"/> Mixed approach
<b>Key sectors</b>	
✓	Smart Specialisation Strategies
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.
✓	Cluster Economic Development
	Cluster Policy
	Social Innovation
	Place-Based Approach
✓	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and Economic Development
	Metropolitan city
	Urban network
✓	Urban competitiveness
	Governance and Cluster
Note:	The main question of the present study is how regional capability bases change and in particular who changes them. The empirical analyses put forward in this study are informed by the notion that there are commonalities in the development paths of firms and regions. The authors consider a region's capability base as the capabilities that emerge from the regional resources (i.e. physical infrastructure, specialized labour markets and research organizations). Capabilities emerge that are often industry specific in the sense that they cannot be applied to all activities, but nor are these capabilities entirely specialized as groups of related industries utilize the same or similar capabilities.
<b>Reference Typology</b>	
✓	Theory
✓	Methodology
	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	In the first selected paragraph, the authors explain the origins of the capability based theoretical framework for regional diversification. Deriving from the resource-based view of the firm (RBV) the authors present the commonalities and differences between firms and regions. The aim of the study is to find out the agents that induce most structural change in regions based on the ability to extract rents from regional capability base with particular attention to the role of relatedness for regional diversification.  The second selected paragraph presents quantitative instruments and test them. Measuring how much employee shift to unrelated industry, the authors quantify the regional capability base structural change. Furthermore, the authors asses the shift in the regional industry mix, the agents that transform the most the regional capability base and the agents more persistent in the creation of novelty.

<b>Reference Field of interest</b>	
✓	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
	Governance
✓	Local innovation process
	Public Policy
	Others
Note:	The study is relevant for the selected fields of interest. It investigates the responsible for the structural change of the regional capability bases in 110 labor market regions in Sweden between 1994 and 2010. The authors found that existing establishments all tend to reinforce a region's existing capability base (i.e., increase the relatedness among industries in a region), whereas new establishments are often set up in more unrelated activities and hence induce more structural change.
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
✓	Territorial milieu
	Social networks
	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
	Governance schemes
✓	Innovation
	Smart technologies
✓	Local value chain
	PPP
✓	Others: Relatedness
✓	Others: Regional capability base
Note :	The authors found that existing establishments all tend to reinforce a region's existing capability base (i.e., increase the relatedness among industries in a region), whereas new establishments are often set up in more unrelated activities and hence induce more structural change. When the existing regional capabilities become insufficient for firms to compete at global markets, the regional capability base must be renewed or lose its attraction. In other words, some degree of unrelated diversification may be required.
<b>Synthesis and Comments</b>	
Synthesis of the document with the indication of the main	The paper provides solid theoretical and methodological findings for understanding how regional economies and their capability bases coevolve with the firms they host applying a resource-

<p>aspects that could be interesting for the state of art of the project.</p>	<p>based point of view. It might be useful for the project because it helps describing regions in terms of strength and weaknesses at a deeper level of capabilities rather than through their industry mix. It might help local policy makers to focus on those industries that could be present in a region as well as for managers and entrepreneurs to identify new potential economic activities.</p> <p>The authors present a theoretical framework that build on top of the resource-based view of the firm in order to analyse the agents that concur to the structural change of the regional capability base. The authors argue that regional capability bases outline the feasible development paths of local economies in the same way that the diversification opportunities for firms are conditioned by their resource bases. A parallel between the growth of firms and the way in which regional economies develop is that it involves enlarging the scope of production beside the scale. Unlike firms, which can exclude others from using their resources, access to regional capabilities is less restricted.</p> <p>The authors test the structural change considered as the employment shifting to unrelated industries, then they identify the agents that induce it and they analyse which one is the more persistent in the creation of novelty in 110 labor market regions in Sweden between 1994 and 2010. The Swedish case shows that the growth, decline and industrial reorientation of existing establishments all tend to reinforce a region's existing capability base (i.e., increase the relatedness among industries in a region), whereas new establishments are often set up in more unrelated activities and hence induce more structural change.</p> <p>The authors found that structural change mostly originates via new establishments, especially those with non-local roots. Even though entrepreneurs start businesses more often in activities unrelated to the existing regional economy, new establishments founded by existing firms survive in such activities more often, inducing longer-lasting changes in the region. This suggests that the mobility of firms and entrepreneurs is an important channel through which industries and their capabilities diffuse.</p> <p>The results are robust, regardless of whether relatedness is measured in terms of human capital requirements, input-output linkages or industries' positions in the industry classification system.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>The article has potential implications for regional policy initiatives because one important part of the Smart Specialisation concept holds that regions should build on related variety to support regional development.</p> <p>In the short run, it is often beneficial to leverage existing capabilities but in the long run, regions will have to adapt to new economic realities. However, long-run structural change can be accomplished through a series of small steps, in a process of related diversification that moves the region away from its traditional capability base. What the exact balance and speed of related versus unrelated diversification is a topic for further research.</p>

	<p>It might be interesting considering alternative approaches which does not calculate how much related employment an industry finds locally, but how related the region's employment is to this industry (i.e. Hidalgo).</p> <p>An unanswered question is about the intrinsic capacities for structural change, for instance, differences in location choices. Similarly, it might be interesting to distinguish spatial sorting of high quality establishments from agglomeration externalities.</p> <p>In the paper, the regional dimension is defined by labour markets and it does not address any social dimension.</p>
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Title	<i>Related Variety and Regional Economic Growth in a Cross Section of European Urban Regions</i>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/> (i.e. web, report study, etc..) if yes specified		
Author(s) name (s) (full)	Frank Van Oort, Stefan De Geus, and Teodora Dogaru		
Year	2014		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	European Planning Studies, Vol. 23, No. 6, 1110–1127		
Link to Publication	<a href="http://dx.doi.org/10.1080/09654313.2014.905003">http://dx.doi.org/10.1080/09654313.2014.905003</a>		
Keywords as they appear in the document	-		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	<ul style="list-style-type: none"> <li>- Agglomeration Economies Between Specialization and Diversity, p. 1112-1113</li> <li>- Conceptual Renewal and Hypotheses: Related Variety and Unrelated Variety, Specialization and Place-Based Development, p. 1113-1115</li> <li>- Data and Variables Used in Empirical Analysis, p. 1115-1120</li> <li>- Modelling Outcomes, p. 1120</li> <li>- Conclusions and Discussion, p. 1120-1124</li> </ul>		
Level	National	Regional	Local
		✓	
Case Study if indicated in the paper (Y)	-This is a case study that analyzes how variety affects growth of 205 regions in 15 European countries.		
Research Method applied	<p>■ Quantitative Method. The research method is mainly explanatory and the authors test four main hypotheses:</p> <ul style="list-style-type: none"> <li>- (i) In the short run, employment growth is positively related to related variety and negatively related to specialisation.</li> <li>- (ii) In the short run, unemployment growth is negatively related to unrelated variety.</li> <li>- (iii) In the short run, labour productivity growth is positively related to specialisation.</li> <li>- (iv) Agglomeration externalities are related to economic performance in all sizes of urban regions in Europe.</li> </ul>		



	<input type="checkbox"/> Qualitative Method
	<input type="checkbox"/> Mixed approach
<b>Key sectors</b>	
✓	Smart Specialisation Strategies
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.
✓	Cluster Economic Development
	Cluster Policy
	Social Innovation
✓	Place-Based Approach
✓	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and Economic Development
	Metropolitan city
✓	Urban network
✓	Urban competitiveness
✓	Governance and Cluster
Note:	<p>The paper investigates how regional variety affects growth of 205 NUTS2 regions in 15 European countries. The aim of the paper is to investigate empirically the contribution of agglomeration economies to economic growth in European regions while separating regions by population size.</p> <p>The results confirm the hypotheses that related variety is significantly related to employment growth, especially in small and medium-sized city-regions, and that specialization is significantly related to productivity growth. The authors did not find robust relationships between unrelated variety and unemployment growth.</p> <p>This study shows that a conceptual renewal centred on related and unrelated variety, specialisation and place-based development may represent an interesting way to advance the debate on agglomeration and spatial heterogeneity in light of European reforms and policy formulations.</p>
<b>Reference Typology</b>	
✓	Theory
✓	Methodology
	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	The first two selected sections of the paper are a brief overview on old and new theoretical concepts relate to agglomeration economies. While the first introduces the debate on specialisation versus diversification, the second presents new theoretical concepts (i.e. related and unrelated variety, specialisation and place-based development) and it also define four hypotheses. The third and fourth selected sections present data, models and results.
<b>Reference Field of interest</b>	

✓	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
	Governance
✓	Local innovation process
	Public Policy
	Others
Note:	The study is relevant for the selected fields of interest. It investigates the effects of regional variety on economic growth (i.e. employment and productivity growth). The authors present a framework that support the original related variety framework by Frenken et al. (2007). They found that entropy/variety at a high level of sector aggregation has a portfolio effect on the regional economy (i.e. protection from unemployment), whereas entropy/variety at a low level of sector aggregation generates knowledge spill-overs and employment growth. The study presents the lifecycle theory that explains the stages of industry evolution (i.e. product innovation and process innovation).
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
✓	Territorial milieu
	Social networks
	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
✓	Supply chains
	Governance schemes
✓	Innovation
	Smart technologies
✓	Local value chain
	PPP
✓	Others: Relatedness
Note :	New theoretical developments in institutional and evolutionary economic geography attempt to explain regional economic development and the role of relatedness and diversification. Cultural and cognitive proximity are considered to be as important as geographical proximity in the transmission of ideas and knowledge. Further argument sustain that the generation of local externalities is also crucially linked to the importance of variety and selection in terms of the “fitness” of a local milieu. Concepts of diversification and specialization should attempt to capture the complex role of variety within the economy.
<b>Synthesis and Comments</b>	

Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.

The paper provides indicators of regional related variety and unrelated variety to overcome the current impasse in the specialization-diversity debate in agglomeration economics. The outcomes of these analyses suggest particular roles in development processes for medium-sized urban regions distinguished from largest urban regions by population size. The strong relationship between related variety and employment growth is a particular feature of small medium-sized urban regions. In accordance with the economics of agglomeration, evolutionary economists also stress the important role of variety in creating new varieties.

The authors investigate the effects of regional variety on economic growth (i.e. employment and productivity growth) and they present a new theoretical framework that support the original related variety framework by Frenken et al. (2007) in order to shed new lights on the specialization-diversity debate in agglomeration economics. The authors expect entropy/variety at a high level of sector aggregation to have a portfolio effect on the regional economy, protecting it from unemployment, whereas they expect entropy/variety at a low level of sector aggregation to generate knowledge spill-overs and employment growth. An interesting theoretical contribution to the specialization-variety debate has been provided by lifecycle theory, which holds that industry evolution is characterized by product innovation, and more employment growth, in a first stage and process innovation, and more productivity growth, in a second stage.

The main findings of the study are:

- (i) In the short run, variety links positively to employment growth and to negatively specialization.
- (ii) In the short run, specialization links positively to productivity growth.
- (iii) In the short run, unemployment growth is not linked with unrelated variety.
- (iv) Regions of all sizes are involved in growth accounting. While employment growth is more naturally suited in medium-sized regions, productivity growth is enabled by specialization patterns in both large and medium-sized regions, with a higher coefficient being found in large urban regions.

The authors tested empirically for the significance of variables based on these concepts, using a cross-sectional data set for 205 European regions during the period 2000–2010. The dependent variables are employment and productivity growth while the explanatory variables are private and public investment in R&D, openness of the economy, market potential, education, population density, wages, related variety, unrelated variety, specialization, and productivity growth. The variables are explained in the paper (p. 1115-1120) and the results are shown in tables (p. 1221-1222).

<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>The article might be useful for the project to advance the debate on agglomeration economies and spatial heterogeneity regarding European reforms and policy formulations.</p> <p>The paper shows that spatial regimes classified by the population size of urban regions differ significantly. This marked regional heterogeneity indicates that micro-economic processes play out differently in different types of regions, thereby confirming that European place-based policy strategies may play an important role for regional development.</p> <p>However, this heterogeneity also suggests that, similar to European regional innovation patterns, which are differentiated among regions according to their regional context conditions, regional heterogeneity and inter-regional network positions support the careful consideration of how “smart specialisation” is evaluated in Europe.</p> <p>The study does not address any social dimension.</p>
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<b>Title</b>	<b><i>Smart Specialisation: Opportunities and Challenges for Regional Innovation Policy</i></b>		
Source Typology	Book <input checked="" type="checkbox"/>		
	Paper <input type="checkbox"/>		
	Other <input type="checkbox"/> (i.e. web, report study, etc..) if yes specified		
Author(s) name (s) (full)	Dominique Foray		
Year	2015		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Routledge, 104 pages		
Link to Publication	<a href="http://www.routledge.com/books/details/9781138776722/">http://www.routledge.com/books/details/9781138776722/</a>		
Keywords as they appear in the document	Technological Innovation-Government Policy Regional Economics Regional Planning Sustainable Development		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	<ol style="list-style-type: none"> <li>1. The Origin</li> <li>2. From smart specialisation to smart specialisation policy</li> <li>3. Designing a smart specialisation strategy</li> <li>4. Goal variations according to regional development</li> <li>5. Toward practical implementation</li> </ol>		
Level	National	Regional	Local
		✓	✓
Case Study if indicated in the paper (Y)	In order to explain the dynamics of smart specialisation, the author uses both storytelling and case studies selected from experiences during the last decades in different European regions (pages 20-31).		
Research Method applied	<input type="checkbox"/> Quantitative Method		
	<input checked="" type="checkbox"/> Qualitative Method The research method is primarily exploratory. The objective of the study is to gain an understanding of underlying reasons, opinions and motivations on smart specialisation. It provides hypotheses for potential quantitative research.		
	<input type="checkbox"/> Mixed approach		
<b>Key sectors</b>			
✓	Smart Specialisation Strategies		
✓	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.		

	Cluster Economic Development
	Cluster Policy
	Social Innovation
✓	Place-Based Approach
	Territorial milieu
✓	Spatial Planning
	Urban Cluster
	Urban Regeneration and Economic Development
	Metropolitan city
	Urban network
✓	Urban competitiveness
✓	Governance and Cluster
Note:	
<b>Reference Typology</b>	
✓	Theory
	Methodology
	Best Practices
✓	Guidelines
✓	Policy Analysis
	Others
Note:	Chapter 1 and 2 discuss the key concepts underpinning smart specialisation and its origin (Theory). Chapter 3 contains five main policy design principles (Guidelines). Chapter 4 and 5 compare Smart Specialisation Strategies with the objectives of regional development strategies within the European union and they address the field of application for regional and interregional development (Policy Analysis).
<b>Reference Field of interest</b>	
✓	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
✓	Governance
✓	Local innovation process
✓	Public Policy
	Others
Note:	

**Reference Keywords according with the MAPS-LED Project**

Key words (three to five keywords selected within the list below)	
	Territorial milieu
	Social networks
✓	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
✓	Supply chains
✓	Governance schemes
✓	Innovation
	Smart technologies
	Local value chain
	PPP
✓	Others: Entrepreneurial discovery

Notes :

The author makes a clear statement on the difference between innovation and entrepreneurial discovery (page 23-24). The main differences lie on the temporal precedence as well as in their characteristics. While entrepreneurial discovery comes at the early stage of the process in which new domains of opportunities (technological and market) are sought, innovation happens later on the development stage. The author build the definition of smart specialisation process on top of this basilar distinction.

**Synthesis and Comments**

<p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>The book provides a solid basis for the project. It explains the concept of Smart Specialisation, how it moved from academic concept to a set of policy guidelines, and how policy designer can implement Smart Specialisation strategies to enhance local economic competitiveness.</p> <p>The author puts at the core of the notion of Smart Specialisation the knowledge that is produced and can be only possessed by the entrepreneurs that is different from one region to another. In this respect, the effort of the policy maker is to choose the interventions to implement these resources. One of the key points of the book is to balance between supporting those economic activities with the greater potential impact on territorial development and the necessarily information flow that filters entrepreneurial discoveries into policies.</p> <p>The policy process of Smart Specialisation is about finding a way to be “unique” in a highly competitive global context. In order to guarantee unique characteristics to regional economies should be understood the dynamic process that build on the traditional economic strengths of a region, while complementing these assets with new-knowledge-based activities that enable the economy to shift toward higher value-added productions by</p>
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	<p>focusing on new activities that reach new threshold and efficiency.</p> <p>This process should be initiated and supported by policy interventions that are presented in the book: harvesting entrepreneurial discoveries; building a strategy attentive to hidden potentials; revising priorities according to new information; monitoring and evaluating progress; supporting early stage and growth of new activities. The author sustains that every region following this process could find its way toward a sustainable and inclusive growth.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>Cluster policy is complementary to Smart Specialisation policy. In the author opinion, after implementing the entrepreneurial knowledge of a certain area, it will arise the need for facilitating economies of scale. The “local” scale is the main dimension addressed in the book and the specific entrepreneurial knowledge is the advantage on top of which building Smart Specialisation strategies. The author debates the inclusiveness of these strategies when discussing the role of different entrepreneurial entities that all will benefit from the Smart Specialisation process (Giants, Goblins and Dwarves metaphor at page 47-49).</p>



<b>Title</b>	<b><i>Related Variety, Unrelated Variety and Technological Breakthroughs: An analysis of US State-Level Patenting</i></b>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/> (i.e. web, report study, etc..) if yes specified		
Author(s) name (s) (full)	Carolina Castaldi, Koen Frenken and Bart Los		
Year	2015		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Regional Studies, Vol. 49, No. 5, 767–781		
Link to Publication	<a href="http://dx.doi.org/10.1080/00343404.2014.940305">http://dx.doi.org/10.1080/00343404.2014.940305</a>		
Keywords as they appear in the document	Recombinant innovation Regional innovation Superstar patents Technological variety Evolutionary economic geography		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	<ul style="list-style-type: none"> <li>- Introduction, p. 768-9</li> <li>- Variety, Recombination and Innovation, p. 769-770</li> <li>- Research Design, p. 770-773</li> <li>- Results, p. 773-776</li> <li>- Discussion, p. 776-777</li> </ul>		
Level	National	Regional	Local
	✓		
Case Study if indicated in the paper (Y)	-This is a case study that analyzes the US patenting at state level		
Research Method applied	<input checked="" type="checkbox"/> Quantitative Method. The research method is mainly explanatory and the authors test two main hypothesis: <ul style="list-style-type: none"> <li>- (i) Regional related variety is positively associated with regional inventive performance.</li> <li>- (ii) Regional unrelated variety is positively associated with the regional ability to produce breakthrough inventions.</li> </ul>		
	<input type="checkbox"/> Qualitative Method		
	<input type="checkbox"/> Mixed approach		
<b>Key sectors</b>			
	Smart Specialisation Strategies		

	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.
✓	Cluster Economic Development
✓	Cluster Policy
	Social Innovation
	Place-Based Approach
	Territorial milieu
✓	Spatial Planning
	Urban Cluster
	Urban Regeneration and Economic Development
	Metropolitan city
	Urban network
	Urban competitiveness
✓	Governance and Cluster
Note:	<p>The paper investigates how variety affects the innovation output of a region. The aim of the paper is to study the different effects of related and unrelated variety on innovation processes. The main findings are that:</p> <ul style="list-style-type: none"> <li>– (i) Related variety increases the established cognitive structures.</li> <li>– (ii) Unrelated variety provides the building blocks for technological breakthroughs and it works connecting previously unrelated technologies.</li> </ul> <p>This study sheds a new and critical light on the related variety hypothesis in economic geography.</p>
<b>Reference Typology</b>	
✓	Theory
✓	Methodology
	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	<p>The first two sections of the paper are a brief overview of the theoretical concepts of related variety, recombinant innovation and their influences on innovation processes. The first section argued that related variety is supportive of innovations that incrementally build on established cognitive structures across “related” technologies, while unrelated variety provides the building blocks for technological “breakthroughs” stemming from combinations across unrelated knowledge domains. The second section gives a brief overview of the theoretical concepts on the interplay of existing pieces of knowledge in recombinant regional innovation processes. The methods are introduced in the third section, which includes a discussion of the procedure adopted to distinguish between incremental innovations and breakthrough innovations.</p>
<b>Reference Field of interest</b>	
✓	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development

	Governance
✓	Local innovation process
	Public Policy
	Others
Note:	The study is relevant for the selected fields of interest. It investigates the regional innovative output looking at the influences of technological closeness of industries at the state level using patent and “superstar patent” as indicator of innovation. This paper’s new framework supports the original related variety framework by Frenken et al. (2007), since related variety is still expected to support innovation in general that lead to employment growth. Additionally, it is also expected that unrelated variety supports breakthrough innovations. Potentially, breakthrough innovations may have much more impact on employment growth than innovations more generally, since whole new industries can emerge out of breakthrough innovations in the long run (Saviotti and Frenken 2008).
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
	Social networks
✓	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
✓	Supply chains
	Governance schemes
✓	Innovation
	Smart technologies
✓	Local value chain
	PPP
✓	Others: Relatedness
✓	Others: Recombinant innovation
Note :	Said that the relatedness principle considers technological closeness between industries, regional innovation seems to be supported by related variety while recombinant innovation by unrelated variety. The latter renders pieces of knowledge that were previously unrelated to become related. Even though recombinant innovation among previously unrelated domains is more likely to fail, when successful, is also more likely to be of a radical nature as recombination across unrelated technologies and it might lead to complete new operational principles, functionalities and applications.
<b>Synthesis and Comments</b>	
Synthesis of the document with the indication of the main aspects that could be	The paper provides solid theoretical and methodological findings for understanding the regional innovative output. It might be useful for the project in order to understand innovative processes and

<p>interesting for the state of art of the project.</p>	<p>identify new domains of intervention for Smart Specialisation strategies.</p> <p>The authors present a new theoretical framework that build on top of the related variety theory adding the recombinant innovation component. The ultimate aim of the paper is to study the different effects of related and unrelated variety on innovation processes. The paper confirms the two hypotheses that (i) related variety increases the established cognitive structures, and (ii) unrelated variety provides the building blocks for technological breakthroughs connecting previously unrelated technologies.</p> <p>To verify the hypotheses, the authors used patent data from 1977 to 1999 for each state of US. The dependent variables are regular innovations and breakthrough innovations defined using statistical regularities in the numbers of citations that patents receive (i.e. superstar patents). The independent variables are unrelated variety, semi-related variety and related variety and they are construct using entropy statistics. Through a regression analysis, the authors found that a high degree of unrelated variety affects the share of breakthrough innovation in a state's total innovation output positively, while semi-related variety has a negative effect.</p> <p>As hypothesized, related variety does not influence breakthrough innovation, but has a clear positive effect on innovation output in general. Indeed, turning to the regional level here considered as state level, regions with high levels of related variety have been found to outperform regions with low levels of related variety in terms of the sheer number of inventions they produce. However, when it comes to breakthrough inventions, regions with higher levels of unrelated variety have been found to outperform regions with lower levels of unrelated variety.</p> <p>The models presented in the article include control variables, time trends and dummies to capture time-invariant state-specific effects. The results also appeared robust against inclusion of spatial effects.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>The article expands the knowledge on regional innovative process. The study has potential implications for regional policy initiatives. Indeed, one important part of the smart specialisation concept holds that regions should build on related variety to support regional development in the long-run. However, this study also suggests that regions should also aim to exploit possible connections between sectors and technologies that are (currently) unrelated in attempt to find innovations that would make them more related.</p> <p>It might be interesting to explore other spatial construct (e.g. Metropolitan area). Given the limitations of patent data, one could attempt to test the theoretical framework by using other proxies for innovation, breakthrough innovation, and related and unrelated variety. The study does not address any social dimension.</p>

Title	<b><i>How does insertion in Global Value Chains affect Upgrading in Industrial Clusters?</i></b>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/>		
Author(s) name (s) (full)	John Humphrey & Hubert Schmitz		
Year	2002		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Regional Studies, Vol. 36 (9), p.1017-1027.		
Link to Publication	<a href="http://dx.doi.org/10.1080/0034340022000022198">http://dx.doi.org/10.1080/0034340022000022198</a>		
Keywords as they appear in the document	Clusters, Value Chains, Competitiveness, Upgrading, Developing Countries		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	<ul style="list-style-type: none"> <li>- Upgrading in Clusters and Value Chains;</li> <li>- Value Chain Governance;</li> <li>- Value Chain Relationships and Upgrading in Clusters.</li> </ul>		
Level	National	Regional	Local
	✓	✓	✓
Case Study if indicated in the paper (Y)	In order to clarify and support the argument of the paper and explain how the insertion in a specific type of value chains governance influences and determines specific upgrading conditions and likelihoods, the authors introduce a footwear industry case study in the context of a developing country: " <i>The Sinos Valley footwear cluster</i> " in South Brazil.		
Research Method applied	<input type="checkbox"/> Quantitative Method		
	<input checked="" type="checkbox"/> Qualitative Method		
	<input type="checkbox"/> Mixed approach The applied research method is mainly exploratory since the objective of the authors is to explore the concept of Global Value Chains related to Cluster policy.		

<b>Key sectors</b>	
	Smart Specialisation Strategies
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.
	Cluster Economic Development
✓	Cluster Policy
	Social Innovation
	Place-Based Approach
	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and Economic Development
	Metropolitan city
	Urban network
	Urban competitiveness
✓	Governance and Cluster
Note:	
<b>Reference Typology</b>	
✓	Theory
	Methodology
✓	Best Practices
	Guidelines
✓	Policy Analysis
	Others
Note:	<p>Sections 1 introduces the literature about industrial clusters and the global value chain research. (Theory).</p> <p>Section 2 deeply examines and compares the two approaches thru the perspective of upgrading strategies.</p> <p>Section 3 discusses different forms of GVCs governance.</p> <p>Section 4 analyses which is the effect of different types of GVCs governance on industrial upgrading.</p>
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
✓	Governance (*)
✓	Local innovation process
✓	Public Policy

	Others
Note:	(*) The authors provide a useful definition of <i>Governance</i> , defined like the coordination efforts of economic activities thru non-market relationships that allow the generation, transfer and diffusion of knowledge leading to innovation (pp. 1018).
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
	Social networks
	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
✓	Supply chains
✓	Governance schemes
✓	Innovation
	Smart technologies
	Local value chain
	PPP
✓	Others: Global Value Chain (*)
Notes :	
The perspective showed by the authors is the one of the Global Value Chain. Relevant is the table that summarizes differences in features between the Cluster and the GVCs approaches (pp.1019).	
<b>Synthesis and Comments</b>	
Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.	<p>The paper provides a useful comparison of the Cluster and Global Value Chain (GVCs) approaches, emphasizing the elements in which they differ each other, especially in terms of governance and upgrading “loci” and choices, deeply analysing implications related to the shift from the narrower, local dimension described by the cluster literature to the wider, global one of value chains. The argument of the paper implicitly opens up new perspective and learning opportunities for the SS3 policy issues.</p> <p>Moreover, the authors gave rise to hidden issues that lie behind the hypothesis at the core of the paper’s debate, such as the idea that networks and interactions among actors are essential in influencing and determining the type of upgrading strategies to undertake in order to cope with overwhelming competitiveness demand in global markets.</p> <p>As evidenced by the author this is true for both the Cluster and GVCs perspectives. However, the GVCs approach introduces a paradigm shift since the focus substantially changes from a strong policy’s networks with the Locality (local firms and institutions) to a not bounded chain governance that “leads to a flowing knowledge thru the chain”, as highlighted by the authors.</p>

The shift is significant since the perception that the Local dimension (cluster) owns all the resources required to be the engine of competitiveness evolves in a wider view of knowledge and innovation relying mostly on Global efforts. As a result, producers' local upgrading (functional upgrading) is stimulated by powerful global buyers.

Showing specific industry case studies in developing countries (from the electronic industry to the Brazilian footwear manufacturers), the authors argue that there is a direct relation between the nature of the coordination of a value chain, (Governance) and upgrading prospects/opportunities.

Willing to deal with coordination issues related to value chains, the authors identify two types of governance that can take the form either of the Network, in case of low risk or of Quasi-hierarchical.

As a production sector moves from lower to higher complexity, than from standardization to customizations, a higher level of coordination is demanded due to risen time pressure. Therefore, as evidenced by the authors the higher is the risk the more is the likelihood of shifting from a Network form of governance to a quasi-hierarchical situation, common especially in the case of developing countries producers, where powerful global buyers take the control over value chains.

In particular, as highlighted in the last section there are four different forms of value chain's governance. Moving from the first (1-Arm's length's market relations) to the last category (4-Hierarchy) and passing from the intermediate stages of Networks (2) and Quasi-hierarchy (3), we are shifting from lower to higher complexity in production, from a cooperative, reciprocal relationship of dependence (2), to a full control exercised by the lead firm (4), from the ease of meeting buyer's requirements to the pressure and the risk of failure of the supply side.

Consequently, at the core of the paper's argument there is the claim that the degree of value chains governance results in a different range of upgrading possibilities. From the developing countries perspective, the ideal condition might be feeding into a quasi-hierarchical chain, furthermore specifically in the case of labour-intensive export-oriented industries, owing to the production speeding up and upgrading encouraged by the global lead firm.

Quasi-hierarchical value chains are characterized by asymmetrical power relationships between local producers and global buyers, typically high influential and powerful. This imbalance in power in favour of globally lead firm brings both advantages and disadvantages for local producers, since even though it speeds up upgrading, it also set limits on functional development of activities.

The case of the Sinos Valley footwear in South Brazil demonstrate how a small firms industrial pattern can be completely changed by the insertion of a global lead firm enforcing upgrading. Therefore, the authors show not only the bright side of having global linkages thru the presence of a strong global buyer, but also the dark side. Whether from one hand they are essential in determining process



	and product upgrading, on the other hand it may also break out market diversification and functional upgrading.
Comments about the possible connection with the specific objectives of the WP1.	The Global Value Chains approach offers a new idea of “chain Governance” that differs from the one of Clusters, now integrated within global value chains. For this reason, analysing a wider, global approach to knowledge and innovation, not bounded in the cluster dimension of local governance, might be an essential stage for the coordination of the objectives envisioned by the MapsLed.

<b>Title</b>	<b><i>Rural Regional Innovation : A Response to Metropolitan Framed Place Based Thinking in the United States.</i></b>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/>		
Author(s) name (s) (full)	Brian Dabson		
Year	2011		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Australasian Journal of Regional Studies, Vol.17 (1) p.7-21.		
Link to Publication	<a href="http://apo.org.au/node/45839">http://apo.org.au/node/45839</a>		
Keywords as they appear in the document	-		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	<ul style="list-style-type: none"> <li>- Regional Innovation, Paragraph 4;</li> <li>- Particular focus should be placed to paragraph 5, 6: Steps toward Rural Regional Innovation, The Elements of Rural Regional Innovation.</li> </ul>		
Level	National	Regional	Local
		✓	✓
Case Study if indicated in the paper (YES)	<ul style="list-style-type: none"> <li>- Brooking Metropolitan Program;</li> <li>- Wealth Creation in Rural Communities (WCRC) supported by the Ford Foundation in Central Appalachia.</li> </ul>		
Research Method applied	<input type="checkbox"/> Quantitative Method		
	<input checked="" type="checkbox"/> Qualitative Method. The research method is exploratory.		
	<input type="checkbox"/> Mixed approach		
<b>Key sectors</b>			
	Smart Specialisation Strategies		
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.		
	Cluster Economic Development		
✓	Cluster Policy		
	Social Innovation		
✓	Place-Based Approach		

	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
	Urban competitiveness
✓	Governance and cluster
Note:	
<b>Reference Typology</b>	
	Theory
	Methodology
	Best Practices
	Guidelines
✓	Policy Analysis
	Others
Note:	
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
✓	Governance
✓	Local innovation process
✓	Public Policy
	Others
Note:	
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
✓	Territorial milieu
	Social networks
	Enabling technologies
	Law profiles
	Regeneration strategies
✓	Urban-rural link <sup>1</sup>

	Assessment models
	Supply chains
	Governance schemes
✓	Innovation
	Smart technologies
✓	Local value chain
	PPP
Note <sup>1</sup> : the concept of Rural Regional Innovation clusters, at the core of the paper, is explained in the paragraph 06 (p.16).	
<b>Synthesis and Comments</b>	
Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.	<p>After a broad historical digression over the dimension of Rurality, thru a rich array of Regional economic theories, from the Porter's to the Mill's views, the paper provides a deep insight into the dynamics that have shaped the Rural development in US, by analysing both the roots and the impacts of a place-based policy initiative.</p> <p>A Regionalist perspective claimed by the Obama administration in 2009 in order to stimulate place-based activities, has allowed to converge Federal Interests and investments around tailored Regional initiatives. Besides the emphasis placed to the need of coordination of rural development programs with broader regional initiatives, the policy evidenced that "the programs in neighbouring zones and within larger regions should be conceived as complementary", hence integrated in a broader framework.</p> <p>As evidenced in the paper, the Metropolitan-framed Regional Innovation cluster approaches should be replaced with a Rural dimension within place-based policies. Nevertheless, the controversial effects of innovation on clusters, especially in terms of geographical disaggregation of functions as showed in the Mill's argument, paved the way to increased vulnerability.</p> <p>However, at the core of a new rural cluster thinking, it claimed that rural regions may benefit from the losing of these economic concentration without negative impacting economic activities and the Focus on Regional efforts remains a necessary stage.</p> <p>According to the USDA Regional Innovation initiatives, Rural Regional Innovation is not necessarily a function of cluster's geographical proximity and, conversely, capturing the benefits of urban rural interdependence is crucial to ensure the prosperity at the national level. In addition, the rural dimension with its features of low density, increased distances and limited resources, requires cross jurisdictional and cross sectional approaches. Furthermore, "Wealth retention" as well as progressive attitudes and strategies based on innovation and entrepreneurship are needed to contrast persistent poverty and foster rural resiliency.</p>
Comments about the possible connection with	Coherent with the main goal of the Maps Led Project, is the concept of Innovation, introduced by the author and supported by the "USDA Regional Innovation initiatives", conceived as an "endogenous product" of the local territorial dimension, hence

the specific objectives of the WP1.	influenced by the specificity of a place and associated interpersonal relationships (Territorial Milieu - Social Innovation). Moreover, the mentioned <i>Wealth Creation in Rural Communities</i> (WCRC) efforts supported by the <i>Ford foundation</i> might be clearly related to the Innovative Milieu driver, linking concept of Regionalism and local value chains in the attempt of stimulating wealth creation and retention in rural areas.
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<b>Title</b>	<b><i>Global Value Chains Meet Innovation Systems: Are There Learning Opportunities for Developing Countries?</i></b>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/>		
Author(s) name (s) (full)	Carlo Pietrobelli & Roberta Rabelotti		
Year	2011		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	World Development Vol.39 (7), pp.1261-1269.		
Link to Publication	<a href="http://dx.doi.org/10.1016/j.worlddev.2010.05.013">10.1016/j.worlddev.2010.05.013</a>		
Keywords as they appear in the document	Global Value Chain, Innovation system, Learning		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	Paragraph 2 - IS and GVC in developing countries; Paragraph 3 - IS and their interactions with GVC;		
Level	National	Regional	Local
	✓		
Case Study if indicated in the paper (Y)	GM and Volkswagen in Brazil, Automotive sector in Argentina and Mexico (Modular chain case studies); Apparel Industry in East Asia, Taiwanese Computer industry (Relational chains case studies). Sinos Valley Shoes Industry (Hierarchy).		
Research Method applied	<input type="checkbox"/> Quantitative Method		
	<input checked="" type="checkbox"/> Qualitative Method		
	<input type="checkbox"/> Mixed approach		
	The applied research method is mainly exploratory.		
<b>Key sectors</b>			
	Smart Specialisation Strategies		
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.		
	Cluster Economic Development		
	Cluster Policy		

	Social Innovation
	Place-Based Approach
	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and Economic Development
	Metropolitan city
	Urban network
✓	Urban competitiveness (*)
✓	Governance and Cluster
Note:	(*) global competitiveness
<b>Reference Typology</b>	
✓	Theory
	Methodology
✓	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	<p>Sections 1 introduces the concept of Innovation System and its linkage with the Global Value chain concept. (Theory).</p> <p>Section 2 explores the concept of IS and GVC in developing countries, types of firms upgrading and the wide range of learning mechanism that corresponds to various governance patterns (types of chain).</p> <p>Section 3 analyse the relationships between IS and GVC.</p> <p>Section 4 presents the main conclusions and results of the study.</p>
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
✓	Governance (*)
✓	Local innovation process
	Public Policy
	Others
Note:	<p>GVCs governance's form, hence to the governance's pattern, distinguished in Market, Modular, Relational, Captive and Hierarchy: from the one with the simpler one, with easiest codifiable transactions, as well as highest skills' degree of suppliers (Market), to the more complex one, with the highest dependency on lead buyers due to lack of competences on the supply-side (Hierarchy). Moreover, learning may be induced by compliance/aligning pressure with international standards or achieved thru the engagement of dominant firms in case of low-skilled competences of suppliers.</p>

<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
	Social networks
✓	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
✓	Governance schemes
✓	Innovation
	Smart technologies
	Local value chain
	PPP
✓	Others: Global Value Chain (*)
Notes : (*)	
<b>Synthesis and Comments</b>	
<p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>The paper provides seeks to investigate the relationship between Innovation System (IS) and Global Value Chains (GVCs) in the context of developing countries (LDCs). In particular, which is the nature of the interaction and how this interaction affects knowledge creation and diffusion, hence the learning process within firms in GVCs.</p> <p>The authors claims that there are several differences in the application of the IS concept's in the context of LDCs. Indeed, since those countries typically exhibit a lack of knowledge-based organizations such as universities and research institutes, the innovation process in LDCs will to lead to basic research and knowledge creation. Conversely, the fountain of innovation &amp; learning in LDCs is mainly external, consistent with the firms' ability of absorbing/acquiring knowledge and technologies produced in other industrialized countries and consequently inserted and applied in the existing technological systems of local firms. That is the meaning of innovation in LDCs. The authors stresses how, as a consequence of the global division of labor, a key role is played by dominant firms (sellers) from advanced countries within the GVC, as they account for the knowledge-transfer process to the supply side (LDCs). However, GVCs lead firms act supporting access and flowing of information related to the proper quality and technological standards that products, developed by LDCs, should face in order to meet global markets requirements.</p> <p>As a result, suppliers from developing countries that has been integrated within a GVC gain awareness of global markets requirements in terms of productivity, standards and technologies.</p>



	<p>Hence, exploit the acquired knowledge is a second essential step consistent with the transformation process of factors of production in outputs, more effectively and efficiently, thru process, product, functional or inter-chain upgrading. Intuitive is the remark made by the authors that, as long as LDCs suppliers move from a form of upgrading to another one, they do not merely gain an higher-value function or position within a GVC, but furthermore acquiring higher specific skill levels in the current value chain they are inserted. Therefore, the key access that pave the way for LDCs to knowledge, learning and innovation is achievable thru their integration in GVCs. The learning mechanism needed to stay within the chain varies according to the type of GVCs governance's form.</p> <p>As evidenced by the results of the paper, IS and GVC governance and learning and innovation of suppliers, interact in various ways.</p> <p>The presence of powerful MSTQ technology organization, may have a significant effects on GVC governance patterns. The GVC governance, is not internally resilient, but conversely in continuous evolution and change, furthermore affected by the type of the related Innovation system.</p>
<p>Comments about the possible connection with the specific objectives of the WP1. about value chain case studies analyses and</p>	<p>Understanding how the innovation mechanism's dynamics took place in the context of developing countries and how the learning process completely differs moving from a value chain to another one is an essential step towards the capacity of manipulate, thru the IS, the various GVC governance's form.</p> <p>Nevertheless, the study seems to rely just upon evidences coming from a purely qualitative analysis on value chains case studies.</p> <p>What is lacking is also a policy prospective/view of the IS within developing countries as well as a measure of GVC governance forms.</p>

<b>Title</b>		<b><i>The Economic Fundamentals of Smart Specialization</i></b>		
Source Typology	Book <input type="checkbox"/>			
	Paper <input checked="" type="checkbox"/>			
	Other <input type="checkbox"/>			
Author(s) name (s) (full)	Dominique Foray			
Year	2013			
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Ekonomiaz vol. 83 (02), pages 55-82.			
Link to Publication	<a href="http://EconPapers.repec.org/RePEc:ekz:ekonoz:2013203">http://EconPapers.repec.org/RePEc:ekz:ekonoz:2013203</a>			
Keywords as they appear in the document	Smart Specialization, Regional Policy, Entrepreneurial Discovery			
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	<ul style="list-style-type: none"> <li>- The goals of Smart Specialization;</li> <li>- Smart Specialization programmes and implementation;</li> </ul>			
Level	National	Regional	Local	
		✓	✓	
Case Study if indicated in the paper (Y)	<i>Pulp and Paper industry</i> (Finland), <i>Plastic Firm</i> (Basque Country), <i>Automotive subcontractors</i> (British Midland) as case studies of smart specialization's setting priorities.			
Research Method applied	<input type="checkbox"/> Quantitative Method			
	<input checked="" type="checkbox"/> Qualitative Method			
	The applied research method is both exploratory and explanatory since it conceptually introduces the Smart Specialization approach and policy implications.			
	<input type="checkbox"/> Mixed approach			
<b>Key sectors</b>				
✓	Smart Specialisation Strategies			
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.			
	Cluster Economic Development			
	Cluster Policy			

	Social Innovation
✓	Place-Based Approach
	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and Economic Development
	Metropolitan city
	Urban network
	Urban competitiveness
	Governance and Cluster
Note:	
<b>Reference Typology</b>	
✓	Theory
	Methodology
	Best Practices
	Guidelines
✓	Policy Analysis
	Others
Note:	<p>Sections 1 and 2 discuss the concept of regional competitiveness, emphasizing the role played by external competitiveness towards regional growth strategies, in order to introduce the Territorial Capital concept and methodological approach to economic development (Theory).</p> <p>Section 3, 4 and 5 contain an empirical analysis carried out by the authors thru the development of a MASST, Macroeconomic, Sectoral, Social (Methodology).</p>
<b>Reference Field of interest</b>	
✓	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
	Governance
✓	Local innovation process
✓	Public Policy
	Others
Note:	<p>Relevant is the distinction introduced by the author between the older Horizontal policy concept and the new Vertical one enforced by Smart Specialization strategies. Instead of supporting any purely innovation-led firm or activity, a vertical policy is meant to be targeted on firms that are able to introduce “innovative ideas in a specialized area that generates knowledge about future economic value of a possible direction of change” (see pp. 61-62).</p>
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	

	Territorial milieu
	Social networks
✓	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
	Governance schemes
✓	Innovation (*)
✓	Smart technologies
	Local value chain
	PPP
✓	Others: Entrepreneurial discovery (**)
<p>Notes : (*) The author distinguishes the concept of simple <i>Innovation</i> as opposed to the one of <i>discoveries</i> that drives the Smart specialization process, able as it is to detect new extents for specialization.</p> <p>The notion of Entrepreneurial discoveries is defined like “innovation complementarities between a key-enabling technology application and a traditional sector, potentially able to produce learning and knowledge spill overs to the whole regional economy” (see pp.61-62).</p> <p>(**) Relevant is also the claim of the author that emphasizes the importance of “<i>entrepreneurial knowledge</i>” as fundamental source for priorities identification. The author also points out how the entrepreneurial capacity of identifying “future specialization spots” is strictly linked to the networks they are able to build with other knowledge organizations (e.g. universities) and consequently SS strategies should make efforts supporting them.</p>	
<b>Synthesis and Comments</b>	
<p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>The paper introduces the concept of Smart Specialization - SS - analysing policy’s objectives and relative implications, mainly focusing on the operationalize issues and requirements that are essentials to translate abstract principles in tangible initiatives. Defined like a “non-neutral and vertically-oriented” policy concept - at core of EU Cohesion Policy, EU 2020 Innovation Union’s objectives and priorities and strongly supported by OECD - aiming at identify regional prioritizing field, areas or sectors thereby promote and foster Innovation. More specifically, the SS approach focuses on the competitive advantages that regions should gain from specializing in a given sector or activity. The novelty of the approach lies in the vertical orientation of a process that seeks to identify domains, fields, economic activities to support, framed within a regional policy context.</p> <p>Selective but not Sectoral, the logic become vertical in the sense of not spreading support in whatever type of economic activities.</p> <p>As evidenced by the author, in the so called <i>Information Age</i>, “be smarter” in the sense of being able to focus and allocate resources in a small number of domains or activities - such as</p>

	<p>R&amp;D allowing knowledge spill overs, producing agglomeration economies or return to scale - is a need for regions. However, specialization is not enough for regions within the new policy framework, especially if it leads to a competition's mechanism for the same type of resources. The complexity of the SS policy concept (regions like Risk-taker) lies in the uncertainty and associated risk of selecting and prioritizing certain areas or sectors for innovation policy's actions,</p> <p>In these regards, five principles conceptually driving the policy can be outlined/traced out: the identification of sectors to prioritize should be driven according to a "mid-grained" level of aggregation (<i>Granularity</i>), hence the right level at which firms/activities will to explore and experiment new technologically innovative potentiality within a given field. Thus, abandoning the older logic of targeting priorities on a specific sector or firm but conversely supporting new activities furthermore allowing to boost and enlarge firm capacities. Secondly, smart specialization priorities should be set where <i>entrepreneurial explorations</i> efforts reveal new future knowledge opportunities for the whole economy of the region. However, the main features of a SS process is that it inevitably leads to "structural changes" involving a cumulative evolution and upgrading process that sums up current industrial and future capacities (e.g. R&amp;D activities) and acquired knowledge in a given sector of the regional system, translated in transition, modernisation and diversification patterns. Another key ingredient is the <i>Inclusive</i> and <i>experimental</i> nature of the policy as well as the <i>dynamic</i> nature of selected priorities, subject to change over time. However, the financial mechanism for entrepreneurial discoveries (project) is a complex matter. Indeed, since they generate informational spillovers, financing sources should spew from public funds. As a consequence, public Venture capital fund seems to be a fundamental tool for SS policy, especially for projects in lagging regions.</p> <p>Moreover, recognized by the author is the possibility of a conflict between two different types of incentives within a SS process - incentives for identifying new areas of specialization and for attracting new firms and investors.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>The paper conceptually inspects the Smart Specialization approach, analyzing policy issues from different regional economic contexts and perspectives. What is clear is that dealing with implementation is still a complex issue, as well finding a coherent and well-defined spatial dimension for SS strategies requires other policy efforts. Furthermore, coordination of both financing tools and among a wide range of different actors with different needs and objectives, intervening throughout the process is required. Finally, the author does not mention the issues related to the old cluster approach and the need to adapt it to the challenges enforced by the new policy's perspective.</p>

<b>Title</b>	<b><i>Regional Competitiveness and Territorial Capital: A Conceptual Approach and Empirical Evidence from the European Union</i></b>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/>		
Author(s) name (s) (full)	Roberto Camagni, Capello Roberta		
Year	2013		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Regional Studies, 2013, Vol. 47(9), p.1383-1402.		
Link to Publication	<a href="http://www.tandfonline.com/doi/abs/10.1080/00343404.2012.681640">http://www.tandfonline.com/doi/abs/10.1080/00343404.2012.681640</a>		
Keywords as they appear in the document	Regional competitiveness and growth Territorial capital		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	<ul style="list-style-type: none"> <li>- The Concept of Territorial Capital</li> <li>- Territorial Capital and Regional Growth</li> <li>- The contribution of Territorial Capital to Regional Growth</li> </ul>		
Level	National	Regional	Local
		✓	✓
Case Study if indicated in the paper (Y)	In order to show the effectiveness of territorial capital assets in stimulating regional competitiveness the authors recall several European case studies such as the <i>Espon project</i> (p.1390).		
Research Method applied	<input type="checkbox"/> Quantitative Method		
	<input type="checkbox"/> Qualitative Method <input checked="" type="checkbox"/> Mixed approach The applied research method is both exploratory and conclusive, since it relies upon both a conceptual and empirical analysis.		
<b>Key sectors</b>			
	Smart Specialisation Strategies		
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.		
	Cluster Economic Development		
	Cluster Policy		

✓	Social Innovation
	Place-Based Approach
✓	Territorial milieu
	Spatial Planning
	Urban Cluster
✓	Urban Regeneration and Economic Development (*)
	Metropolitan city
	Urban network
✓	Urban competitiveness (*)
	Governance and Cluster
Note:	(*)The dimension considered by the authors is wider than the urban context and extended to the Regional/Territorial dimension since the emerging macro theme of the paper is the Territorial Capital approach adopted and applied by territorial development policies.
<b>Reference Typology</b>	
✓	Theory
✓	Methodology
	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	Sections 1 and 2 discuss the concept of regional competitiveness, emphasizing the role played by external competitiveness towards regional growth strategies, in order to introduce the Territorial Capital concept and methodological approach to economic development (Theory). Section 3, 4 and 5 contain an empirical analysis carried out by the authors thru the development of a MASST, Macroeconomic, Sectoral, Social (Methodology).
<b>Reference Field of interest</b>	
✓	Spatial dimension
✓	Social context
	Environmental aspects
✓	Economic Development
✓	Governance
✓	Local innovation process
✓	Public Policy
	Others
Note:	Interesting is the introduction of the term " <i>Territorial</i> " as the one that holds a higher explanatory power than <i>Regional</i> , thus conceived and described by the author as a <i>system of localized</i> elements, features, potentials, capabilities and weaknesses. (beginning of p. 1387).
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	

✓	Territorial milieu
✓	Social networks
	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
✓	Assessment models
	Supply chains
✓	Governance schemes
	Innovation
	Smart technologies
	Local value chain
	PPP
	Others:
<p>Notes :</p> <p>Relevant is the distinction claimed by the authors between <i>Social</i> and <i>Relational Capital</i> (p.1388).</p> <p>Social capital, conceptually defined as the “glue holding society together”, is distinguished from the concept of Relational Capital, equated to <i>local milieu</i> and conceived as the substrate of proximity relations in which is embedded and empowered the system of local production and local actors producing a local dynamism of collective knowledge.</p>	
<p><b>Synthesis and Comments</b></p>	
<p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>The paper provides a deep understanding and definition of the concept of Territorial Capital, conceived as the truly unique value of each region (regional territorial assets) that need to be identified and interpreted in order to enable tailored-made regional and territorial growth efforts as well as regional competitiveness reason for which it is highly related to the concept of Smart Specialization Strategies.</p> <p>After a review of the main Regional Growth approaches (demand-driven and supply-driven models) historically applied to pursue regional growth, the authors introduce the concept of territorial capital and a more differentiated and specific regional growth pattern. A strong emphasis is placed on how the territorial capital approach (TOWARDS SPECIALIZATION) to regional performances may contribute to foster regional competitiveness, and precisely the crucial role played by territorial, cognitive and relational non-mobile or slowly mobile local assets. Finally, at the core of the paper there is the willingness of evaluating the territorial capital effectiveness towards regional growth stimulation, simulating thru an Econometric Model (Macroeconomic, Sectorial, Social, Territorial model - MASST) the 2015 regional growth scenario in the European union territory, treated as a whole dimension of intervention to deal with simultaneously.</p>



	<p>In the first section (Theory) the authors discuss and define the concept of competitiveness thru different theory's perspectives. Implicit is the claim of a new measure for regional competitiveness: new growth strategies must be set up aiming at new objectives of external competitiveness and relying upon local territorial assets utilization and maximization (Territorial Capital).</p> <p>At the core of the second section there is the shift in paradigm from a purely supply-side functional approach relying upon capital and labor to a more complex <i>cognitive</i> and <i>relational approach</i> that embrace and recognize <i>social capital</i> or knowledge-sharing <i>assets</i> as determinant factors of growth. These considerations paved the way for a new definition of Local Competitiveness as incorporated in creativity and synergetic proximity network of relationships. The Territorial Capital concept - key argument of the paper and rooted in the <i>local innovative milieu</i> approach, has been introduced by the <i>OECD</i>. Since it is defined as "the set of localized assets, both material and non-material" that constitute the resource for territorial competitiveness, the approach is relevant to the aims of implementing SS3.</p> <p>From the analysis of the so called <i>Innovative cross</i>, grouping the <i>intermediate classes</i> deriving from the matrix (<i>traditional square</i>) representing the traditional elements of territorial capital, is the one that according to the authors requires more attention reflecting a more innovative approach in terms of translation of principles in new and effective local governance actions, and public policy intervention.</p> <p>The categorizing approach of territorial capital components, built on the dimension of rivalry and materiality, provides a framework for interpreting regional development features, bringing together traditional elements defined as growth preconditions, driving force, and those described as <i>social filters</i>.</p> <p>In conclusion, the empirical analysis, carried out through the labelled MASST econometric model of regional growth, simulated on 259 European regions, would stress how different is the contribution of an increase in territorial capital assets shaping the heterogeneity of the European regional growth path, and in particular which is more relevant, according to the structural and institutional characteristics of each region, yielding growth results.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>Coherently with the main goal of the Maps Led Project, the Territorial Capital assets approach upon which the authors focus its analysis, allows to implicitly introduce a new concept of Cluster mostly relying upon Social Assets, hence more socially-oriented. As a result, the <i>territorial capital</i> approach specifically recognizes the value of relational and intangible assets as the social substrate that allows to empower regional growth.</p> <p>Social assets are hence conceived and turned in measurable capital assets.</p> <p>The conceptual analysis, supported by the results descending from the empirical analysis, is highly relevant to new spatial development policies and according to SS3, endorsing new</p>

	common governance scheme mostly relying upon local synergies, linkages and relational assets. Furthermore, implicitly suggesting that local policy-makers should act like facilitators of cooperative actions and linkages within both regional and inter-regional dynamics.
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Title		<b><i>Clusters, Globalization and Entrepreneurial Discovery Strategies in the RIS3</i></b>		
Source Typology	Book	<input type="checkbox"/>		
	Paper	<input type="checkbox"/>		
	Other	<input checked="" type="checkbox"/> Conference Publication		
Author(s) name (s) (full)	Jonatan Paton, Jaime del Castillo, Belen Barroeta			
Year	2014			
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	51ème colloque, Association de Science Régionale de Langue Française (ASRDLF)			
Link to Publication	<a href="http://asrdlf2014.org/">http://asrdlf2014.org/</a>			
Keywords as they appear in the document	Smart Specialization, Entrepreneurial discovery Strategies, Clusters, Cluster Policy			
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	<ul style="list-style-type: none"> <li>- Clusters and Cluster Initiatives;</li> <li>- Clusters and Smart Specialization;</li> <li>- Cluster Initiatives and RIS3;</li> </ul>			
Level	National	Regional	Local	
	✓	✓	✓	
Case Study if indicated in the paper (Y)	-			
Research Method applied	<input type="checkbox"/> Quantitative Method			
	<input checked="" type="checkbox"/> Qualitative Method			
	<input type="checkbox"/> Mixed approach			
The applied research method is mainly exploratory since the objective of the authors is to investigate the concept of Smart Specializations, RIS3 strategy and their implications with cluster theory, policy and initiatives.				
Key sectors				
✓	Smart Specialisation Strategies			
✓	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.			
✓	Cluster Economic Development			

✓	Cluster Policy (*)
	Social Innovation
	Place-Based Approach
	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and Economic Development
	Metropolitan city
	Urban network
	Urban competitiveness
✓	Governance and Cluster
Note:	(*) Relevant is the distinction pointed out by the authors between clusters and cluster initiatives, since the latter seek to maximize the linkages and collaborative efforts towards innovation between its members in what is defined a frame of “quadruple helix” (according to which in the regional system are incorporated not only firms linked to the economic activities, public actors and researchers but also the community).
<b>Reference Typology</b>	
✓	Theory
	Methodology
	Best Practices
	Guidelines
✓	Policy Analysis
	Others
Note:	
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
✓	Governance
	Local innovation process
✓	Public Policy
	Others
Note:	The forthcoming Regional Smart Specialization strategy - RIS3 - implicitly introduces a new governance scheme with a more effective coordination of actors and economic activities towards efficiency, innovation and more effective productions.
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
	Social networks

	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
✓	Governance schemes
✓	Innovation
	Smart technologies
	Local value chain
	PPP
✓	Others: Global Value Chain (*)
Notes : (*) The cluster theory may be conceived like the functional approach (tool) incorporated within the smart specialization theory.	
Indeed, as the authors claim, one of the essential elements clusters that make them directly linked to the SS3 concept is the “progressive formation of Global Value chains” in the global context (see table pp. 7).	
<b>Synthesis and Comments</b>	
Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.	<p>The paper seeks to investigate the concept and tradition of Clusters and their key role in the context of Smart Specialization Strategies - SS3, defined as a territorial development model able to boost and diffuse in a capillary manner regional innovation, efficiency and positive externalities such as knowledge spill over and economies of scales within interconnected, interdependent and competitive economic activities.</p> <p>More importantly, the resulting synergies developed within those adjacent firms leads to spreading large scale benefits in terms of economic development and higher innovation, not merely for the clusters themselves but for the entire territory in which there are inserted. In particular, the more they are linked and “anchored” to a given territorial dimension, the greater is the achieved regional level in terms of innovation and competitiveness.</p> <p>As a consequence, the cluster phenomenon is at the core of the Regional Smart Specialization Strategies - RIS3, being understood as fundamental policy instruments for economic development within regions.</p> <p>In these regards, cluster policy has been mostly applied as a corrective policy able to address several kind of negative externalities, such as market and government failures. Therefore, cluster policy and cluster building have become crucially important within the smart specialization context since they allow to apply and match both industrial and innovation policies with a regional policy approach. For these reasons, understanding the regional cluster pattern thru a specific selection mechanism represents, according to the authors, the required step for tracing out which are the key regional productive capacities to focus and build on, by embedding them in economic development strategies.</p>

	<p>The Smart specialization concept, that stemmed from the need of narrowing the existing gap between EU and USA in terms of inability of set priorities for ensuring regional development, is a flourishing and on-going concept defined by one of the authors like a strategic governance process (Castillo) that will to achieve regional capacities prioritization, diversification and specialization.</p> <p>Nevertheless, the smart specialization framework lacks of some essential specifications in terms of the instruments and actors involved in the forthcoming RIS3 and the implicit new governance scheme that lies behind it. Indeed, nowadays the traditional cluster policy is facing a reformulation in order to match with the new framework of RIS3, while however cluster initiatives play a significant role for a good definition of the RIS3 at each stage of the strategic process, through the definition and implementation till the monitoring (see table pp. 9). In particular, cluster policy and initiatives are essential tools for trace out the regional specialization composition and setting of related priorities to orient smart specializations policies.</p> <p>Moreover, they allow to create a “solid” <i>critical mass</i> (required for internationalization) relying upon geographical proximity and connectedness of firms and actors. They also play an intermediate role for understanding and managing the established Intra, Extra and Inter-cluster networks and cooperation, since strengthening those relationships leads to foster productivity and exports.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>Understanding the complex framework of smart specializations and the related regional strategy RIS3 directly implies the need of figuring out how cluster policy and initiatives are integrated and essential to “operationalize” and orient priorities within the Smart specialization context.</p> <p>Some insights and clarification about the possible connections and impacts on the GVCs are marginally identified by the authors, since they take into account multiple perspective and narrower or wider approaches.</p> <p>As emphasized by the authors, cluster policy approaches may be either narrow if cluster interventions are targeted on a single level of governance, whereas they are broader whether acting within the Global Value Chain (GVCs) incorporating multiple level of governance and involved actors.</p> <p>Therefore, a broader approach of cluster policy seems to be the linkage in between RIS3 strategy and the GVCs since it incorporates considerations of a broader set of economic activities (external to the cluster itself) affecting clusters.</p>

<b>Title</b>	<b><i>Territorial Governance in the context of RIS3 Smart Specialization Strategy</i></b>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input type="checkbox"/>		
	Other <input checked="" type="checkbox"/> Conference Publication		
Author(s) name (s) (full)	Jonatan Paton, Jaime del Castillo, Belen Barroeta		
Year	2014		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	ERSA European Regional Science Association.		
Link to Publication	<a href="http://www-sre.wu.ac.at/ersa/ersaconfs/ersa14/e140826aFinal00393.pdf">http://www-sre.wu.ac.at/ersa/ersaconfs/ersa14/e140826aFinal00393.pdf</a>		
Keywords as they appear in the document	Governance, Smart Specialization, RIS3, Innovation System, Innovation Regional Strategy		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	<ul style="list-style-type: none"> <li>- Implications in the competitive context</li> <li>- Elements of territorial governance</li> <li>- Governance in the frame of smart specialization</li> <li>- Key aspects to be considered for a RIS3 governance</li> </ul>		
Level	National	Regional	Local
		✓	✓
Case Study if indicated in the paper (Y)	-		
Research Method applied	<input type="checkbox"/> Quantitative Method		
	<input checked="" type="checkbox"/> Qualitative Method		
	The applied research method is mainly exploratory since the objective of the authors is to investigate the concept of Smart Specializations, RIS3 strategy and their implications with cluster theory, policy and initiatives.		
	<input type="checkbox"/> Mixed approach		
<b>Key sectors</b>			
✓	Smart Specialisation Strategies (*)		
✓	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan. (**)		

	Cluster Economic Development
	Cluster Policy
	Social Innovation
	Place-Based Approach
	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and Economic Development
	Metropolitan city
	Urban network
	Urban competitiveness
	Governance and Cluster
Note:	(*) Relevant is the statement made by <i>Del Castillo</i> that points out how the strategic process of SS3 should be consistent with the Global Context “where specialization is configured as part of the GVC in which the Region is a leader and has a comparative advantage.  (**) According to the authors the RIS3 must be “an interface between the funds allocated at a regional level (Cohesion policy) and the rest of European policy funds (Horizon 2020)”.
<b>Reference Typology</b>	
✓	Theory
	Methodology
	Best Practices
	Guidelines
✓	Policy Analysis
	Others
Note:	Sections 1 focuses on the definition of the Key elements enabling competitiveness. Section 2 introduces the concept of governance linked to territorial innovation systems. Section 3 discusses governance issues within a SS3 framework and the key role played by regional innovation systems in the whole process, hence which are the implications in terms of regional strategies (RIS3).
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
✓	Governance (*)
✓	Local innovation process
✓	Public Policy
	Others



Note:	(*) From the author line of thought ( <i>Del Castillo et Al</i> ) a desirable territorial development model of SS3 needs to be rooted/anchored/radicated in a strong governance able to ensure Regions' competitive and comparative advantages, arising from their specific assets, (local) in the global context. (pp.8)
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
	Social networks
	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
✓	Governance schemes
✓	Innovation (*)
	Smart technologies
	Local value chain
	PPP
	Others: Global Value Chain (**)
Notes : (*) The concept of Innovation is described like a “process” strongly anchored to the full set of territorial preconditions consistent with the existent social, cultural, institutional and territorial components (see pp. 3) In this perspective Innovation shows features of “public good” and is the result of the local dimension's conditions. (**) Opportunities and Risks of fitting RIS3 priorities within the GVC framework are evidenced by the authors (pp. 12).	
<b>Synthesis and Comments</b>	
Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.	<p>The paper explores in depth the key issue of Governance towards the implementation of Research and Innovation Strategies for Smart Specialization (RIS3).</p> <p>As evidenced by the authors, the key argument is that smart specialisation strategies would led to build a new governance pattern for more efficient and highly coordinated regional innovation systems. Therefore, the novelty of the new territorial development model lays in the fact that it places a strong emphasis on the role of governance, since its success strictly depends from both the governance system and from the strategy process whereby the governance will to achieve its objectives.</p> <p>The context of increasing globalization and changes in the socio-economic structure faced by territories raised the role of Innovation understood as a major determinant to build a competitive advantage for regions.</p> <p>In particular, the key issue introduced by the authors is how build a new governance scheme able to favour the transformation of</p>

	<p>regional innovation systems' components incorporating specialization priorities.</p> <p>Therefore, from a system perspective, regional innovation system is compounded by a set of "forces", from the technological to the institutional, social and organizational. Hence, the interaction among those components is essential for the innovation systems' evolution towards the economic development process of regions. Indeed, the governance of regional systems' specialization paths should be incorporated and coordinated in a global and competitive directions of specialization.</p> <p>However, it is clear that the current definition of governance is not suitable/able to address the coordination issues of the socio-economic system within a Smart Specialization rationale, aiming at focus policy efforts at the Regional level. Relevant is the remark made by the authors about how crucial is the role of the governance process in identifying the "components and actors" of each regional innovation system, as well as their roles and relationships (leaders and executors).</p> <p>Finally, the author identifies opportunities and threats within a RIS3 governance framework. From one hand setting priorities and funds in given areas (Prioritizations versus specialization) is positive for developed regions favouring the creation of a critical mass in R&amp;D, on the other hand widening the development gap between regions. Secondly achieving a "specialized diversification" at a regional level, as remarked by the authors, would led to change the entire economy of regions. The same concept is not fruitful for regions lacking a rooted critical mass and organization capacities.</p> <p>The will of achieving a consistency with the Global context equals to consider specialization within a GVC's governance framework. As a result, aligning regional priorities with the global ones is a need for greater innovation and knowledge spillover.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>Within the context of Smart specialization, the concept of governance acquires complexity belonging to a wider, "Glocal" dimension that put together Local/Regional and Global dimensions.</p> <p>A common identification that stands out/comes to light/arises from the SS3 literature is the "implicit need" of shaping/orienting the specialization process (even in terms of governance and cluster policy) in function of international leaders and global market needs. Entering in GVC seems to be a priority to stay in the market and to be competitive, with the consequent risk of making void SS3 efforts (translated in disadvantages and in an even wider development gap between lead and developing countries/firms) with the risk of non-addressing the economic and technological change in the local economy.</p> <p>Setting priorities within regions in a RIS3 governance prospective is meaningless for those regions lacking strong capabilities in terms of entrepreneurships and R&amp;D. Thus the risk is to foster the development within regions that are already developed, weakening indirectly the ones that are less advanced in terms of research and technological capabilities. As evidenced in the paper, also regional diversification's exploitation is not always beneficial. Governance</p>

	<p>failures are behind the corner within a RIS3 process since the risk is that those three key concepts of Prioritization versus Specialization, Specialized diversification and the idea of a “global governance” cannot address developing regions issues.</p> <p>The risk is that the SS3 strategy would become an economic development’s strategic tool paving the way to innovation within already “strong regions” whereas being ineffective for regions with “low profile’s” economic development patterns. Therefore, implicit is the need of rethink and reshape the Governance and its key elements within the RIS3 process in order to avoid the risk of being cut out the regions upon which those strategies were supposed to be tailored.</p>
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<b>Title</b>		<i>Smart Specialization, Regional Approach and Applications to EU Cohesion Policy</i>		
Source Typology	Book	<input type="checkbox"/>		
	Paper	<input checked="" type="checkbox"/>		
	Other	<input type="checkbox"/>		
Author(s) name (s) (full)	Philip McCann & Raquel Ortega-Argilés			
Year	2013			
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Regional Studies, 2013, Vol. 49(8), p.1291-1302.			
Link to Publication	<a href="http://dx.doi.org/10.1080//00343404.2013.799769">http://dx.doi.org/10.1080//00343404.2013.799769</a>			
Keywords as they appear in the document	Smart Specialization, European Union, Cohesion Policy, Innovation, Place-based			
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	<ul style="list-style-type: none"> <li>- A Non-Spatial Regional Interpretation of the Smart Specialization Logic</li> <li>- Economic Geography and the Smart Specialization Logic</li> <li>- The justification for using Smart Specialization in Regional Policy</li> </ul>			
Level	National	Regional	Local	
		✓	✓	
Case Study if indicated in the paper (Y)	-			
Research Method applied	<input type="checkbox"/> Quantitative Method			
	<input checked="" type="checkbox"/> Qualitative Method			
	<input type="checkbox"/> Mixed approach The applied research method is mainly exploratory since the objective of the authors is to investigate the concept of Smart Specialization Strategy and its implication, as well as the spatial and place-based issues related to regional growth objectives.			
<b>Key sectors</b>				
✓	Smart Specialisation Strategies			
✓	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.			
	Cluster Economic Development			
	Cluster Policy			

✓	Social Innovation
✓	Place-Based Approach
	Territorial milieu
✓	Spatial Planning
	Urban Cluster
	Urban Regeneration and Economic Development
	Metropolitan city
	Urban network
	Urban competitiveness
	Governance and Cluster
Note:	The authors point out the need of defining a spatial dimension allowing the SS3 to be operational rather than being purely conceptual, hence shifting from a sectoral and space-neutral concept to a place based approach to Policy.
<b>Reference Typology</b>	
✓	Theory
	Methodology
	Best Practices
	Guidelines
✓	Policy Analysis
	Others
Note:	<p>Sections 1 introduces the concept of SS3, its origins and implications (Theory).</p> <p>Section 2 and 3 explore linkages to regional issues and discuss the emerging economic geographic concerns and contradictions in translating the SS3 concept in a regional policy (Policy Analysis).</p> <p>Section 4 advocates the SS3 concept as effective regional policy.</p> <p>Section 5 illustrates how the SS3 policy can be incorporated and implemented within the new EU Cohesion policy.</p>
<b>Reference Field of interest</b>	
✓	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
	Governance
✓	Local innovation process
✓	Public Policy
	Others
Note:	
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	

	Territorial milieu
✓	Social networks
	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
✓	Governance schemes
✓	Innovation
	Smart technologies
	Local value chain
	PPP
	Others:
Notes :	
<b>Synthesis and Comments</b>	
<p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>The paper deeply explores the concept of Smart Specialization Strategy (SS3), its roots, features, implications and objectives within the framework of both the <i>EU Cohesion Policy's</i> set of objectives as well as the <i>Innovation Union</i> initiative. In particular, the authors will to provide a deep insight in the application and evolution of a sectoral and non-spatial concept, as it what was defined at the early stage, “translating” and fitting it into to a well-defined context, from a spatial and regional point of view.</p> <p>The SS3 concept, according to the authors, stemmed from the attempt of investigating and explaining the gap in productivity between USA and EU and the factors enforcing/underpinning the increasing phenomenon.</p> <p>As a result, what was labelled as SS3 can be summarized thru the assumption that regions would specialize in different knowledge oriented sectors directly linked to their local strengths and from which drive a “policy-prioritization logic” supporting growth at the European level.</p> <p>At the core of the unripe “sectoral” concept of SS3 there were three basic a-spatial elements, such as the essential role of “<i>entrepreneurial search process</i>” in identifying opportunities for technological advances as well as the <i>size</i> and the <i>linkages</i> of the specializing sector, enabling a knowledge-spillover effect.</p> <p>As evidenced in the paper, finding a SPATIAL dimension is the primary objective, coherent /in line with the Maps Led project efforts.</p> <p>In these regards, the authors stress the issues recognized in matching the existing theory with specific regional growth needs</p>

	<p>and translating the logic in a policy applicable in a territorial and more specifically in a regional dimension.</p> <p>There is an economic geographic argument behind the SS3 that requires attention in order to bridge the existing gap from theory to practice, thus translating a-spatial principles of a sector in spatially defined, regional contexts. As evidenced by the authors, the regions that are more suitable to SS3 implementation are the core regions, ironically the ones excluded by the Cohesion policies growth's objectives. Therefore, the policy reflects a contradiction implicitly lies in the EU cohesion policy definition, being more suitable to favour regions with a high potential, worsening regional disparities, instead of targeting disadvantaged regional growth objectives.</p> <p>Moreover, as emphasized in the paper, space neutrality is the second contradiction embodied in an approach that would achieve a placed –based approach. From local regional growth perspective, regions differ also in terms of innovation. For this reasons, the policy has to be targeted to the local labour force, ensuring the regional “<i>embeddedness of local activities</i>” in a context of a wider global value chains, together with the concept of promoting <i>technological diversification</i> (rather than specialization) in a specific dominant (or more specialized) sector within regions (relatedness). The third element essential to translate the SS3 concept in a regional policy is the <i>connectedness</i> feature as pointed out by the authors, in terms of inter-sector networking and knowledge dissemination processes.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>According to the author and translating the principles of Smart Specialization in effective, spatially defined, regional-tailored policy priorities is an achievable objective.</p> <p>Relevant to the objective of the Maps Led project is the need of a deep understanding of the economic distribution of activities and innovation across regions, as well as of the industrial base and vocation, the labour force characteristics and considering principles such as the embeddedness, relatedness and connectedness within the regional highly specialized and diversified industry or sector. In order to fit those a-spatial principles in a spatial context, understanding that there are economic Geography implications to consider is crucial. Entrepreneurship and Innovation, are indeed embedded in a diversified scale of economies dependent from geography features, such as size of regions, density of population, technological advances, specialization, as well market scale. The result is therefore a diversified regional response in terms of entrepreneurial search process.</p>

Title		<i>Clusters and the New Economics of Competition</i>		
Source Typology	Book <input type="checkbox"/>			
	Paper <input checked="" type="checkbox"/>			
	Other <input type="checkbox"/>			
Author(s) name (s) (full)	Micheal Eugene Porter			
Year	1998			
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Harvard Business Review, November-December 1998: 77.			
Link to Publication	<a href="https://hbr.org/1998/11/clusters-and-the-new-economics-of-competition">https://hbr.org/1998/11/clusters-and-the-new-economics-of-competition</a>			
Keywords as they appear in the document	-			
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	What is a Cluster? Pages 78-80 Why Clusters are critical to Competition. Pages 80-84			
Level	National	Regional	Local	
	✓		✓	
Case Study if indicated in the paper (Y)	Case studies: California Wine Cluster; Italian Leather Cluster; US Clusters; Portugal's Clusters.			
Research Method applied	<input type="checkbox"/> Quantitative Method			
	<input checked="" type="checkbox"/> Qualitative Method – it is an exploratory study providing a new concept for clusters			
	<input type="checkbox"/> Mixed approach			
<i>Key sectors</i>				
	Smart Specialisation Strategies			
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.			
✓	Cluster Economic Development			



✓	Cluster Policy
	Social Innovation
	Place-Based Approach
	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
✓	Urban competitiveness
	Governance and cluster
Note:	<p>The paper deals with the cluster economic development, stating that “clusters represent a new approach of thinking about location, companies and institutions such as universities can contribute to competitive success and together with government can promote economic development and prosperity”.</p> <p>In the paragraph called “Birth, Evolution and Decline” the author explains how a cluster can develop after its birth: “Sometimes a chance event creates some advantageous factor that, in turn, fosters cluster development- although chance rarely provides the sole explanation for a cluster’s success in a location”.</p> <p>Also the Cluster Policy sector is faced in the paper, more precisely in the paragraph “What’s Wrong with Industrial Policy”, where the author states that “the aim of cluster policy is to reinforce the development of all clusters. This means that a traditional cluster such as agriculture should not be abandoned; it should be upgraded”.</p> <p>The sector of Urban competitiveness is also tackled in the paper, because “Cluster affect competitiveness within countries as well as across national borders” and “more important to ongoing competitiveness is the role of location in innovation. Yes, companies have to spread activities globally to source inputs and gain access to markets”.</p>
<b>Reference Typology</b>	
✓	Theory
	Methodology
	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	The paper lays on the theory that location should no longer be a source of competitive advantage. Open global markets, rapid transportation, and high-speed communications should allow any company to source anything from any place at any time. But in practice, location remains central to competition.
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects

✓	Economic Development
✓	Governance
✓	Local innovation process
	Public Policy
	Others
Note:	<p>Economic development is a related field to this paper because in it are explained the mechanisms with which local activities can enjoy benefits from their nearness. Furthermore, it is explained also how countries should expand internal trade among cities and trading with neighboring countries.</p> <p>Governance is another field tackled in the paper, with its pros and cons. Sometimes government policies can unwittingly harm the formation of clusters. Something must be adjusted in order to have a synergy between public administration and companies for fostering a local economy.</p> <p>Local innovation process is another field of interest because in the paper is explained how Clusters make opportunities for innovation, also providing capacity and flexibility to act rapidly. Local suppliers and partners can and do get closely involved in the innovation process, ensuring a better match with customers' requirements.</p>
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
✓	Territorial milieu
✓	Social networks
	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
✓	Supply chains
	Governance schemes
✓	Innovation
	Smart technologies
✓	Local value chain
	PPP
	Others:
Notes :	
<p>Territorial milieu is a keyword for the paper because inside the concept of clusters lays the characteristics of the area which are attempted to be fostered from the clusters growth.</p> <p>Social networks are crucial inside this view because the ensemble of formal and informal relationship inside members of a cluster, belonging to different entities or companies, are the core of the social texture with which is formed a cluster.</p> <p>Supply chain can benefit from the presence of a cluster, because a better supply chain means a higher quality of the products, with benefits to the entire economy. In the term supply chain is contained also the concept of supply of trained people. "A greater supply of better and trained people, for example, can outweigh any increase in competition".</p>	

Innovation is directly related to clusters, which affect competition by increasing productivity, driving the direction and pace of innovation and stimulating the formation of business.

The paper is linked to the concept of local value chain. "A cluster is an alternative way of organizing the value chain [...] the proximity of companies and institutions in one location – and the repeated exchanges among them – fosters better coordination and trust".

**Synthesis and Comments**

<p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>The document is a milestone for the cluster theory.</p> <p>It explains specifically the meaning of clusters and why they are so extremely important for a local economy and critical for competition.</p> <p>In the first part the paper focuses on cluster theory, with reference on some case study and how to spur economic development in those areas.</p> <p>It is presented also the relation among clusters and productivity, with few case studies taken as an example, such as California wine cluster, Italian leather cluster, US clusters and Portugal clusters.</p> <p>The understanding of clusters lays on the following issues: the choice of the right location, local engagement, the upgrade of the cluster and the collective work within a cluster.</p> <p>In the last part takes place a section about the mistakes of industrial policy and Public-private responsibilities and investments, so with more focus on governance.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>Within the objectives of the WP1, in this paper is presented a concept of social clusters, intended as the local engagement of the community within the clusters. The social glue that binds together a cluster facilitates access to important resources and information.</p> <p>To maximize the benefits of cluster involvement, companies must participate actively and establish a significant local presence.</p> <p>It is crucial within this view, to foster ongoing relationships with government bodies and local institutions such as utilities, schools and research groups.</p>

<b>Title</b>	<b><i>Science, technology and innovation for economic growth: Linking policy research and practice in 'STIG Systems'</i></b>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/> (i.e. web, report study, etc..) if yes specified		
Author(s) name (s) (full)	Philippe Aghion, Paul A. David, Dominique Foray		
Year	2008		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	SIEPR Discussion Paper No. 06-39.		
Link to Publication	<a href="http://myweb.rollins.edu/tlairson/pek/davidsti.pdf">http://myweb.rollins.edu/tlairson/pek/davidsti.pdf</a>		
Keywords as they appear in the document	Science & technology policy Institutions Systems		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	Choosing "repair-tools" to fix "market failures": neutral vs. non-neutral instruments. (paragraph 3)		
Level	National	Regional	Local
		✓	
Case Study if indicated in the paper (Y/N)	No		
Research Method applied	<input type="checkbox"/> Quantitative Method (if yes specified)		
	<input checked="" type="checkbox"/> Qualitative Method (if yes specified)		
	<input type="checkbox"/> Mixed approach (if yes specified)		
<b>Key sectors</b>			
	Smart Specialisation Strategies		
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.		
	Cluster Economic Development		
	Cluster Policy		
✓	Social Innovation		
	Place-Based Approach		

	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
✓	Urban competitiveness
	Governance and cluster
	Competitive Advantage
Note:	<p>Social innovation is linked to the concept of education, which should be thought of as complementary to technical change and innovation. These theories were first pointed out by Nelson and Phelps (1966). According to them, a higher level of education should speed the process of catching up with the technological frontier (or “best practice”).</p> <p>Innovation in this paper is often related to subsidies, and how they influence the growth of firms and innovation.</p> <p>Subsidies are also related to competitiveness. Sometimes they can have positive effects on the market, helping to reduce the externalities. In some cases, instead, they emphasize the gap between big and small firms.</p>
<b>Reference Typology</b>	
	Theory
	Methodology
	Best Practices
	Guidelines
✓	Policy Analysis
	Others
Note:	The typology of this paper can be classified as policy analysis, since it approaches the policy issues relating to science, technology and innovation and their relation with economic growth.
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
	Governance
✓	Local innovation process
✓	Public Policy
	Others
Note:	Economic development in the paper is referred as economic growth, which is linked to the topics of science, technology and innovation, which instead of being treated in isolation and as distinct topics, are brought together in a unique scheme within a general equilibrium context.

	<p>The issue of innovation is related to innovation policy. In this paper the question is if workable science, technology and innovation policies can be designed and evaluated in a “systems-theoretic” framework.</p> <p>Public policy is faced in the section 2 of the paper, in which is presented an overview of Science, Technology and Innovation policy that integrates the market failure rationale for policy within a broader systems perspective.</p> <p>Policy is faced also in section 4 of the paper, where emerge critical aspects of the interdependence between STIG-policy and other classes of economic policy concerned with human capital formation, macroeconomic performance and effective competition.</p>
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
	Social networks
✓	Enabling technologies
✓	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
	Governance schemes
✓	Innovation
	Smart technologies
	Local value chain
	PPP
	Competition
	Clusters
<p>Notes :</p> <p>Enabling technologies and law profiles are linked in this paper with the concept of optimization of processes of information by public policy measures, so that they yield the desired long-run rate of technological innovation and productivity growth.</p> <p>Innovation complementarities, coordination failures and of endogenous evolution of institutions. These are the three “themes” that have structured past and more recent research in the field of technology policy.</p> <p>Innovation is linked to innovation policy, and in this paper is considered within a broader view. The increasing awareness of the intimate and multiple connections of technological change and innovation with advances in science, on the one hand, and the set of socio-economic institutions operating in a given context, on the other, encourages the conceptualization of “science, technology, innovation and growth systems” (STIGS) as appropriate subjects for policy-oriented research.</p>	
<b>Synthesis and Comments</b>	
	The document is on the relevance of “systems-theoretic” approaches to the interdependent policy issues relating to the

<p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>dynamics of science, technology and innovation and their relationship to economic growth.</p> <p>Generic knowledge is crucial because under the right economic conditions can generate innovations yielding lower cost or higher quality new goods and services, or possibly both.</p> <p>Rather than being treated in isolation as distinct and separate topics, science, technology and innovation are brought together within a dynamic general equilibrium context.</p> <p>The issue is not “theory for theory’s sake”, but, instead, theory and empirical research for the sake of informed and effective policy practice.</p> <p>This paper has also been written to stimulate some multidisciplinary discussion.</p> <p>Section 3 opens the toolbox to discuss the proposition that a “correct” policy needs instruments that are neutral and nonspecific with respect to technologies and firms.</p> <p>Section 4 examines critical aspects of the interdependence between STIG-policy and other classes of economic policy concerned with human capital formation, macroeconomic performance, effective competition, the efficiency and flexibility of labour markets, and the stability and responsiveness of financial institutions.</p> <p>Section 5 then takes up the question of the practicalities and costs of actual policy interventions.</p> <p>Anyway, technology and innovation policy becomes politically controversial when it enters into specific details that are perceived to have differential effects on particular markets, institutions and industries.</p> <p>This essay has sought to confront these challenges by addressing the issue of the practical correction of market failures and policy coordination failures, by indicating an appropriate systems paradigm and set of (simulation) tools to work within it in order to assess the dynamics of interactions among policy initiatives, and, finally, by addressing the problems of practical policy evaluation.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>Within the objectives of the WP1, it is expected to produce a new concept of cluster, more social and local oriented.</p> <p>In the paper, the development of very general scientific and technological knowledge, forms a common foundation for specialized engineering advances in distinct industrial clusters. Opportunities are thereby created for further innovations that realize new technological functionalities from the design of products and systems than entail the convergence of previously distinct technological clusters, sometimes exploiting the complementarities between older and newer clusters.</p> <p>These newer clusters will be more local oriented and will create resilient economy only if knowledge, science, technology and innovation will merge together in a cooperation of public and</p>

	private firms, under the management of new and more local oriented policy.
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<b>Title</b>	<b><i>How the Universities Can Best Contribute to Enhancing Europe's Innovative Performance</i></b>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input type="checkbox"/>		
	Other <input checked="" type="checkbox"/> (i.e. web, report study, etc..) Report Study		
Author(s) name (s) (full)	Paul Allan David and Stan Metcalfe		
Year	2009		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	EU Report 24047. "Knowledge for Growth Prospects for science, technology and innovation". European Commission, November 2009.		
Link to Publication	<a href="http://ec.europa.eu/research/era/pdf/knowledge_for_growth.pdf">http://ec.europa.eu/research/era/pdf/knowledge_for_growth.pdf</a>		
Keywords as they appear in the document	-		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	"Research and invention is not innovation.." (pp. 53) "Two very different and sometimes conflicting notions of "connections" or "interactions" with business are often lumped together."		
Level	National	Regional	Local
	✓		✓
Case Study if indicated in the paper (Y/N)	No		
Research Method applied	<input type="checkbox"/> Quantitative Method (if yes specified)		
	<input checked="" type="checkbox"/> Qualitative Method (if yes specified)		
	<input type="checkbox"/> Mixed approach (if yes specified)		
<i>Key sectors</i>			
	Smart Specialisation Strategies		
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.		
	Cluster Economic Development		
	Cluster Policy		
✓	Social Innovation		
	Place-Based Approach		

	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
✓	Urban competitiveness
	Governance and cluster
	Competitive Advantage
Note:	<p>Social innovation is linked to the concept of interactions within different organisations, which are important informing “knowledge ecologies” from which emerge “systems of innovation.”</p> <p>Competitiveness can emerge when institutions of the Community’s higher education sector are in urgently need of “modernising” changes if they are to play their part in Europe’s drive to sustain growth and job creation. Universities are often embedded in urban networks so that their outcomes can result in a broader concept of Urban Competitiveness.</p>
<b>Reference Typology</b>	
	Theory
	Methodology
✓	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	The typology of this paper can be classified as best practices because it seeks the best way for public institutions as universities to contribute to innovation.
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
	Economic Development
✓	Governance
✓	Local innovation process
	Public Policy
	Others
Note:	Governance is related to the concept of partnership among institutions and firms. New challenges identified in the European Commission’s Green Paper are excellent resourced research institutions able to develop and maintain partnerships with other entities, such as joint research ventures, cluster or virtual networking. The knowledge transfer among all these actors can result in a multidisciplinary-driven innovation process.
<b>Reference Keywords according with the MAPS-LED Project</b>	

Key words (three to five keywords selected within the list below)	
	Territorial milieu
✓	Social networks
✓	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
✓	Governance schemes
✓	Innovation
	Smart technologies
	Local value chain
	PPP
	Competition
	Clusters
	Development
	New Economics
<p>Notes :</p> <p>The social networks with which universities are connected to private firms are several: they can range from informal contacts, attendance at conferences and access to published literature, to recruitment of graduates, staff exchanges and joint research programs or specific contracts.</p> <p>All these types of connections result in a better exploitation of the ideas developed within universities, through a professional management of intellectual property, opening technology licensing offices and launching and investing in their own “spin-off” and “start-up” companies, which in turn can enable new technologies.</p> <p>The aforementioned process seeks to transform the division of labour between academia and commerce by bringing higher educational institutions more fully into market as a supplier of innovation services.</p> <p>As a result, universities are totally embedded in the contemporary innovation process.</p>	
<b>Synthesis and Comments</b>	
<p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>The document is part of a European Report about knowledge for growth. More in details, it focuses on the role of universities and their innovation schemes in the social context. Universities are a focus of attention from European union because of they are traditional place for knowledge spreading across population and nest of innovation.</p> <p>In the last times, European universities did not have good performances as their North American counterparts and this is explained from the change of the economy in the last four decades and the slower adaptation that universities shown in response to this important change.</p>

	<p>New challenges for European universities are the growth of partnerships with other entities, joint research ventures, clusters and knowledge transfers between public research and industry. Other challenges are the diversity of specialised expertise within the university and cooperative ethos of open knowledge-exchange.</p> <p>An important point highlighted is the clear distinction between research and invention with innovation.</p> <p>The interactions with businesses must be improved and are mainly two: better connection of universities with firms' innovative activities such as stronger network arrangements and collaborative funding, and secondly is a better exploitation of the ideas developed within universities, with a better management of intellectual property, opening technology licensing offices and launching and investing in their own "spin-off" and "start-up" companies.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>Within the objectives of the WP1, it is expected to produce a new concept of cluster, more social and local oriented.</p> <p>In this paper there is a concept of social clusters, intended as the engagement of universities with local firms. The social glue that binds together clusters in this case is the innovation that can be found within start-up and spin-off companies.</p> <p>Inside this start-up and spin-off companies can be established a significant local presence of young professionals who previously studied in the universities of the areas.</p> <p>Within this view can be spurred the ongoing relationships within companies and local institutions such as universities, schools and research groups.</p>

<b>Title</b>	<b><i>The Case for Regional Development Intervention: Place-based versus Place-Neutral Approaches</i></b>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/> (i.e. web, report study, etc..) if yes specified		
Author(s) name (s) (full)	Fabrizio Barca, Philip McCann and Andrés Rodríguez-Pose		
Year	2012		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Journal of Regional Science, Vol. 52, No.1, 2012, pp. 134-152.		
Link to Publication	<a href="http://onlinelibrary.wiley.com/doi/10.1111/j.1467-9787.2011.00756.x/full">http://onlinelibrary.wiley.com/doi/10.1111/j.1467-9787.2011.00756.x/full</a>		
Keywords as they appear in the document	-		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	Globalization and Economic Geography (paragraph 2) The Policy Response: Spatially-blind versus Place-based Approaches (par. 3) What Future for Regional Development Intervention? (par. 5)		
Level	National	Regional	Local
		✓	
Case Study if indicated in the paper (N)	-		
Research Method applied	<input type="checkbox"/> Quantitative Method (if yes specified)		
	<input checked="" type="checkbox"/> Qualitative Method (if yes specified)		
	<input type="checkbox"/> Mixed approach (if yes specified)		
<b>Key sectors</b>			
	Smart Specialisation Strategies		
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.		
	Cluster Economic Development		
	Cluster Policy		
✓	Social Innovation		
✓	Place-Based Approach		

	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
	Urban competitiveness
	Governance and cluster
	Competitive Advantage
Note:	<p>The place-based approach in the paper is linked to the concept of geographical context, whereby context here is understood in terms of its social, cultural, and institutional characteristics.</p> <p>Furthermore, the place-based approach emphasizes the problem of knowledge in policy intervention. The typical question could be: Who knows what to do where and when?</p> <p>Social inclusion is the core of development intervention, which should gradually put emphasis on efficiency and on territorial convergence and how strategies should consider economic, social, political, and institutional diversity in order to maximize both the local and the collective potential for economic development.</p>
<b>Reference Typology</b>	
✓	Theory
	Methodology
	Best Practices
	Guidelines
✓	Policy Analysis
	Others
Note:	<p>The paper discusses the changes in growth and development theory and alternative ways of thinking in contrast with the new economic geography theory, which advocates the advantages associated with the agglomeration effects of large cities.</p> <p>Moreover, in the paper are analysed development policies to cause changes in both socioeconomic trends across the world and economic theory. This area of economic development policy is the field in which are embedded Place-based approaches, which are intended to foster new local economic development, contrary to old spatially-blind approaches.</p>
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
	Governance
✓	Local innovation process
✓	Public Policy

	Others
Note:	<p>In the paper there are three reference fields of interested, interlinked among them. At the beginning of the study are analyzed the strategies for maximize local economic development. The heart of economic development and success are the peculiarities of an area and the ability to generate and strengthen a comparative advantage. This concept is linked to the local innovation process.</p> <p>Public policy is related to economic development by means of development policy, which purpose is to promote knowledge and ideas through the interaction of the local groups and the external elites involved in the policy.</p> <p>The result of the Place-based approach is a sequence of place-based interventions—named integrated regional policies —organizing infrastructure endowment, with schooling, business development, and the promotion of innovation, as a mean to accomplish greater local development.</p>
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
	Social networks
	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
✓	Governance schemes
✓	Innovation
	Smart technologies
	Local value chain
	PPP
	Competition
	Clusters
<p>Notes :</p> <p>Governance plays and has played historically an influencing role in the process of development. The paper advocates the need of a reform of the institutions and governance in new European countries.</p> <p>Furthermore, Governance is considered as a broader context in any country, together with the institutional framework, in which operates Regional development policy.</p> <p>Place-based policies identify the need for involvement based on partnerships between different levels of governance as a means of institution-building and also of identifying and building on local knowledge.</p> <p>Innovation, together with human capital, has recently brought to the discussion inside development theories.</p> <p>The promotion of innovation is now the agenda. Not only infrastructure provision or schools improvement are now seen as priorities from local policy actors.</p>	

### Synthesis and Comments

Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.

The paper studies the argument about place-neutral and place-based policies for economic development. In the document are delineated some of the economic features of the modern era of globalization, then examined the rethinking that has taken place inside policy and then are considered the differences among two approaches: space neutral and place-based approach. Two case studies are discussed, namely developing countries and European Union.

Specific city regions, called global cities, play a key role in patterns of global engagement, accounting for a disproportionate share of trade-related activities. Growth and development theories could no longer explain empirical patterns of the rethink in economic development, related to economic geography. Aspects such as human capital and innovation, agglomeration and distance and institutions have a pivotal role. Globalization has made localities more important for growth and prosperity.

In the old approach, decision making was a top-down process; policies relied on the replica of positive development strategies applied in very different contexts. The same attitude was applied to similar problems in diverse places without any consideration of the specifics of the regional and local context.

Unbalanced policies are linked to the construction of physical infrastructure or roads and ribbon-cutting right before elections. By the same token, state aid and industrial intervention has wasted resources on declining industries, lame ducks, and big projects.

A new paradigm in policy was needed. It took long time for the international community to react to the mistakes made by top-down policy. The world bank's view has been for years that agglomeration of large cities could have brought advantages to the whole community, reducing poverty. But with the passing of time many reports have advocated place-based strategies to tackle the underutilization of potential and persistent social exclusion.

From the place-based perspective, mega urban regions are not the only conceivable growth pattern

Today's World Bank analysis of the policy implications of economic geography appears to be somewhat at odds with the long-term position advocated by the same organization over several decades.

The organization and the systems of economic geography are different in different parts of Europe, and this diversity means that simple off-the-shelf urban expansion prescriptions of the type offered by the World Bank are no longer efficient to respond to the economic, social, and environmental challenges tackled by Europe.

It is politically undoable and against the principles of social and territorial cohesion that a winner takes positive outcomes like



	<p>human resources from other member states, that is not consistent with the basis of EU.</p> <p>In the developing countries, instead, the argument is that “one-size-fits-all” strategies are inappropriate. What is good in one city may not be appropriate in another one. The policy must fit the existing level of local development and must be designed to utilize and improve the institutional capacity available.</p> <p>The paper advocates that there are different pathways and scenarios for economic development. Mega-urban development supported by the World bank is just one pattern. Convergence should not be a principal objective.</p> <p>If convergence must be promoted, this should be done throughout development in poorer areas instead of mere redistribution.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>Within the objectives of the WP1, it is expected to produce a new concept of cluster, more social and local oriented. In the paper the place-based argument implies that this can only be achieved by trying to make growth and development intervention more “place-aware”, by making policies that are both place- and people-based will a strong case for regional development intervention be made.</p>

Title		<i>The goals of Smart Specialisation</i>		
Source Typology	Book <input type="checkbox"/>			
	Paper <input checked="" type="checkbox"/>			
	Other <input type="checkbox"/> (i.e. web, report study, etc..) if yes specified			
Author(s) name (s) (full)	Dominique Foray and Xabier Goenaga			
Year	2013			
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	S3 Policy Brief Series n° 01/2013 – May 2013 - S3 Platform, JRC-IPTS.			
Link to Publication	<a href="http://ftp.jrc.es/EURdoc/JRC82213.pdf">http://ftp.jrc.es/EURdoc/JRC82213.pdf</a>			
Keywords as they appear in the document	-			
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	1 – Towards a new architecture for regional innovation strategy 2 - On the process and procedures of smart specialisation 3 – Goals and metrics of Smart Specialisation			
Level	National	Regional	Local	
		✓		
Case Study if indicated in the paper (Y)	Are case studies addressed in the reference? If yes specified Finland, Basque Country and British Midlands.			
Research Method applied	<input type="checkbox"/> Quantitative Method (if yes specified)			
	<input checked="" type="checkbox"/> Qualitative Method (if yes specified)			
	<input type="checkbox"/> Mixed approach (if yes specified)			
<b>Key sectors</b>				
✓	Smart Specialisation Strategies			
✓	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.			
	Cluster Economic Development			
	Cluster Policy			
	Social Innovation			
	Place-Based Approach			
	Territorial milieu			
	Spatial Planning			

	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
	Urban competitiveness
	Governance and cluster
✓	Competitive Advantage
Note:	<p>The first key sector is Smart specialisation. It is the object of the paper, which explains in detail this new policy, linked to the concept of research and innovation on SS.</p> <p>According to the authors, “the principle of prioritisation in a vertical logic defines a method to identify desirable areas for innovation policy intervention”.</p> <p>The key sector of Smart Specialisation is directly linked to the competitive advantage key sector, since SS “seeks robust and transparent means for nominating new activities, aiming at exploring and discovering new technological and market opportunities and at opening thereby new domains for constructing regional competitive advantages”.</p>
<b>Reference Typology</b>	
	Theory
✓	Methodology
	Best Practices
	Guidelines
✓	Policy Analysis
	Others
Note:	Smart Specialisation in this paper is intended as a method to help policy-makers to identify desirable areas for innovation policy and intervention.
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
	Economic Development
✓	Governance
✓	Local innovation process
✓	Public Policy
	Others
Note:	<p>The field of interest of Governance is faced in the paper: “What governments would support is neither whole sectors nor single firms but the growth of new activities”.</p> <p>Local innovation process and public policy fields of interest are related to the concept of Vertical policy, explained in the paper. It is a method to help policy-makers to identify desirable areas for innovation policy intervention. According to the authors, five policy principles are important for identifying new activities.</p>
<b>Reference Keywords according with the MAPS-LED Project</b>	

Key words (three to five keywords selected within the list below)	
	Territorial milieu
	Social networks
	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
	Governance schemes
✓	Innovation
	Smart technologies
✓	Local value chain
	PPP
	Other:
✓	Vertical logic
✓	Entrepreneurial discovery
<p>Notes :</p> <p>Vertical logic is a keyword because Smart specialisation centres on a more vertical and non-neutral logic of intervention. (paragraph 1)</p> <p>Furthermore, the author makes a clear distinction between entrepreneurial innovation and entrepreneurial discovery, which is intended as the second of the five main principles laying behind the policy (parag. 2)</p>	
<b>Synthesis and Comments</b>	
<p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>The paper deals with the innovative concept of Smart Specialisation, emphasizing the principle of prioritisation in a vertical logic, seeking robust and transparent means for nominating new activities, exploring and discovering new technological and market opportunities and opening new domains for regional competitive advantage.</p> <p>The new strategy adds a more vertical logic of intervention, instead of the classical horizontal neutral logic of intervention. Some choices of technologies, fields and sub-system could be favoured from the new regional policy.</p> <p>Horizontal policies might be difficult to achieve but the risk of being wrong is minimized. With the new vertical policies, the identification of desirable areas of intervention is extremely difficult and entails a great risk.</p> <p>Smart Specialisation helps policy-makers to identify domains and activities for potential specialisation. The vertical prioritisation is difficult.</p> <p>The central insight is that resources should be concentrated in specially selected domains with particular kinds of technology,</p>

	<p>namely activities that show potential and/or have scale and agglomeration economies.</p> <p>Five policies are important: Granularity, Entrepreneurial Discovery, Priorities emerging today will not be supported forever, Smart Specialisation as an inclusive Strategy and the Experimental Nature of the policy and the need for evaluation.</p> <p>The principles that form the baseline of the policy process are: Non-Neutral Policy, Keeping Market Forces Growing, Interactive process policy-private sector, activity as the right level of intervention, evolving priorities, experimental nature of policy and the Process that helps reveal areas of desirable interventions.</p> <p>The goals of SS are: facilitating the emergence and early growth of new activities, diversifying regional systems through the generation of new options and generating critical mass.</p> <p>Metrics are also important in the process and the need for data and indicators about smart specialisation is critical. Without metrics and indicators as well as regular data collection, the patterns of smart specialisation strategies will not be discernible and policy makers will be unable to track progress. There is a need to measure the emerging trends regarding entrepreneurial discoveries, the development of new activities, the diversification of the system and the generation of critical clusters.</p> <p>As a conclusion, a smart specialisation strategy attempts to make two critical and somewhat conflicting requirements compatible: identifying priorities in a vertical logic (specialisation) and keeping market forces working to reveal domains and areas where priorities should be selected (smart).</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>Within the objectives of the WP1, it is expected to produce a new concept of cluster, more social and local oriented. In this paper there is a concept of social clusters, inside the principle of Smart Specialisation as an inclusive strategy. A Smart specialisation needs to be inclusive. This does not mean that the strategy will support a project in every sector (the last word is given to the entrepreneurial discoveries!) but inclusive smart specialisation means giving every sector a chance to be present in the strategy through a good project.</p> <p>As Phelps argues: “While dynamism is crucial, we want dynamism with economic justice – with what I call economic inclusion. It means drawing companies and people into the economic sector of a modern economy, where new ideas for new processes and products are conceived and experimented”.</p>

<b>Title</b>		<b><i>Modern regional innovation policy</i></b>		
Source Typology	Book <input type="checkbox"/>			
	Paper <input checked="" type="checkbox"/>			
	Other <input type="checkbox"/> (i.e. web, report study, etc..) if yes specified			
Author(s) name (s) (full)	Philip McCann and Raquel Ortega-Argilès			
Year	2013			
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Cambridge Journal of Regions, Economy and Society 2013, 6, 187-216.			
Link to Publication	<a href="http://cjres.oxfordjournals.org/content/early/2013/05/08/cjres.rst007.abstract">http://cjres.oxfordjournals.org/content/early/2013/05/08/cjres.rst007.abstract</a>			
Keywords as they appear in the document	Economic Growth Innovation Regional Development			
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	Contemporary regional innovation policies (pag. 196) Innovation policy developments in the EU: smart specialisation (pag.206)			
Level	National	Regional	Local	
		✓		
Case Study if indicated in the paper (Y)	Innovation policy approaches and tools: SME support measures : Bavaria (DE)—Innovation vouchers; West Midlands (UK): Innovation voucher scheme—INDEX; Estonia (EE)—IVC Innovation Voucher Grant programme; Opolskie (PL)—Ensuring access to finance; Wales (UK)—Providing skilled labour to local SMEs; Prince of Wales Innovation Scholarships; Bratislava (SK)—Support for Purchases of Innovative Technologies and Creation of Quality Management Systems (SPIT and CQMS); Nord-Pas-de-Calais			

	<p>(FR)—The 2000 SME Plan; New Albany, Indiana (US)—One Southern Indiana Chamber (1SI) and Economic Development; Prato (IT)—Supporting internationalisation; rethinking the product; Chamber of Commerce of Prato;</p> <p>Pennsylvania (US)—Center for Trade Development; Washington (US)—State export initiative.</p> <p>Innovation policy approaches and tools: promoting rural development;</p> <p>Cross-border coordination and cooperation of innovation policy:</p> <p>Lille (FR) and Kortrijk and Tournai (BE): Eurometropolis, European Grouping of Territorial Cooperation (EGTC); Baltic Sea Region Strategy; South Bohemia (CZ) and Upper Austria (AT): MSB Technet; Berlin Brandenburg (DE): InnoBB; France, Italy, Spain and Greece: IC-Med;</p>
Research Method applied	<input type="checkbox"/> Quantitative Method (if yes specified)
	<input checked="" type="checkbox"/> Qualitative Method (if yes specified)
	<input type="checkbox"/> Mixed approach (if yes specified)
<b>Key sectors</b>	
✓	Smart Specialisation Strategies
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.
	Cluster Economic Development
	Cluster Policy
	Social Innovation
	Place-Based Approach
	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
✓	Urban competitiveness
	Governance and cluster
	Competitive Advantage
Note:	Smart Specialisation agenda is discussed in the paper, as a policy for prioritizing regional innovation policy, which originated in non-spatial innovation policy debates and which now has been applied in an explicitly regional context.
<b>Reference Typology</b>	
	Theory
	Methodology
	Best Practices
	Guidelines
✓	Policy Analysis
	Others

Note:	<p>The typology of this paper can be classified as policy analysis, since it approaches the policy issues inside a modern regional innovation context.</p> <p>In terms of policy, special attention is devoted to the role of local market failures and local institutions in explaining the importance and need for regional innovation policies, and the advent of the smart specialization agenda is discussed.</p>
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
✓	Governance
✓	Local innovation process
✓	Public Policy
	Others
Note:	<p>In the paper is analyzed the role played by innovation in economic development and in particular its relationship with geography. What started as a relatively niche study and science-based R&amp;D way of thinking about innovation policy has developed into a much more multi-dimensional policy approach involving matters of institutions, geography and linkage development.</p>
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
	Social networks
✓	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
✓	Governance schemes
✓	Innovation
	Smart technologies
	Local value chain
✓	PPP
	Competition
	Clusters
Notes :	<p>Enabling cross-over technologies is stated as an important step in this paper, since enabling cross-over technologies and targeting new applications for sector-specific</p>



technologies to reduce dependence and vulnerability of an area. This should be sided with an always present horizontal policy, intended as reducing regulatory barriers and diminishing bureaucracy.

With the advent of Smart Specialisation Strategy, there will be a shift in thinking, also involving a reconsideration of the possible partnership roles of different levels of Governance schemes.

Innovation is deeply analysed in the paper, especially its role in economic growth, with analytical and empirical issue.

PPP are discussed inside the broader understanding of the smart specialization approach.

### **Synthesis and Comments**

Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.

Innovation policy has developed into a much more multi-dimensional policy attitude linking matters of institutions, geography and linkage development.

The role which knowledge plays in economic growth is not simply a matter of knowledge assets but also a matter of knowledge processes.

Innovation is nowadays assumed as the process of converting new ideas into marketable outcomes.

There are different approaches: Orthodox Approaches, which tend to compare different indicators between countries such as Total Factor Productivity (TFP), and Heterodox approaches which comprises the understanding of changes instead of analytical structural characteristics.

In the last studies emerged a broad understanding that knowledge investments are not of themselves sufficient to promote growth; rather it depends on the intermediate success of translating those investments to commercially successful outcomes.

Empirical developments have taken place both in terms of better innovation classification systems, improved measurement systems and also in terms of better economic methods.

In terms of empirical approaches, the use of patent data as an index of innovation dominated most early econometric work on innovation. The use of patents as innovation indicator has been largely criticized, mainly for two reasons: Firstly, patents reflect almost none of the innovations which take place in service industries. Second, patents also poorly reflect the variety of innovations, including non-technological innovations.

The understanding of the term innovation has varied over the time: innovation is based on a much wider set of linkages and issues than earlier technology-led approaches.

Moreover, the growth impacts of innovation are understood to depend heavily on the linkages or transmission effects between firms and between sectors, rather than just activities within firms or sectors.

There is now widespread evidence that certain regions are systematically more disposed towards innovation than others, and some observers have related innovation to employment or population density.

Regional differences in innovation performance still tend to be very marked and persistent. Any policy initiatives are, or should be, able to respond to these regional innovation variations also depends on the

	<p>nature of knowledge spillovers, knowledge transactions and knowledge exchanges.</p> <p>Many modern innovation policy interventions are designed to overcome some of systems configuration failures, which consist in market failures and system failures related to both insufficient knowledge exchanges and also institutional weakness.</p> <p>Innovation should be approached differently, depending on the country.</p> <p>For countries with high frontier technology creation potential and a strong institutional framework, the promotion of innovation clusters should be the priority; in a weaker but improving institutional context the priority should be on improving the value added of natural resources wealth and the technology commercialization, while in very weak institutional contexts the priority should be leveraging 'pockets of dynamism'.</p> <p>In the paper have been grouped examples of modern regional innovation policy intervention, used as case studies in this paper.</p> <p>A final issue in modern regional innovation policy recently is the question of how to choose priorities.</p> <p>The Smart Specialization approach is a policy prioritization agenda for regional innovation policy which emerged in non-spatial innovation policy debates and which now has been applied in an explicitly regional context.</p> <p>This approach is specifically targeted for regional development. It aims to emphasize technological and skills diversification, the promotion of cross-sectorial linkages and the building of multi-stakeholder and multi-institutional policy frameworks.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>Within the objectives of the WP1, it is expected to produce a new concept of cluster, more social and local oriented.</p> <p>In the paper, there is a comparison between the concept of USA and European policy and clusters.</p> <p>The policy agenda in Europe tends to be rather broader than in USA, where 'clusters' are still seen largely in sectorial terms, whereas in Europe, regional innovation systems tend to be understood more along the lines of the regional innovations systems literature, of which regional sectorial clusters are one possible manifestation amongst many.</p> <p>The smart specialization agenda aims to link most of the themes already described in this paper into a coherent policy framework, seeking to link innovation promotion to questions of transparent and appropriate governance systems.</p>

<b>Title</b>	<b>Smart specialisation strategies in south Europe during crisis</b>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/>		
Author(s) name (s) (full)	Nicos Komninos, Bernard Musyck and Alasdair Irain Reid.		
Year	2014		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	European Journal of Innovation Management, Vol. 17 no. 4 pp. 448 - 471		
Link to Publication	<a href="http://dx.doi.org/10.1108/EJIM-11-2013-0118">http://dx.doi.org/10.1108/EJIM-11-2013-0118</a>		
Keywords as they appear in the document	Innovation, Specialisation, Strategy, Regions.		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	RIS3 designs in Greece during a crisis of the development model (paragraph 2) Discussion: smart specialisation as a driver of structural productive change (paragraph 5)		
Level	National	Regional	Local
		✓	
Case Study if indicated in the paper (Y)	The case of Greece; the case of Cyprus; the case of Slovenia.		
Research Method applied	<input type="checkbox"/> Quantitative Method (if yes specified)		
	<input checked="" type="checkbox"/> Qualitative Method (if yes specified)		
	<input type="checkbox"/> Mixed approach (if yes specified)		
<b>Key sectors</b>			
✓	Smart Specialisation Strategies		
✓	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.		
	Cluster Economic Development		
	Cluster Policy		
	Social Innovation		
	Place-Based Approach		
	Territorial milieu		
	Spatial Planning		

✓	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
✓	Urban competitiveness
	Governance and cluster
Note:	<p>Smart specialization strategies are the main theme on which is focused the paper. They are conceived as a mixture of production areas, R&amp;D, and innovation specialisation, allowing to the less favoured regions to catch-up with most technologically advanced regions.</p> <p>Urban cluster is a key sector linked to cluster development theory and with regional specialisation. This method is used for identifying which sector is the most performing. This examination of the sectors recognized is essential so as to specify, as precisely as possible, market places which would offer the most potential. Afterwards, the regions must define cross-cutting technologies for the priority sectors and niche markets identified.</p> <p>Competitiveness is an underlying condition for an effective RIS3 policy. Important drivers of competitiveness for key businesses and industries are technologies, skills and competences, foresight on future trends, emerging markets. Regaining competitiveness through diversification of the products and international markets and high-quality product and services is a fundamental challenge of the EU smart growth strategy and the new regional development policy of smart specialisation.</p>
<b>Reference Typology</b>	
✓	Theory
	Methodology
	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	The typology of this paper can be classified as theory, although it has both practical and theoretical significance. It focuses on the main challenges of smart specialisation and offers guidance in the elaboration of RIS3 in peripheral European Union (EU) economies. Conversely, it offers a model for the entrepreneurial discovery process, based on the assessment of areas and futures of productivity and added-value intensification, as productive diversification and crisis exit path.
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
	Economic Development
✓	Governance
✓	Local innovation process
✓	Public Policy
	Others

	<p>Governance issues are linked with the elaboration of RIS3 in the three south European countries (Greece, Slovenia, and Cyprus) explained in this paper. The cases studies are created on the direct participation of the authors in assessing the progress of RIS3. They are planned around key aspects of the smart specialization perspective, such as the choice of areas for specialization, innovation drivers, and bottom-up governance and private sector leadership.</p> <p>Note: The local innovation process linked to regional RIS3 relies on two steps: identify research infrastructures, ICT and selected key enabling technologies and make these technologies widely available in order to start the production of goods and the provision of services.</p> <p>Public Policy is also a relevant reference field of interest because RIS3 is conceived as a new regional development policy of 2014-2020 opens the way towards more expanded policies and solutions.</p>
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**Reference Keywords according with the MAPS-LED Project**

Key words (three to five keywords selected within the list below)

	Territorial milieu
	Social networks
	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
✓	Governance schemes
✓	Innovation
	Smart technologies
	Local value chain
✓	PPP
✓	Competition
	Clusters

Notes :

Governance schemes and innovation are the key features of the smart specialization perspective, together with private sector leadership.

An important goal for the governance schemes within RIS3 is to sustain technologies and marketable innovations in the specialisation fields. This necessitates a drastic reorganisation of the knowledge and innovation system.

Public-private partnerships are closely related to policy-maker's credibility, and with their expertise they can bring value added to the process rather than having a mere role of power inside the process.

Competition is linked to Competitiveness, which is faced in the paper, as an outcome that can be achieved thru innovation and diversification, but also as a goal to attain in order to catch-up with most advanced and high-tech countries.

**Synthesis and Comments**

<p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>The paper evaluates the setting of regional and national authorities in south-east Europe during the crisis about research and innovation strategies for smart specialisation (S3).</p> <p>Evidence on smart specialization efforts is carried out by means of three case studies: Greece, Slovenia and Cyprus. The Southern European area has encountered deterioration of competitiveness due to wrong policies of governments, which tended to offer liquidity and loans beyond the refund capacity of recipients. The fundamental step of the EU smart growth strategy is to regain competitiveness, diversification of production and internationalization of the market. The smart specialization focus is not a return to Ricardian theory of comparative advantage, nor it is just a mere industry specialization but it is a mix of production areas, R&amp;D, innovation specialization which helps less favored regions to catch-up with more tech-advanced regions.</p> <p>Greece coped with a double bottleneck due to low competition with products coming from low-cost countries and also against high quality products from developed markets. Since 2007 a series of studies addressed the question whether the Greek Economy should concentrate the production and in which technology specialize. A critical mass and potential for innovation is detectible in the agro-food sector, tourism in the islands and knowledge-intensive services in the two metropolitan regions. Further examination of the identified sectors is required to accurately specify market niche which would offer the most potential. Afterwards, the regions should define cross-cutting technologies for the priority sectors and niche markets identified. The ongoing Greek challenge is to identify research infrastructures, ICT and selected key enabling technologies, and to make these technologies widely available to become products and services. The central objective of RIS3 governance is to support technologies and marketable innovations in the specialization fields. This requires a radical reorganization of the Greek knowledge and innovation system.</p> <p>Slovenia situation improved after independence and EU accession in 2004. A political crisis contributed in 2013 to a slow public sector reaction to global and domestic challenges. Technology based sector continue to decline in year-on-year terms, and output in metal and electricity industries also declined slightly. The dispersion in per capita GDP has not been accompanied by income inequalities, due to a big commuting from suburbs to central regions, which however will not be a sustainable situation for the economy in the long run. Slovenian R&amp;D and innovation policy required more emphasis and critical mass by giving priority to a limited number of areas of existing and emerging and technological and business strengths. The main problem is not the absence of a fitting policy-mix but the implementation and organization of research and innovation policies. After all, Slovenian practice with European funds has been positive, though still there is a huge potential of collaborations with neighboring countries like Austria, Hungary, Croatia and Italy which can become important business partners. Regions in south Europe can develop different specialization</p>
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	<p>scenarios from the diversification of leading sectors. There is a urgent need to foster the development of “innovation platforms”, and PPs and financial engineering tools are the building blocks of these innovation platforms.</p> <p>Financial sector must pay attention to fund the application of Key Enabling Technologies on a multi-sectorial basis and innovative industrial and knowledge based service firms.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>Within the objectives of the WP1, it is expected to produce a new concept of cluster, more social and local oriented. It is interesting the Slovenian RIS3 approach which takes into account “related variety” as priority setting is based on expertise and technology know-how rather than a mere selection of sectors or clusters. RIS3 as a new regional development policy of 2014-2020 open the route towards more diversified solutions, among them there is open and social innovation for implementing productive transformation.</p>

## 1. Literature reference

<b>Title</b>	<i>Guest editorial on research and innovation strategies for smart specialisation in Europe</i>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/>		
Author(s) name (s) (full)	Mikel Landabaso		
Year	2014		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	European Journal of Innovation Management, Vol. 17 Iss 4 pp. 378 - 389		
Link to Publication	<a href="http://dx.doi.org/10.1108/EJIM-08-2014-0093">http://dx.doi.org/10.1108/EJIM-08-2014-0093</a>		
Keywords as they appear in the document	Smart Specialization, Industrial policy, Practice, Research, Innovation, Competition		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	Good governance and RIS3 (paragraph 2) Progress in theory building through policy experimentation: entrepreneurial discovery as RIS3 DNA (paragraph 4) Smart specialization: pending issues and way forward (paragraph 5)		
Level	National	Regional	Local
		✓	
Case Study if indicated in the paper (Y)	Basque Country Innovation Policies; RIS3 in UK; The case of the Netherlands; The case of Malta; the case of Greece; the case of Cyprus; the case of Andalucia		
Research Method applied	<input type="checkbox"/> Quantitative Method (if yes specified)		
	<input checked="" type="checkbox"/> Qualitative Method (if yes specified)		
	<input type="checkbox"/> Mixed approach (if yes specified)		
<b>Key sectors</b>			
✓	Smart Specialisation Strategies		
✓	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.		
	Cluster Economic Development		
	Cluster Policy		



	Social Innovation
✓	Place-Based Approach
	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
	Urban competitiveness
	Governance and cluster
Note:	<p>Smart specialization is the main sector to which belongs the paper. It is intended as a process of priority-setting in national and regional research and innovation strategies so as to build “place-based” competitive advantages and help regions and countries develop an innovation-driven economic transformation agenda.</p> <p>The paper deals with new perspectives for planning Science Technologies and Innovation policies.</p> <p>RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan is the key sector in which are proposed new policy approaches.</p> <p>The third key sector of the paper is Place-based approach, which in this case takes shape as RIS3. A place-based approach in RIS3 implicitly identifies the significance of entrepreneurship and innovation as key drivers for regional development. Moreover, efficient national innovation systems need regional innovation policies developed in a bottom-up way through RIS3.</p>
<b>Reference Typology</b>	
✓	Theory
	Methodology
	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	<p>The typology of this paper can be classified as theory, since it makes also a summary of the history of theory starting from Dominique Foray which for first clearly established the centrality of the concept of entrepreneurial discovery in defining RIS3.</p> <p>After that initial stage, have been made many progresses in theory building through policy experimentation. Entrepreneurial discovery as RIS3 is the essential phase of RIS3 driving processes in the economic transformation in a regional economy.</p>
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
	Governance

✓	Local innovation process
✓	Public Policy
	Others
Note:	<p>Economic development in the paper is treated as a major field of interest. This paper defines and discovers the methods and prospects for smart specialization to lead innovation and economic development.</p> <p>Local innovation process is another main field of interest, since RIS3 is a process based on research and innovation strategies to build “place-based” competitive advantages. Regions and localities can gain from this innovation process, by means of a transformation agenda which core target is to develop an innovation-driven economy.</p> <p>Public policy is the third main reference field, as RIS3 can be seen as a new policy approach, with multi-sectorial methodology, in the industrial field but not only. Universities, spin-offs and education entities are also involved in this process, which can also result as a successful crisis exit strategy for non-leading countries such as the south European ones, strongly hit from the last economic crisis.</p>
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
	Social networks
✓	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
	Governance schemes
✓	Innovation
	Smart technologies
	Local value chain
	PPP
✓	Competition
	Clusters
Notes :	
<p>The technologies that are intended to be enabled in the paper face a double challenge, to define R&amp;I infrastructures, and key-enabling technologies, including ICT as drivers of industry diversification and to make these technologies diffuse widely throughout the economic tissue.</p> <p>Innovation is a keyword for the paper because the promotion of innovation can have positive outcomes like the creation of jobs. Furthermore, Innovation specialisation together with R&amp;D enables the less-favoured regions to catch up.</p> <p>Competition is an important keyword because it increases the incentive to innovate and is linked to the presence of specialization.</p>	

## Synthesis and Comments

Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.

The paper discusses the new policy of Research and Innovation Strategies for Smart Specialisation (RIS3) across Europe.

S3 is supported by European Union as an ex ante conditionality for all Regions to receive structural funds in the field of innovation.

Globalisation has brought to the table new challenges. One of them in European regions is to increase the long-term productivity of the economies through the creation of business environments which are also innovation-friendly. The new place-based industrial policies are intended for modernising, diversifying and exploring new areas of economic activity through research and innovation, from advanced manufacturing.

There is at the moment a critical need of new forms of public entrepreneurship and a fast improvement of effective innovation policies, targeting the real economy and focusing on sustainable jobs.

The Basque country started to modernize industrial policies in the 80s driven by the pressure of industrial reconversion.

“Over-institutionalization” is found in many less favored regions, can be seen as a limiting factor in the design and implementation of RIS3 as an economic transformation policy tool. The historical prejudice towards technology and applied research acted as a barrier to a reformed STI system.

In the case of the UK the lack of an appropriate and regional differentiated governance structure, affects the capacity to conduct efficient smart specialization strategies.

The Netherlands case is used to illustrate a country which, unlike the UK, has strong sub-national governments, but in which the national government responsible for innovation policy has largely taken a space-blind logic, sectorial in concept and top-down in governance instructions.

The Netherlands case is different than the UK, because there is a strong presence of national governments, but in which the national government responsible for innovation policy has largely taken “a space-blind logic, sectorial in concept and top-down in governance instructions”.

Malta is a good case study to measure the degree to which the economic transformation potential of smart specialization strategies can make a small island internal market stronger against external shocks and more competitive to non-conventional island activities such as health, aviation, and high-added value manufacturing.

RIS3 can be seen as a unique economic opportunity and not only a promising innovation policy procedure which deserves further research attention as well as bold practical experimentation, also to help improve badly needed public entrepreneurship in the field of research and innovation.

<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>Within the objectives of the WP1, it is expected to produce a new concept of cluster, more social and local oriented.</p> <p>Inter-cluster innovation opportunities come out from this methodology of RIS3 which also proposes new visions and opportunities for cooperation among international players, like clusters, sectors or R&amp;I capacities, pointing at new possibilities.</p>
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Title		<i>Global Value Chain Analysis</i>		
Source Typology	Book <input type="checkbox"/>			
	Paper <input type="checkbox"/>			
	Other <input checked="" type="checkbox"/> (Presentation – Eurostat Seminars)			
Author(s) name (s) (full)	Louis Brennan			
Year	2014			
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Eurostat Seminar: Global value chains and economic globalization: The Eurostat initiative. Presentation consisting of 34 pages.			
Link to Publication	<a href="http://s3platform.jrc.ec.europa.eu/documents/10157/542125/L.Brennan_Dublin_3July2014.pdf">http://s3platform.jrc.ec.europa.eu/documents/10157/542125/L.Brennan_Dublin_3July2014.pdf</a>			
Keywords as they appear in the document	-			
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	4.GVCs and Smart Specialization			
Level	National	Regional	Local	
	✓			
Case Study if indicated in the paper (Y)	Are case studies addressed in the reference? If yes specified The Biopharmaceutical Industry in Ireland			
Research Method applied	<input type="checkbox"/> Quantitative Method (if yes specified)			
	<input checked="" type="checkbox"/> Qualitative Method (if yes specified)			
	<input type="checkbox"/> Mixed approach (if yes specified)			
<b>Key sectors</b>				
✓	Smart Specialisation Strategies			
✓	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.			
	Cluster Economic Development			
	Cluster Policy			
	Social Innovation			
	Place-Based Approach			

	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
	Urban competitiveness
	Governance and cluster
	Competitive Advantage
Note:	<p>Smart specialisation strategies are linked with Global Value Chains.</p> <p>A certain amount of Value added can be captured by means of joining a phase of a GVC. In this way can be created jobs, the income of an area can increase, technology can be diffused throughout the population and can occur sustainable development.</p> <p>A demonstration of smart specialization in action via GVC has been given by the Ireland's Biopharmaceutical industry, using a holistic approach to development.</p>
<b>Reference Typology</b>	
	Theory
	Methodology
✓	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	This paper can be classified as Best Practices because the relation of Global Value Chains with Smart Specializations and the example offered by the Irish biopharmaceutical industry can suggest lesson for other regions.
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
	Governance
✓	Local innovation process
	Public Policy
	Others
Note:	<p>The economic development approach of a Global Value Chain is not the usual one. It is determined by trade and competitiveness, and country do not necessarily have to develop a vertically integrated industry to participate in a global trade, since they just need to develop some capacities in specific segments or stages of production.</p> <p>The Local Innovation process can be fostered through an efficient manufacturing sector, which needs effective and competitive services as well as a skilled workforce</p>

	and continuous innovation in products, processes and business models. This can be done joining a Global Value Chain.
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
	Social networks
	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
✓	Supply chains
	Governance schemes
✓	Innovation
	Smart technologies
	Local value chain
	PPP
	Other:
Notes :	
<p>The paper deals with Supply Chains, which are the core of the document. Supply chain is a synonym of Value Chain. In the document are also explained the implications of Global Value Chains (GVCs), the flows of GVCs and their basic concepts, the indicators for representing global Value chains and the relation with Smart Specialization.</p> <p>Innovation is another important keyword of the document, since it is linked to Global Value chains, as it is an outcome from the process of joining a global value chain.</p>	
<b>Synthesis and Comments</b>	
<p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>Value Chains are defined as all the activities for bringing a product from producer to the consumer, such as designing, production, marketing, distribution and support to the consumer.</p> <p>Value Chain activities can create goods or services. They are called Global Value Chains (GVC) when are divided among diverse firms spread across different geographic areas of the world.</p> <p>During the last years, emerged major paradigm changes: the change of strategic framework, from countries to firms and GVCs, and the change of economic framework, from industries to tasks and business services, such as intermediations, R&amp;D, logistics and marketing, which are crucial for producing higher value added manufactures.</p> <p>Growing global value chains means that a country's export can increase intermediate exports.</p> <p>GVCs are linked with Smart Specialization: the ability of a country to participate in global trade and benefit from the transfers is related to its capability to identify its best position in GVCs.</p>

	<p>Joining GVCs can have different positive outcomes: Improving the connectivity with international markets, improving business and fostering innovation.</p> <p>The value added along the GVC is not always the same. It changes along the different stages, with a U-shaped curve called “the smiling curve”. Highest Value added is registered in initial phases of R&amp;D and design and in the last phases of the product, Marketing and Services. Less value added is created in the central phases: Logistics and production.</p> <p>With the passing of the time the gap between the value added generated from pre- and post-production activities and production activities is increased, if we compare the value chain in the 70s and the current value chain (OECD, 2013).</p> <p>The regional dimension is essential. Integrated regions are more attractive to GVC lead firms. Anyway, the objective is not essentially to develop an integrated industry, but to capture a significant part of the chain’s value added.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>Within the objectives of the WP1, it is expected to produce a new concept of cluster, more social and local oriented. In this paper the closest concept of social resides inside the link between Global value chains and Smart Specialisation as an inclusive strategy.</p> <p>An implementation of a certain industry or service inside an area with the linked participation in GVCs can result in a capture of a certain amount of value added, in terms of jobs, income, technology diffusion, sustainable development. All these outcomes in turn can be seen as social and local oriented outcomes of a Smart Specialisation Strategy.</p>



Title		<i>Green industrial policy</i>		
Source Typology	Book <input type="checkbox"/>			
	Paper <input checked="" type="checkbox"/>			
	Other <input type="checkbox"/> (i.e. web, report study, etc..) if yes specified			
Author(s) name (s) (full)	Dani Rodrik			
Year	2014			
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Oxford Review of Economic Policy, Volume 30, Number 3, 2014, pp. 469–491			
Link to Publication	<a href="http://oxrep.oxfordjournals.org/content/30/3/469.full.pdf">http://oxrep.oxfordjournals.org/content/30/3/469.full.pdf</a>			
Keywords as they appear in the document	Green growth Industrial policy			
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	The case for green industrial policy: strong in theory, ambiguous in practice (paragraph II) Better rules for industrial policy (paragraph IV)			
Level	National	Regional	Local	
		✓		
Case Study if indicated in the paper (Y)	Solyndra case - solar cell manufacturer Tesla motors case			
Research Method applied	<input type="checkbox"/> Quantitative Method (if yes specified)			
	<input checked="" type="checkbox"/> Qualitative Method (if yes specified)			
	<input type="checkbox"/> Mixed approach (if yes specified)			
<i>Key sectors</i>				
	Smart Specialisation Strategies			
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.			
	Cluster Economic Development			
	Cluster Policy			
	Social Innovation			
	Place-Based Approach			
	Territorial milieu			
	Spatial Planning			

	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
✓	Urban competitiveness
	Governance and cluster
Note:	The competitiveness issue in the paper is treated as something that can be improved by industrial policy. Subsidizing investment in home technologies can shift rents from foreign producers in imperfectly competitive industries. Boosting green industries in this sense is done for competitive reasons.
<b>Reference Typology</b>	
	Theory
	Methodology
	Best Practices
	Guidelines
✓	Policy Analysis
	Others
Note:	The typology of this paper can be classified as policy analysis, since the key objective of this paper is to show how the practice of industrial policy can be improved by designing institutional frameworks that counter both informational and political risks.  It is provided a brief overview of the range of green industrial policies already in place in the United States, Germany, China, and Japan, then is discussed a specific instance of industrial support that ended up in failure, and argue that the real lessons are quite different from those that are conventionally drawn. Then are provided some general guidelines about the design of industrial policy.
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
	Governance
✓	Local innovation process
✓	Public Policy
	Others
Note:	Economic development in the paper is treated as a major field of interested in which is embedded the green growth, based on the sustainable use of non-renewable resources and that fully internalizes environmental costs, including most critically those related to climate change.  Local innovation process is spurred with many types of collaboration, like deliberation councils, regional collaborative innovation centers, investment councils, and private-public venture funds.

	Public policy in the paper has a key role, expressed as industrial policy. The paper aims at showing how the industrial policy can be improved with better designed institutional frameworks.
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
	Social networks
✓	Enabling technologies
✓	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
	Governance schemes
✓	Innovation
	Smart technologies
	Local value chain
	PPP
	Competition
	Clusters
<p>Notes :</p> <p>The technologies that are intended to be enabled in the paper are green technologies, which lower social costs and that economize on exhaustible resources and emit fewer greenhouse gases.</p> <p>Enabling green technologies which are environmentally friendly can be actually advantageous from a national standpoint. Such policies are viewed as providing broad-based technological capabilities, a head-start, and, in new industries, competitive advantage in global markets, and well-paying jobs.</p> <p>In the paper are discussed important law profiles and policies across four great world economic powers: United States, China, Germany and India.</p> <p>Innovation is an outcome that can result from a well-designed policy. Currently, all the countries that want to become global leaders in developing and manufacturing cutting-edge clean technologies have the duty of pursuing the growth in the renewable energy sector, trying to spur innovation and investment in the nation's energy infrastructure.</p>	
<b>Synthesis and Comments</b>	
Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.	<p>The paper shows how industrial policy can be improved by designing stronger institutional frameworks. Green growth can be seen as part of the economic development, based on the sustainable use of non-renewable sources, which in turn fully internalizes environmental costs.</p> <p>The development of new technologies generates positive spillovers that are not fully captured by the original investors.</p> <p>A reason why green technologies may need to be publicly subsidized is that carbon is significantly mispriced. The benefits</p>

of carbon abatement represent the conventional public good, producing strong incentives for individual countries to free ride on others' efforts. Government support for green is flourishing, both in advanced and emerging economies.

Historically, industrial policy worked in many places in East Asia to foster structural change and new industries, while in advanced countries and many developing countries it remains synonymous with good money spent after bad.

However, government funding has played a key role in developing important industries in US such as Silicon valley and Biotechnology. Every key technology in the iPhone for instance, has benefited from public funds.

The case against industrial policy comes in two forms: governments do not have the information needed to make right choices and governments inviting political manipulation by well-connected firms and lobbyists. Industrial policy became driven by political instead of economic reasons.

It is needed a set of mechanisms recognizing errors and consequently revising policies.

Governments have been reticent in reducing GHG emissions and establishing other steps that would prevent disastrous climate change.

The concept of green growth has produced the idea that policies that promote environment protection are advantageous from a national standpoint. From a quick overview of existing programs in China, US, Germany and India, it emerges that Germany and China have the most aggressive policies, with supports of funds on wind energy, PV systems, renewable energies and climate protection initiatives.

A study case taken as an example of failure in US is Solyndra, PV cells firms which bankrupted after government funding because it relied on a technology that was cheaper at the time of the firm's birth, but that became expensive after few years. Solyndra failure was treated as an indication of a broader problem rather than as something that was within the normal parameters of the program. This was a wrong approach, because the measure of success is not whether some projects fail, but how the portfolio fares overall. A positive example is given by Tesla Motors, the electrical car company which with \$465 of loan from the government, turned losses to a great success.

The reasoning for industrial policies to stimulate green industries is robust.

In all cases there are strong theories justifying policy interventions, but inconclusive empirical evidence on whether policy works on average. The debates now focus on how the requisite policies should be designed.

The matter is if national competitiveness will be translated into subsidies or tariffs. The former expands the global supply of clean technology while the latter restrict it. A practical attitude would enhance the general industrial policies, with policy-

	makers more aware of and better targeted on environmental concerns.
Comments about the possible connection with the specific objectives of the WP1.	<p>Within the objectives of the WP1, it is expected to produce a new concept of cluster, more social and local oriented.</p> <p>In the paper, the industrial policy targeted at green technologies has the aim to lower social costs. If this can take place, all the society can benefit from a policy, from individual to firms, which create clusters. A modern cluster is the one that can fully take advantage from well-designed industrial policies, with minimum pitfalls and maximum spillover.</p>

Title	<i>Study of Industrial Cluster Upgrading on Supply Chain.</i>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input type="checkbox"/>		
	Other <input checked="" type="checkbox"/> Conference Publication		
Author(s) name (s) (full)	Jin Lei		
Year	2009		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	First International Conference on Information Science and Engineering (ICISE). Nanjing, China, Saturday 26th to Monday 28th December 2009. CPS Editor. p. 4502-4505.		
Link to Publication	<a href="http://ieeexplore.ieee.org.ezproxy.neu.edu/stamp/stamp.jsp?tp=&amp;arnumber=5455117">http://ieeexplore.ieee.org.ezproxy.neu.edu/stamp/stamp.jsp?tp=&amp;arnumber=5455117</a>		
Keywords as they appear in the document	Supply chain Industrial cluster Upgrading specialization		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	III. Impact of Supply Chain for Industrial Cluster Specialization Model IV. Upgrading Paths of Industrial Cluster on Supply Chain		
Level	National	Regional	Local
		✓	
Case Study if indicated in the paper (Y)	-		
	<input type="checkbox"/> Quantitative Method		
	<input checked="" type="checkbox"/> Qualitative Method, because of its exploratory approach.		

Research Method applied	It mainly explores the relationships between supply chain and industrial cluster and creates an analysis model about the impact of the development of the first one on the specialization of the second one.
	<input type="checkbox"/> Mixed approach
<b>Key sectors</b>	
	Smart Specialisation Strategies
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.
✓	Cluster Economic Development
	Cluster Policy
	Social Innovation
	Place-Based Approach
	Territorial milieu
	Spatial Planning
✓	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
✓	Urban network
✓	Urban competitiveness
	Governance and cluster
Note:	<p>The paper deals with the relations between supply chain and industrial cluster, which create a model of production organization of particular industries. Industrial cluster focuses on the regional concentration, while supply chain on the network of production, and it also has a key role in the clusters' development.</p> <p>It proposes an analysis model about the specialization theory, through which is possible to conclude that the influence of the supply chain's globalization on the industrial cluster includes the shift from the vertical concentration model, to the distributed concentration; the expansion of the traditional industrial clusters' boundaries; the improvement of the specialized separation of labor; a different configuration of the benefits' distribution within the different parts of clusters, which reduces the competitiveness of the traditional ones. It should upgrade them.</p>
<b>Reference Typology</b>	
✓	Theory
✓	Methodology
	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	<p>The paper opens up by examining the actual trend of economic globalization, in which each node of the supply chain selects the best competitors, and by analysing the different definitions of both the concepts of industrial clusters and supply chain and their relationship.</p> <p>The second part focuses on an analysis model about the impact of the development of supply chain on the specialization of industrial cluster.</p>
<b>Reference Field of interest</b>	

	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
	Governance
✓	Local innovation process
	Public Policy
	Others
Note:	The paper stresses the concept of economic development through industrial cluster's upgrading within the economic globalization context, in a supply chain logic. Corporations within clusters may reduce their costs through a local innovation process to take the competition advantage, or they can improve the production through the agglomeration advantage.
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
	Social networks
✓	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
✓	Assessment models
✓	Supply chains
	Governance schemes
✓	Innovation
	Smart technologies
✓	Local value chain
	PPP
	Others:
Notes: The author of the paper highlights the importance of traditional industrial clusters' upgrading and of improving the competitive advantage of clusters, that should be considered both from the perspective of clusters and supply chain. Clusters, being nodes of the globalized value chain, are part of the global supply chain. A model explores the relation between the development of supply chain and the specialization of industrial clusters. The technology segment can be considered a segment of the supply chain, which has a key role in the development of industrial cluster. It should enable technologies then, because technical innovation is the core competitiveness of clusters, which have to form gradually their own R&D and production.	
<b>Synthesis and Comments</b>	



<p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>Within the new economic globalization context, the traditional industrial cluster model deeply changes.</p> <p>The author polarizes on the prominence of traditional industrial clusters' upgrading and on the refinement of the competitive advantage of clusters, considered both from the perspective of clusters and supply chain.</p> <p>The paper primarily examines the actual trends and definitions of the concepts of industrial clusters and supply chain and their relationship.</p> <p>The first concept highlights the regional concentration, while the second one, with a key role in the development of clusters, focuses on the network of production.</p> <p>In the second part an analysis model about the impact of the development of supply chain on the specialization of industrial cluster is built.</p> <p>With the development of international supply chain, costs of transaction and transportation drop considerably.</p> <p>Companies within industrial clusters may reduce their costs through a local innovation process to take the competition advantage, or they can improve the production through the agglomeration advantage.</p> <p>The model allows to deduct that the influence of the supply chain's globalization on the industrial cluster comprises the shift from a vertical concentration model, to a distributed concentration; the expansion of the traditional industrial clusters' boundaries; the improvement of the specialized separation of labor; a different configuration of the benefits' distribution within the different parts of clusters, which reduces the competitiveness of the traditional ones.</p> <p>With the globalized supply chain, the advantages of the latter ones decline, so their upgrading from the supply chain perspective is fundamental.</p> <p>It should enable a technical research and development, because technical innovation is the core competitiveness of clusters; foster scientific and technical innovation; allow the brand marketing in order to have a bigger market share; accumulate knowledge and technology, because clusters have to form gradually their own R&amp;D and production.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>The concept of Cluster, which exists already for a long time, creates with the supply chain concept a model depending on specific industries.</p> <p>The globalized supply chain gives rise to the shift from a vertical concentration model, to a distributed concentration; the expansion of the traditional industrial clusters' boundaries; the improvement of the specialized separation of labor; a different configuration of the benefits' distribution within the different parts of clusters, which reduces the competitiveness of the traditional ones.</p> <p>They should be upgraded through technical and scientific innovation, brand marketing, knowledge and technology gathering.</p> <p>Clusters' capacity of R&amp;D and brand marketing have turned into their core for competitiveness.</p> <p>The paper does not address the social dimension of clusters, while the local one is addressed through the concept of non-integration production mode, which implies that the production procedures are concentrated in different regions, in order to have a global ideal.</p>



<b>Title</b>	<b><i>Converting smart specialisation into a regional strategy.</i></b>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/> (i.e. web, report study, etc..) if yes specified		
Author(s) name (s) (full)	Jaime Del Castillo, Belén Barroeta, Jonatan Paton		
Year	2011		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	INFYDE Working Paper, Vol.2, n°1, p. 1-7.		
Link to Publication	<a href="http://s3platform.jrc.ec.europa.eu/c/document_library/get_file?uuid=c34b51f8-f9c6-4f17-ae3-8d65560b894e&amp;groupId=11299">http://s3platform.jrc.ec.europa.eu/c/document_library/get_file?uuid=c34b51f8-f9c6-4f17-ae3-8d65560b894e&amp;groupId=11299</a>		
Keywords as they appear in the document	-		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	<ul style="list-style-type: none"> <li>- Smart specialization strategy: the policy</li> <li>- Can all the regions be leaders if they chose correctly their strategy?</li> <li>- Elements to build a smart specialisation strategy</li> </ul>		
Level	National	Regional	Local
		✓	
Case Study if indicated in the paper (Y)	-		
Research Method applied	<input type="checkbox"/> Quantitative Method		
	<input checked="" type="checkbox"/> Qualitative Method, since the research method is mainly exploratory. It develops the concept of smart specialization and does an overview of the necessary key issues and strategies to apply it at the regional level.		

	<input type="checkbox"/> Mixed approach
<b>Key sectors</b>	
✓	Smart Specialisation Strategies
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.
	Cluster Economic Development
	Cluster Policy
	Social Innovation
	Place-Based Approach
✓	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
✓	Urban network
✓	Urban competitiveness
	Governance and cluster
Note:	
<b>Reference Typology</b>	
	Theory
✓	Methodology
	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
	Governance
	Local innovation process
✓	Public Policy <sup>1</sup>
	Others
Note:	1. There is a synthesis about the main elements to build a smart specialization strategy, thus, about how smart specialization configures a policy (showed in the scheme at page 7). It shows the three components of global context, specialization and relatedness, into the three main steps of building a policy, consisting in identification, design and implementation and evaluation and monitoring.
<b>Reference Keywords according with the MAPS-LED Project</b>	

Key words (three to five keywords selected within the list below)	
✓	Territorial milieu
	Social networks
✓	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
	Governance schemes
✓	Innovation
✓	Smart technologies
	Local value chain
	PPP
✓	Others: Regional Competitiveness Turbine

Notes: The regions have to find the specialization that can give them a competitive and comparative advantage over the others, allowing the development of future new activities. It should identify the regional related diversity, to mature new smart technology domains and sectors.

The Regional Competitiveness Turbine relates to a scheme (page 3) which enables to visualize the three aspects of specialization, relatedness and global perspective graphically, as a sum made of three vortices, wh8ich transversal core is the entrepreneurial spirit.

### **Synthesis and Comments**

<p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>The paper provides a theoretical and methodological base for understanding the concept of smart specialization and the issues and strategies necessary to apply it at the regional level.</p> <p>In the first part, it addresses the theory behind the concept of smart specialization, which today is the base for the European regional cohesion policy.</p> <p>Regional Strategies based on smart specialization issues were developed in order to reduce the competitiveness gap between Europe and the United States.</p> <p>The regions have to prioritize sectors and technologies potentially competitive in a global sense that could generate new activities.</p> <p>The three main elements defining the smart specialization are: global context, meaning that the patterns are considered within a global value chain and hold comparative advantages; specialization, referred to the prioritization of efforts that can give competitive advantages; and relatedness, which ensure a related variety.</p> <p>The authors give also the key issues for these elements and combine them graphically, putting the entrepreneurial spirit as a transversal core.</p> <p>Another point of the paper is about how smart specialization converts itself into a policy; the strategies in order to do that may comprehend the three</p>
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	<p>phases of: identification; design and implementation, to realize the strategy; evaluation and monitoring, ensuring learning and continuous processes.</p> <p>It also gives the key issues for these stages.</p> <p>In the last part, a scheme resumes the policy foundations in the past, the present and the future, trying to understand if all the regions can be leaders if they choose correctly their strategy.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>The paper adds to the concept of the technological cluster, the role of the entrepreneurial spirit, as the transversal core for regional growth.</p> <p>Smart specialization strategies comprehend the sum of specialization, plus relatedness and global perspective; thus, competitive advantage, plus the comparative one, plus entrepreneurship.</p> <p>The “regional” scale is the major dimension that the paper addresses and the entrepreneurial spirit is the base for building the smart specialization strategies.</p> <p>The smart specialization strategy should comprehend an initial stage of identification to classify the patterns through a “bottom-up” approach, with a “top-down” support from the government; thus, the authors debate the inclusiveness of the strategies, pointing out, in the key issues for “identification”, the starting point for a discussion about the role of different entities, who could benefit from the whole process.</p> <p>The paper also suggests to look at the territory’s strategic needs and priorities, in order to specialize in specific technological domains and/or sectors, where the region is able to obtain competitive advantages and can prioritize efforts and resources.</p>

<b>Title</b>	<i>Intra-product International Specialization, Global Value Chain and China's Manufacturing Industries Upgrading.</i>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input type="checkbox"/>		
	Other <input checked="" type="checkbox"/> Conference Publication		
Author(s) name (s) (full)	Xiuzhen Li		
Year	2011		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	International Conference on Management and Service Science (MASS 2011). Wuhan, China, Friday 12th to Sunday 14th August 2011. IEEE Publisher. p. 1-3.		
Link to Publication	<a href="http://ieeexplore.ieee.org.ezproxy.neu.edu/stamp/stamp.jsp?tp=&amp;arnumber=5999278">http://ieeexplore.ieee.org.ezproxy.neu.edu/stamp/stamp.jsp?tp=&amp;arnumber=5999278</a>		
Keywords as they appear in the document	Intra-product international specialization global value chain upgrading of manufacturing industry		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	III. Global Value Chain and Industrial Upgrading IV. The value Chain of Manufacturing Industry and the Upgrading of China's Manufacturing Industries		
Level	National	Regional	Local
	✓	✓	
Case Study if indicated in the paper (Y)	China's manufacturing Industries		
	<input type="checkbox"/> Quantitative Method		


Research Method applied	<input checked="" type="checkbox"/> Qualitative Method, since it mainly analyses the Inter-product International Specialization, the Global Value Chain theory and the possibility for countries at the lowest positions to upgrade with an exploratory approach. <input type="checkbox"/> Mixed approach
<b>Key sectors</b>	
	Smart Specialisation Strategies
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.
	Cluster Economic Development
	Cluster Policy
	Social Innovation
	Place-Based Approach
	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
✓	Urban network
✓	Urban competitiveness
✓	Governance and cluster
Note:	<p>The author points out the need for the developing countries to upgrade and specialize at different nodes of the global value chain.</p> <p>It analysis of this latter concept and the process in which its value hierarchy matches the global hierarchy of comparative advantages in the Intra-Product International specialization network.</p> <p>Furthermore, it has been made a value chain governance model examination, linking its changes to the opportunity for enterprise to upgrade.</p>
<b>Reference Typology</b>	
✓	Theory
	Methodology
✓	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	<p>In the first part of the paper, the author explains the main theoretic ideas behind the concept of Global Value Chain and Intra-Product Specialization and the way they are linked.</p> <p>The second part focuses more on industrial upgrading, distinguishing the main four models and discussing the value chain governance model.</p> <p>It ends up by outlining the characteristics of the manufacturing industries of China and their upgrading attempt, from the perspective of intra-product international specialization.</p>
<b>Reference Field of interest</b>	
✓	Spatial dimension



	Social context
	Environmental aspects
✓	Economic Development
✓	Governance
✓	Local innovation process
	Public Policy
	Others
Note:	<p>The economic development is analyzed through the two concepts of global value chain and the intra-product international specialization, two faces of one economic phenomenon.</p> <p>The innovation process is necessary for holding a strategic position within the new internationalization of production, characterized by a spatial decentralization ending with a transnational organization of the production chain.</p> <p>The governance model of the global value chain is studied in relation to the opportunity of upgrading for enterprises.</p>
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
	Social networks
✓	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
✓	Governance schemes
	Innovation
	Smart technologies
	Local value chain
	PPP
	Others:
✓	Global Value Chain
✓	Intra-product International Specialization
✓	Upgrading
<p>Notes: The author of the paper highlights the importance of the technological innovation to support the industrial upgrading process and allow to hold a strategic position within the new emerging context, characterized by the two faces of one economic phenomenon: the global value chain and the inter-product international specialization.</p> <p>The value chain governance model are also linked with the enterprise upgrading process; thus, it depends on the complexity of transaction, the ability to identify information and the one of the suppliers.</p>	
<b>Synthesis and Comments</b>	

<p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>The paper provides a deep framework about the Global Value Chain and the process through which its value hierarchy matches the global hierarchy of comparative advantages in the Intra-Product International specialization network.</p> <p>The last concept refers to a production internationalization, which is spatially decentralized and which leads to a transnational system about the chain of production.</p> <p>Within this global network, the nodes able to create value for the product form its global value chain. The ones with the highest value-added capacity are usually the core nodes.</p> <p>Thus, Global Value Chain and the Intra-Product International specialization are two faces of the same unique economic phenomenon.</p> <p>The author of the paper highlights the importance of the technological innovation to support the industrial upgrading process and allow to hold a strategic position within this new emerging context.</p> <p>Industrial upgrading relates to the inclusion of enterprises into high value-added activities.</p> <p>It is possible to distinguish four models (Table 1, pag. 2) referring to:</p> <ul style="list-style-type: none"> <li>i) Upgrading of process, where the added value can be obtained by new organization ways, lower costs, better transportation system;</li> <li>ii) Upgrading of product, by expanding the market share;</li> <li>iii) Upgrading of function, by enriching higher positions in the value chain;</li> <li>iv) Upgrading in the chain, through a shift into high-performance industries.</li> </ul> <p>Furthermore, the enterprise upgrading process is linked with the value chain governance model and it depends on the complexity of transaction, the ability to identify information and the one of the suppliers. (Fig. 1, pag. 2)</p> <p>Enterprises are included in a dynamic recycling process, thanks to this framework.</p> <p>The paper ends up by polarizing on the characteristics of the manufacturing industries of China and their upgrading attempt, from the perspective of intra-product international specialization.</p> <p>China's economic benefits are inconsistent, despite the large manufacturing volume, so it is within the lowest position of the global chain, mainly because it lacks technologies, brands, capacities of developing new products.</p> <p>It can just narrow the gap with the developed countries by acquiring skills, emulating and innovating; government should create policies to support and boost upgrading strategies and only by dominating the basic technologies, with the means of innovation, it is possible to hold a strategic position in the new context of international specialization.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>The paper addresses the concept of industrial cluster through the ones of intra-product international specialization and global value chain, with are two faces of the same unique economic phenomenon and project the "decentralized international production" in several subject areas.</p> <p>Really often, the core nodes of the global value chain are the ones with the highest value added capacity; this allows to establish a value hierarchy,</p>

	<p>reflected also into the different requirements to the local endowment (the production factors) in the different regions involved in the global economic activities.</p> <p>The author does not address the social dimension.</p>
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Title		<i>Why the World Suddenly Cares About Global Supply Chains.</i>		
Source Typology	Book <input type="checkbox"/>			
	Paper <input checked="" type="checkbox"/>			
	Other <input type="checkbox"/> (i.e. web, report study, etc..) if yes specified			
Author(s) name (s) (full)	Gereffi Gary & Lee Joonkoo			
Year	2012			
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Journal of Supply Chain Management - Vol. 48, Issue 3, p. 24-32.			
Link to Publication	<a href="http://onlinelibrary.wiley.com.ezproxy.neu.edu/doi/10.1111/j.1745-493X.2012.03271.x/epdf">http://onlinelibrary.wiley.com.ezproxy.neu.edu/doi/10.1111/j.1745-493X.2012.03271.x/epdf</a>			
Keywords as they appear in the document	global value chain supply chain management international/global purchasing outsourcing (make or buy) literature survey			
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	 <ul style="list-style-type: none"> <li>- VIEWING THE GLOBAL ECONOMY THROUGH A GVC LENS</li> <li>- BEYOND BUSINESS STRATEGIES</li> <li>- RESEARCH IDEAS FROM THE GLOBAL VALUE CHAIN PERSPECTIVE</li> </ul>			
Level	National	Regional	Local	
	✓	✓		
Case Study if indicated in the paper (Y)	China's economy Large emerging economies			
	<input type="checkbox"/> Quantitative Method			

Research Method applied	<input checked="" type="checkbox"/> Qualitative Method, since it focuses, with an exploratory approach, on the main aspects of Global Value Chain and the link between the two core concepts of governance and upgrading, with a discussion also on the future of GVC analysis.
	<input type="checkbox"/> Mixed approach
<b>Key sectors</b>	
	Smart Specialisation Strategies
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.
	Cluster Economic Development
	Cluster Policy
	Social Innovation
	Place-Based Approach
	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
✓	Urban competitiveness
✓	Governance and cluster
Note:	<p>The author highlights the importance to participate in global value chains and the conditions under which it can contribute to the economic and social upgrading mainly in developing countries.</p> <p>An important issue is to map the “governance structures” of global supply chains, its centerpiece, which often is a mix of different schemes in different parts of the chain and which helps to identify possibilities and obstacles for entering in the industry, fundamental for firms’ competitive strategies.</p> <p>The specialized clustered factories are linked to the suppliers of the key parts and to global buyers.</p>
<b>Reference Typology</b>	
✓	Theory
	Methodology
✓	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	<p>The paper lays on the theory about Global Value Chain, considered a means for studying how the contemporary supply chains internationally expand and spatially divide themselves.</p> <p>The GVC scheme gives a holistic view of global firms from a top-down and a bottom up points of view, which core concepts are respectively “governance” and “upgrading”.</p>

	The new global economy has three main characteristics, like Global Value Chain's consolidation and the new geography shaped by value. Thus, in the second part there is an emphasis on China's economy, which benefited from a high level of concentration within global supply chain, but does not produce or catch most of the value generated thanks to its exports.
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
✓	Governance
✓	Local innovation process
	Public Policy
	Others
Note:	<p>The economic development is addressed through the concept of Global Value Chain, which framework has been adopted by the main international organizations.</p> <p>The global economy is characterized by three main innovative aspects, referred to the global value chains consolidation and the new maps created by value's production and trading, the birth of global supermarkets and private standards in chains driven by buyers, the supply chains' regionalization, and the end markets' relocation towards the developing economies.</p> <p>There is also a study and classification of the governance structure of global supply chains, which helps to understand chances and obstacles of industries, important for competitive strategies.</p>
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
	Social networks
	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
✓	Supply chains
✓	Governance schemes
	Innovation
	Smart technologies
	Local value chain
	PPP
✓	Others: Global Value Chain
✓	Upgrading

Notes: Countries' ability to flourish depends on their role in global supply chains.

The authors focus on the Global Value Chain concept, which became popular and useful for understanding expansion and fragmentation of supply chains and value adding and trading.

They also study the relations between the two main related notions of upgrading and governance.

The first one's focus is on the stakeholders' strategies for maintaining or improving their location within the new economy, while the last one, classified into five forms, shows how corporate power could model profits and risks within industries.

**Synthesis and Comments**

Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.

The paper provides a deep framework about the Global Value Chain concept, which became popular and useful for understanding the international expansion and fragmentation of supply chains and value adding and trading.

The ability of countries to flourish depends on their role within global value chains, thus, it is important to participate and to understand the conditions under which it can contribute to the economic and social upgrading mainly in developing countries.

The GVC scheme gives a holistic view of global firms from a top-down and a bottom up points of view, which core concepts are respectively "upgrading" and "governance".

The first one's focus is on the stakeholders' strategies for maintaining or improving their location within the new economy, while the last one shows how corporate power could model profits and risks within industries.

It is possible to classify five main forms of governance, in which *market* and *hierarchies* are the two extremes about vertical integration, and *modular*, *relational* and *captive* are the in between network concepts, about competition; the latest researches showed that global industries often have a mix of these schemes in different points of global supply chain.

The new global economy is characterized by three main innovative aspects, referred to the Global Value Chain's consolidation and the new geography shaped by value's production and trade; the birth of global supermarkets and private standards in buyer-driven chains; the supply chain regionalization and the relocation of end markets towards the large developing economies like China, India and Brazil.

Regarding the first characteristic, there is an emphasis on China's economy, which benefits from a high level of concentration within global supply chain, but does not produce, nor catch most of the value generated by its exports.

This gap between where final goods are produced and sent abroad and where value is produced and caught, grows with the number of traded intermediate goods.

Overall, there are different issues about GVC requiring detailed understanding and possible future collaborations with global supply chains researchers, like the governance structures, which contribute to identify possibilities and obstacles for entering in the industry, fundamental for firms' competitive strategies.

Other two important issues regard the understanding of where the value is created and caught within the different points of GVC and the question

	about the facilitation of lower-level firms' upgrading, which made global supply chains <i>inclusive</i> , or <i>exclusive</i> .
Comments about the possible connection with the specific objectives of the WP1.	<p>The paper addresses the concept of industrial cluster through the one of global value chain, which focuses on the global expansion of supply chains and the creation and capture of value.</p> <p>A new era of competition emerged thanks to globalization, reshaping production and trade and changing industries' organization.</p> <p>There has been a shift from "producer-driven" supply chains, to "buyer-driven" ones, from a regional production, to a global one, and from global North, to global South.</p> <p>The specialized clustered factories are linked to the suppliers of the main parts and to global buyers.</p> <p>Contemporary researches are now focusing also to the main conditions under which the participation in global value chains could help the emerging economies for an economic and social upgrading.</p> <p>The local markets' knowledge advantage, for developing countries, vanishes when multinationals recover.</p>



<b>Title</b>	<b>Smart specialization concept and the status of its implementation in Romania</b>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/> (i.e. web, report study, etc..) if yes specified		
Author(s) name (s) (full)	Steliana Sandu		
Year	2012		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Procedia Economics and Finance, Vol. 3, 2012, p. 236-242.		
Link to Publication	<a href="http://www.sciencedirect.com/science/article/pii/S2212567112001463">http://www.sciencedirect.com/science/article/pii/S2212567112001463</a>		
Keywords as they appear in the document	Smart specialisation concept Smart specialization strategies Smart priorities financing		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	<ul style="list-style-type: none"> <li>- Smart specialisation – a new concept and instrument of the 2020 EU Strategy</li> <li>- The regional dimension of the Smart Specialization concept – a new base for the recent strategies in the European Union</li> <li>- The strengths and weaknesses in implementing Smart Specialization in Romania</li> </ul>		
Level	National	Regional	Local
	✓	✓	
Case Study if indicated in the paper (Y)	- The paper focuses on the national and regional background, in order to study the smart specialization implementation in Romania		
Research Method applied	<input type="checkbox"/> Quantitative Method		
	<input checked="" type="checkbox"/> Qualitative Method, because the research approach is exploratory. The paper provides also some hypotheses for future quantitative researches, indicating a general indicators system for the evaluation of smart specialization in Europe. This is to demonstrate that smart specialization is measurable.		
	<input type="checkbox"/> Mixed approach		
<b>Key sectors</b>			
✓	Smart Specialisation Strategies		
✓	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.		
	Cluster Economic Development		
	Cluster Policy		

	Social Innovation
	Place-Based Approach
	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
	Urban competitiveness
	Governance and cluster
Note:	
<b>Reference Typology</b>	
✓	Theory
✓	Methodology
✓	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	The first part of the paper deals with the main aspects supporting smart specialisation strategies, considering the Regional dimension of this concept as a new base for the most recent European strategies. It explains also that one of the future methodological developments regards an indicators system and some adequate assessment methods, proposing a first three indicators groups system. The second part lays on the status of smart specialization implementation in Romania, comparing strengths and weaknesses at the National governance level, and the regional one.
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
	Governance
	Local innovation process
✓	Public Policy
	Others
Note:	
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
✓	Territorial milieu
	Social networks
✓	Enabling technologies

✓	Law profiles
	Regeneration strategies
	Urban-rural link
✓	Assessment models
	Supply chains
	Governance schemes
✓	Innovation
	Smart technologies
	Local value chain
	PPP
	Others
Notes :	
<b>Synthesis and Comments</b>	
Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.	<p>The paper seeks to examine the literature about the smart specialisation field, attempting to bring together theory, method and practice of this matter and addressing their application in the Romanian context.</p> <p>The quite new Smart Specialisation concept is seen as a solution to guarantee a fair EU research funds distribution and to focus on the most innovative sectors, which can be attractive, performant, or important from a socio-economic point of view.</p> <p>It underlines the necessity to distinguish between the smart specialisation concept and some other ones, such as R&amp;D specialisation, and to give a more theoretical and methodological consideration to policy makers for its implementation in several R&amp;D, innovation and economic context.</p> <p>Smart Specialisation strategies may represent a fundamental instrument for an efficient allocation of resources.</p> <p>The paper stresses the importance of considering the smart specialisation measurable and of producing aggregate statistics.</p> <p>In order to do so, it provides a first possible step with the provision of a framework of indicators, that may consists of three main groups, describing the potential of the region, its economic situation and the cooperation level between the business environment and the specific R&amp;D sector.</p> <p>The author wants to put forward new challenges to the scientific community of Romania and to the policy makers.</p> <p>He studies the status of smart specialization implementation in Romania, by comparing strengths and weaknesses both at the national and regional level, underlying the fact that there are still many obstacles that many regions should surpass.</p> <p>They have to find some solutions to improve their innovative performance.</p>
Comments about the possible connection with	The paper clarifies that the industrial policy based on cluster concept is a main premise for smart specialization, which clearly

the specific objectives of the WP1.	<p>represents a chance to capitalize on the specific values and features of each region, in order to become competitive.</p> <p>One of the key element of the process, the “entrepreneurial discovery”, has both a bottom up and a top down approach, and the main involved stakeholders have to identify the most promising areas of specialization of a state or a region.</p> <p>Each region has to identify its best assets and R&amp;D potential, to concentrate on a limited number of priorities, that can develop the excellences and make possible the competition in the global economy.</p>
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<b>Title</b>	<b><i>Smart Specialization a Possible Solution to the New Global Challenges.</i></b>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/> (i.e. web, report study, etc..) if yes specified		
Author(s) name (s) (full)	Margareta Rusu		
Year	2013		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Procedia Economics and Finance, Volume 6, p. 128–136.		
Link to Publication	<a href="http://www.sciencedirect.com/science/article/pii/S221256711300124X">http://www.sciencedirect.com/science/article/pii/S221256711300124X</a>		
Keywords as they appear in the document	Wood processing industry Smart specialization R&D Innovation		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	4. Smart Specialization in Europe, pp. 131-133 5. Smart Specialization in Romania, pp. 133-134 6. Smart Specialization in the context of climate change mitigation, pp. 134-135		
Level	National	Regional	Local
	✓	✓	
Case Study if indicated in the paper (Y)	- The Country of Romania		
Research Method applied	<input type="checkbox"/> Quantitative Method		
	<input checked="" type="checkbox"/> Qualitative Method, because the research approach is primarily exploratory. After a general excursus on the concept of smart specialization, the article focuses on the situation both in Europe and in the country of Romania.		
	<input type="checkbox"/> Mixed approach		
<b>Key sectors</b>			
✓	Smart Specialisation Strategies		
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.		

	Cluster Economic Development
	Cluster Policy
	Social Innovation
	Place-Based Approach
✓	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
✓	Urban competitiveness
	Governance and cluster
Note:	
<b>Reference Typology</b>	
✓	Theory
✓	Methodology
	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	Within the theoretical excursus about the concept of smart specialization in Europe and especially in the country of Romania, the author also suggests to put its strategies in the context of the climate change mitigation and to improve R&D and innovation. Furthermore, there are some attempts to measure smart specialization.
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
	Governance
	Local innovation process
✓	Public Policy
	Others
Note:	The paper is important mainly for the selected fields of interest. It focuses on the concept of smart specialization in Europe and in the country of Romania and its use for enabling an oriented policy agenda and for mitigating climate change consequences.
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
✓	Territorial milieu

	Social networks
✓	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
✓	Assessment models
	Supply chains
	Governance schemes
✓	Innovation
	Smart technologies
	Local value chain
✓	PPP
	Others:

Notes: The study suggests to link better research and innovation, creating public-private research partnerships and finding smart specialization solutions.

It puts the S3 in the context of climate change mitigation, where there is a need to improve R&D and innovation, enabling technologies and strengthening the Romanian wood processing industry, which is a well-known tradition in the country.

The author also points out the necessity of measuring smart specialization, through indicators systems, also for better assessing it.

**Synthesis and Comments**

<p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>The paper provides a base for better understanding the concept of smart specialization, within the strategy Europe 2020, as a key answer to avoid the European’s research funds dissipation and to focus on the most attractive, innovative, competitive and strategic sectors.</p> <p>It is necessary to make smart specialization measurable, through indicators systems, also for better assessments.</p> <p>A key element of smart specialization is the “entrepreneurial discovery”, a process both “bottom up” and “top down”, which allows to identify the most promising areas of specialization of a region and to capitalize on them.</p> <p>Research efforts in Europe are increasing, taking into account the fact that until now many European countries have specialized in sectors that even do not need any additional R&amp;D.</p> <p>R&amp;D plays a crucial role in transforming the specialization of countries and in modernising the traditional sectors, enabling their shift into the ones of the knowledge economy; investing in the “D” is fundamental for the whole increase of a particular area.</p> <p>The European commission is encouraging national and regional authorities to put smart specialization at the core of their strategies; it also has launched a Platform to support the members to define, assess and develop strategies and competitive advantages. It establishes the main involved actors and is based on the partnerships among them.</p>
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	<p>By integrating policies and European funds Europe will better turn knowledge into innovation.</p> <p>Looking at the situation in Romania, new financing instruments have been laid down, to improve the competitiveness and the technologic and economic performances of the companies.</p> <p>The improved regulatory framework has facilitated the route for S3 and the sectors were identified making an analysis of the regional potential.</p> <p>One of the most traditional Romanian sectors is the art of crafting and processing wood and this sector could add value to the regional economy and create jobs.</p> <p>Furthermore, it is possible to put the S3 into the context of the new Global Challenges, like the fight against climate change, which require an improvement of R&amp;D and innovation, mainly in the forest based industries.</p> <p>Romania should reinforce its competitive position in the wood processing industry, facing Globalization, thus, research and innovation have to be more linked, creating public-private partnerships, innovation funds have to get closer to the policy objectives.</p> <p>Both Europe and Romania have to increase their performances in transforming research and innovation funds into their application. This requires a broader support of the full innovation cycle.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>The “national” and the “regional” scale are the major dimensions that the paper addresses and the entrepreneurial discovery process, a bottom-up and top-down process is considered the key element for building the smart specialization strategies, which necessarily have to be measured through indicators systems.</p> <p>Each area has to identify a limited number of priorities where it can excel and compete, taking into account the specific conditions of the place, like in the case of the wood processing industry in Romania, that has a well-known tradition.</p> <p>It is necessary to act through a bi-dimensional process (bottom up and top down), where all the involved actors are protagonists with their expertise and proceed with strong public-private partnerships.</p>



Title		<i>What's next in researching cluster policy: place-based governance for effective cluster policy</i>		
Source Typology	Book <input type="checkbox"/>			
	Paper <input checked="" type="checkbox"/>			
	Other <input type="checkbox"/> (i.e. web, report study, etc..) if yes specified			
Author(s) name (s) (full)	Miranda Ebbekink & Arnoud Lagendijk			
Year	2013			
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	European Planning Studies - Vol. 21, Issue 5, p. 735-753.			
Link to Publication	<a href="http://www.tandfonline.com/doi/abs/10.1080/09654313.2013.734460">http://www.tandfonline.com/doi/abs/10.1080/09654313.2013.734460</a>			
Keywords as they appear in the document	-			
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	<ul style="list-style-type: none"> <li>- The Search for "Policy Leverage": A Return to Efficacy</li> <li>- Towards a "Place-Based" Model of Cluster Governance</li> <li>- The Prominent Role of "Civic Entrepreneurs"</li> </ul>			
Level	National	Regional	Local	
		✓	✓	
Case Study if indicated in the paper (Y)	- The Spanish region (autonomous community) País Vasco			
Research Method applied	<input type="checkbox"/> Quantitative Method			
	<input checked="" type="checkbox"/> Qualitative Method, because it uses an exploratory approach, since it mainly compares some cluster policy analysis.			
	<input type="checkbox"/> Mixed approach			
Key sectors				
	Smart Specialisation Strategies			
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.			
✓	Cluster Economic Development			
✓	Cluster Policy			
	Social Innovation			
✓	Place-Based Approach			

	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
	Urban competitiveness
✓	Governance and cluster
Note:	
<b>Reference Typology</b>	
	Theory
	Methodology
	Best Practices
	Guidelines
✓	Policy Analysis
	Others
Note:	
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
✓	Governance
	Local innovation process
✓	Public Policy <sup>1</sup>
	Others
Note:	1. There is a comparison between the current norm in terms of Cluster Policy of the “Cluster Building” and the alternative policy rationale of “Policy Leverage” (showed in Table 1. – pp. 738).
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
	Social networks
	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains

✓	Governance schemes
✓	Innovation
	Smart technologies
✓	Local value chain
✓	PPP
	Others
Notes :	
<b>Synthesis and Comments</b>	
Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.	<p>“Cluster policy” is still an open debate. Local cluster policies are popular and had a rapid development, but tend to suffer from ineffectiveness, probably because of the way policies have been inserted into the specific rationale named from Feser (2008) “cluster building”, which currently is the norm and which objective is to build specific regional innovation clusters by concentrating public resources by sector and location.</p> <p>The paper proposes the alternative rationale of “policy leverage”, already provided by Feser, which prime goal is the Local Economic Development, mixing the specific expert knowledge, instead of the cluster growth target of the former policy. A greater efficacy of the existing policies in this way may lead to cluster economic development.</p> <p>Another suggestion of the paper is a governance model presenting a new approach to intelligence gathering and to collective strategy-making. A bottom-up knowledge process, coupled with qualified external validation, may ensure that policies are designed on the specific needs and priorities of a territory. The proposed model attributes a fundamental role to “civic entrepreneurs” who operate at the interaction point of both public and private spheres, with a neutral role of mediators and integrators, in line with “place-based” approaches.</p>
Comments about the possible connection with the specific objectives of the WP1.	<p>The paper attempts to define a more socially and locally oriented concept of cluster, looking at the territory’s strategic needs and priorities.</p> <p>Through the proposed model of cluster governance, a synergetic public-private collaboration becomes a policy reality.</p> <p>Fundamental here was the coupling of cluster actors and their “strategic intelligence” with a strategic policy development, in order to address the existing barriers, from the administrative point of view, and to allow a refinement by engaging societal stakeholders.</p>

<b>Title</b>	<b><i>On Some Aspects of Territorial Competitiveness: Smart Specialization in the Zlín 2020 Strategy</i></b>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/> (i.e. web, report study, etc..) if yes specified		
Author(s) name (s) (full)	Novosák Jiří, Hájek Oldřich, Zahradník Petr, Nekolová Jana		
Year	2013		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Journal of Competitiveness, Vol. 5, Issue 3, pp. 3-13		
Link to Publication	<a href="http://www.cjournal.cz/files/140.pdf">http://www.cjournal.cz/files/140.pdf</a>		
Keywords as they appear in the document	territorial competitiveness smart specialization strategic planning Zlín		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	3.1 Smart specialization in the Zlín 2020 Strategy – analytical part 3.2 Smart specialization in the Zlín 2020 Strategy – strategic part 4. Discussion and Conclusion		
Level	National	Regional	Local
		✓	
Case Study if indicated in the paper (Y)	- The Zlín agglomeration – Zlín, Otrokovice and Vizovice Regions of Czech Republic		
Research Method applied	<input type="checkbox"/> Quantitative Method		
	<input checked="" type="checkbox"/> Qualitative Method, because it has an exploratory approach. It studies the relations between smart specialization and territorial competitiveness in particular within the Zlín agglomeration Development Strategy.		
	<input type="checkbox"/> Mixed approach		
<b>Key sectors</b>			
✓	Smart Specialisation Strategies		
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.		
	Cluster Economic Development		

	Cluster Policy
	Social Innovation
	Place-Based Approach
✓	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
✓	Urban competitiveness
	Governance and cluster
Note:	<p>The paper deals with the relations between smart specialization and territorial competitiveness, two often mentioned concept nowadays.</p> <p>The first one is used as a key to formulate strategic objectives for the economic development of the city together with innovations.</p> <p>Territories have to identify the fields with the highest potential, for future competitive gains, and at the same time consider the traditional territorial structures, within the territorial milieu, as the economic basis.</p> <p>The second one, territorial competitiveness, can be increased by the smart specialization concept, one of its sources.</p>
<b>Reference Typology</b>	
✓	Theory
	Methodology
✓	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	<p>In the first part of the paper there is an excursus on the different approaches and definitions of territorial competitiveness and its relations with the smart specialization concept.</p> <p>The second section discusses the Zlín 2020 strategy in an analytical part defining strengths, weaknesses and opportunities of the area, and a strategic one, which goal is supporting competitiveness of the Zlín agglomeration.</p>
<b>Reference Field of interest</b>	
✓	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
	Governance
✓	Local innovation process
	Public Policy

	Others
Note:	<p>The selected fields of interest are the most relevant.</p> <p>The spatial dimension is addressed through the concept of spatially concentrated specialization, based on innovation, emphasizing the importance of a higher spatial level; thus, it was chosen the approach having as core the innovation-based diversification of traditional, local industries.</p> <p>The authors carried out a qualitative analysis of the Zlín agglomeration, through the evaluation of innovative projects; the results highlight the strong link between innovation and specialization (fig. 3 shows the spatial distribution of financial allocation – pag. 9).</p> <p>Innovations are seen as fundamental in several concepts, like the one of innovative milieu.</p> <p>Within the Zlín 2020 Strategy, the main goal of the thematic area “Economic development and Labour Market” is to support the territory competitiveness in accord with the smart specialization concept, that is considered as a leading notion.</p>
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
✓	Territorial milieu
	Social networks
✓	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
✓	Assessment models
✓	Supply chains
	Governance schemes
✓	Innovation
	Smart technologies
	Local value chain
	PPP
	Others:
<p>Notes:</p> <p>Territories sustain their exclusive knowledge base as the font of both innovation and territorial competitiveness and the activities which mostly absorb and spread the innovations produced are underlined by the smart specialization.</p> <p>Innovations are a key part of territorial development in several notions, like the ones of clusters and innovative milieu and the concept of Smart Specialization is used for creating a driving framework to formulate goals and measures within the thematic area “Economic Development and Labour Market”, on the basis of the assessment of the two themes of innovative environment and territorial specialization.</p> <p>Territories also support the spatial spread of knowledge, through the creation of linkages between different stakeholders, supply chains, etc.</p> <p>They have to identify or enable the technological domains with the highest potential in terms of future competitiveness.</p>	

<b>Synthesis and Comments</b>	
<p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>The paper provides a solid framework for preparing strategic development documents, using the Zlín Strategy as case study.</p> <p>In the first part, there is an excursus on approaches and definitions of territorial competitiveness and a study of its relations with smart specialization, two often mentioned notions nowadays.</p> <p>The second section discusses the Zlín 2020 strategy in an analytical part defining strengths, weaknesses and opportunities of the area, and a strategic one, which goal is supporting the competitiveness of the agglomeration.</p> <p>The first often cited concept of smart specialization is considered a key ingredient for formulating strategic objectives and measures for the economic development of the city, on the basis of the assessment of the innovative environment and the territorial specialization (within the analytical part of the Zlín Strategy).</p> <p>Territories have to determine the fields with the highest potential, in terms of future competitive gains, and at the same time consider the traditional territorial structures, within the territorial milieu, as the economic basis.</p> <p>The authors have ranked the Zlín agglomeration industries according the chosen criteria (fig. 1 – pag. 7), then they carried out a qualitative analysis, by assessing the innovative projects.</p> <p>The results highlight the strong link between innovation and specialization (fig. 3 shows the spatial distribution of financial allocation – pag. 9).</p> <p>The second concept of territorial competitiveness can be improved by the smart specialization notion, which is strengthened by the size of the sector and the relations between the different actors.</p> <p>Overall, the connection territorial competitiveness, smart specialization and programming create such a cycle.</p> <p>The Zlín 2020 strategy may be used as a good case study for linking academic approaches with public practices.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>The Smart Specialization concept appears to be a serious and leading attempt to strengthen the territorial competitiveness nowadays.</p> <p>It relies upon an innovation-based diversification of traditional, local and large scale industries and tries to obtain gains from economies of scale and knowledge flowing; thus, the size and the linkages with all the different stakeholders are fundamental for gaining more.</p> <p>The two concepts of economies of scale and knowledge spreading are the roots for clusters, or agglomeration economies, like economies of localization.</p> <p>Territories should identify the fields with the highest potential and at the same time consider the traditional territorial structures as the economic basis.</p>

The local dimension is not defined by administrative boundaries of the Zlín city, because of the wider spatial relations of economic development; it rather relates to three municipalities creating the Zlín agglomeration.

The study does not discourse on the social dimension of the agglomeration phenomenon.



<b>Title</b>	<b><i>The Role of Government Institutions for Smart Specialisation and Regional Development.</i></b>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input type="checkbox"/>		
	Other <input checked="" type="checkbox"/> Report Study		
Author(s) name (s) (full)	Andrés Rodríguez-Pose, Marco di Cataldo, Alessandro Rainoldi		
Year	2014		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	S3 Policy Brief Series No. 04/2014. Luxembourg: Publications Office of the European Union.		
Link to Publication	<a href="http://ftp.jrc.es/EURdoc/JRC88935.pdf">http://ftp.jrc.es/EURdoc/JRC88935.pdf</a>		
Keywords as they appear in the document	Regional Policy Institutional framework Coordination Governance structures		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	2. Government institutions for smart specialisation strategies 3. Empirical model and regression results		
Level	National	Regional	Local
		✓	
Case Study if indicated in the paper (Y)	-		
Research Method applied	<input type="checkbox"/> Quantitative Method		
	<input type="checkbox"/> Qualitative Method		
	<input checked="" type="checkbox"/> Mixed approach, since the method is both exploratory and explanatory. The first part sets the theoretical importance of having a strong institutional framework, which institutions are able to act as coordinators or facilitators of the interventions, in order to have successful RIS3 policies, thus effective smart specializations. The second part presents an econometric study as a method for exploring the relation between government institutions and innovation, confirming the key role played by governance schemes.		

<b>Key sectors</b>	
✓	Smart Specialisation Strategies
✓	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.
	Cluster Economic Development
	Cluster Policy
	Social Innovation
✓	Place-Based Approach
✓	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
✓	Urban competitiveness
	Governance and cluster
Note:	<p>The paper investigates the relation between government institutions and innovation, in order to understand if the success of RIS3 depends on the ability of government institutions of coordinating and facilitating policies and interventions.</p> <p>It focuses on the concept of smart specialization, requiring the adaptation of policies to specific contexts, and the main issues that can represent serious barriers to its application and success. The place-based approach for regional development is re-confirmed by the acknowledgment that strong institutions are a precondition for successful RIS3 strategies.</p> <p>The process of setting the right conditions for the competitiveness of regions is tortuous and a solid institutional environment is fundamental for enhancing it.</p>
<b>Reference Typology</b>	
✓	Theory
✓	Methodology
	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	<p>The first section of the paper is an overview of the design and implementation of RIS3, which faces important challenges, making a distinction between the peripheral areas and the core ones within Europe.</p> <p>Pivotal for the effective use of RIS3 interventions are the strong government institutions.</p> <p>The second section discusses the role of government in RIS3, by proposing a new method, with an econometric study that identifies the key elements affecting innovation, measured through the annual change in patents.</p>
<b>Reference Field of interest</b>	
	Spatial dimension

	Social context
	Environmental aspects
✓	Economic Development
✓	Governance
	Local innovation process
✓	Public Policy
	Others
Note:	<p>The selected fields of interest make the paper important.</p> <p>The focus is on the link between the governance structure and the innovation, which leads to the economic development. An important barrier for innovation and development may be represented by the lack of adequate economic resources.</p> <p>The regional government has to define the key objectives of the public policies in the competitive areas, in order to create a long-term image of the innovative path of the region.</p> <p>Local authorities manage directly the policies to assess the impact of the strategies.</p> <p>Unsuccessful policy outcomes, mainly in terms of the selection of suboptimal targets, may depend on the presence of briberies.</p>
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
✓	Territorial milieu
	Social networks
✓	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
✓	Assessment models
	Supply chains
✓	Governance schemes
✓	Innovation
	Smart technologies
	Local value chain
	PPP
	Others:
<p>Notes: Local governments should identify the position of the region within the international chain and the territorial milieu for smart specialization.</p> <p>The set of institutions and reforms in a place is exclusive and cannot be transferred to other backgrounds.</p> <p>The governance structure plays an important role for enabling technologies and a rapid progressing technological situation.</p> <p>The authors of the paper created a model with an econometric study for exploring the relationship between governance structure and innovation and the results confirmed the key</p>	

role played by the first one for the advancement of the region. Thus, a good quality of government institutions is within the main requisites to develop effective strategies in Europe.

**Synthesis and Comments**

Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.

The paper provides a background for introducing a new vision of innovation policy in Europe through Research and Innovation Strategies for Smart Specialization (RIS3), taking in account the fact that its success depends on the governance structure and how the institutions coordinate and facilitate the interventions.

The first part addresses the European situation, with an important difference between advanced and lagging regions.

While in the first ones it could be relatively easy to implement RIS3 and create an agenda for stimulating the competitive advantage and the specificities of the places, in the second ones, there may be some obstacles within the institutional conditions that may represent a barrier.

Thus, the main question aroused in the paper is to what degree improving weak government structures in the less advanced European areas can be considered a prerequisite to make innovative policies.

The concept of Smart Specialization starts from the acknowledgement that the best way to close the existing gaps between the regions is by identifying the specific assets with the highest potential for innovation; a pre-condition in doing this is a high grade of competency of governments also in identifying the most promising activities. All the local actors who could enable this discovery should be included in the process of formulating the strategies.

It should be aware from the situations that may represent barriers for innovation and development, like a mediocre government.

The authors developed an empirical model in order to explore the relation between governance structure and innovation, through a knowledge production function, where the dependent variable is the annual change in patents' applications, while the independent ones comprehend regional government quality, initial level of technological development, private expenditures in Research and Development (R&D), spatial weight of business R&D expenditures, social filter index.

The analysis was carried on a sample of 225 NUTS2 regions, divided into "periphery" and "core" for the 1995-2009 period.

The results confirm the key role played by the quality of government index on the advancement of regions; thus, it is within the main requisites to develop effective strategies in Europe.

Innovation can come in several ways and in the economically belated territories it depends more on institutional and socioeconomic development.

For this reason, institutional reforms are more vital where the administrative structures' quality is lower and bribery is higher.

This reinforces the effectiveness of place-based approach for regional development.

<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>One of the main characteristic of the regional interventions in terms of development, within the context of Europe is a new place-based approach, promoting Research and Innovation strategies for Smart Specialization (RIS3), which core is that strategies cannot be duplicated automatically in different context.</p> <p>It should identify the most promising assets in regions, in terms of innovation, rather than simply jeopardising the potential of smart specialization. Policies and strategies should be adapted to local contexts and governments play a critical role in this procedure.</p> <p>The paper addresses the social issue within the context of the empirical model created, in which the “social filter index” is an indicator of the societal conditions influencing the region’s capacity of creating new knowledge.</p> <p>The results of the model suggest that by strengthening the socio-economic conditions of a region, this can have high returns through new investments in the innovation field.</p>
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<b>Title</b>	<b><i>How Smart, Connected Products Are Transforming Competition.</i></b>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/> (i.e. web, report study, etc..) if yes specified		
Author(s) name (s) (full)	Michael E. Porter and James E. Heppelmann		
Year	2014		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Harvard Business Review – Vol. 92, Issue 11, p. 64–88.		
Link to Publication	<a href="https://hbr.org/2014/11/how-smart-connected-products-are-transforming-competition">https://hbr.org/2014/11/how-smart-connected-products-are-transforming-competition</a>		
Keywords as they appear in the document	Strategy Competition Information Technology Transformation Information Technology Industry		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	The Third Wave of IT-Driven Competition What Are Smart, Connected Products? Reshaping Industry Structure Smart, Connected Products and Competitive Advantage		
Level	National	Regional	Local
	✓		✓
Case Study if indicated in the paper (Y)	Mini-case study insights on some companies		
Research Method applied	<input type="checkbox"/> Quantitative Method		
	<input checked="" type="checkbox"/> Qualitative Method, since it mainly analysis the rapidly changing nature of goods and how this is reorganizing value chains, varying structure, boundaries, opportunities and competitive challenges of industries.		
	<input type="checkbox"/> Mixed approach		
<b>Key sectors</b>			
	Smart Specialisation Strategies		
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.		

	Cluster Economic Development
	Cluster Policy
	Social Innovation
	Place-Based Approach
	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
✓	Urban network
✓	Urban competitiveness
	Governance and cluster
Note:	<p>The author highlights the fact that the technology changes have led to the birth of Smart Connected Products, which allow the exchange of information within urban networks, reshape competition and enlarge industries' boundaries.</p> <p>They change the way the value is created, the way companies compete and the competition's boundaries.</p> <p>Anyway, the basic rules behind competition, despite everything, did not change.</p>
<b>Reference Typology</b>	
✓	Theory
	Methodology
	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	<p>In the article, the authors introduce the new era of Smart Connected Products, which mainly modify the structure of industries and competition.</p> <p>Companies can progress from simply creating products in a system, to proposing something more intricate and with a greater value in a "system of systems".</p>
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
	Governance
✓	Local innovation process
	Public Policy
	Others
Note:	<p>The economic development is analyzed in terms of an opportunity offered by the whole new class of Smart Connected Products, within the third IT-driven phase of transformation, which seems the biggest one.</p>

	Both Governments and businesses have to be prepared to participate and enable innovation.
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
	Social networks
✓	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
✓	Supply chains
	Governance schemes
✓	Innovation
✓	Smart technologies
	Local value chain
	PPP
	Others:
<p>Notes: The authors of the paper highlight the demand of technological innovation, new abilities and processes from smart connected products, throughout the value chains, which change substantially.</p> <p>A set of new technological possibilities is possible, but companies should look over them, in order to allow to the competitive innovation to occur.</p> <p>It is about the development of new businesses, which can enlarge the opportunities, but also threaten value chains, since they rethink the competition framework and constrain industries to reshape themselves.</p>	
<b>Synthesis and Comments</b>	
<p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>In the article, the authors expand on the Five Forces of Porter and introduce the third IT wave of “Internet of Things” which, contrarily to the previous two, transforms the offerings and seems to be the biggest one.</p> <p>It is about the new era of <i>Smart Connected Products</i>, which mainly allow the exchange of information within urban networks, modify the way the value is created, the structure of industries, and competition essential features and boundaries.</p> <p>Anyway, the basic rules behind competition, like the Five Forces of Porter, do not change.</p> <p>Companies can progress from simply creating physical products in a system, to proposing something much more comprehensive and with a greater value within “system of systems”.</p> <p>This shift is reshaping and enlarging industry boundaries.</p> <p>Both Governments and businesses have to be prepared to participate and enable innovation, making clear choices within this</p>



	<p>new smart, connected world, compound of several layers, in order to compete successfully.</p> <p>The authors develop a technology model for these products and analyze the way companies can get a competitive advantage.</p> <p>A key concept is the demand for technological innovation, new abilities and processes from smart connected products, throughout the value chains, which change substantially.</p> <p>It is about the development of new businesses, which can enlarge the opportunities, but also threaten value chains, since they rethink the competition framework and constrain industries to reshape themselves.</p> <p>The economic development is analyzed in terms of an opportunity offered by the whole new class of Smart Connected Products.</p> <p>A set of new technological possibilities are just unlocked, but companies should look over them.</p> <p>They face several strategic choices, which have an impact on their tactical and competitive position and the open up of new paths to differentiate and add value to the offerings, which shift rivalry within competitors.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>The paper addresses the concept of industrial cluster through the one of the value chain, which will assist to a new flow of technologies, skills and processes.</p> <p>Smart Connected Products will create new forms of smart relationships, like clouds that corporate systems, data, products.</p> <p>As these products move within these growing networks, companies have to rethink their mission.</p> <p>The author addresses the social dimension, saying that the third IT wave will better meets human needs and will require different skill sets and challenges.</p> <p>Finally, Smart Connected Products will have a deeper and more local know-how.</p>

Title	<i>Upgrading in Global Value Chains: Lessons from Latin American Clusters</i>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/>		
Author(s) name (s) (full)	Elisa Giuliani, Carlo Pietrobelli & Roberta Rabellotti		
Year	2005		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	World Development, Elsevier, Volume 33, Issue 4, pages 549-573		
Link to Publication	<a href="http://www.sciencedirect.com/science/article/pii/S0305750X05000033">http://www.sciencedirect.com/science/article/pii/S0305750X05000033</a>		
Keywords as they appear in the document	Latin America Small enterprise Industrial policy Clusters Global value chain Innovation		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	<ol style="list-style-type: none"> <li>1. Introduction, p. 550</li> <li>2. Clusters and value chains, pp. 551-552</li> <li>3. The sectoral dimension of SMEs' upgrading, pp. 552-556</li> <li>5. Sectoral patterns of upgrading: empirical evidence, pp. 557-566</li> </ol>		
Level	National	Regional	Local
	✓	✓	
Case Study if indicated in the paper (Y)	<p>The study analyses 40 case studies including:</p> <ul style="list-style-type: none"> <li>- Sinos Valley footwear cluster</li> <li>- Mexican footwear clusters of Guadalajara and Leon</li> <li>- Salmon cluster in Chile</li> <li>- Petrolina Juazeiro mango cluster</li> <li>- Nicaragua milk and dairy cluster</li> <li>- Delphi automotive cluster in Juarez, Mexico</li> </ul>		
	<input type="checkbox"/> Quantitative Method		

Research Method applied	<input type="checkbox"/> Qualitative Method
	<input checked="" type="checkbox"/> Mixed approach - The research method is both exploratory and explanatory. The first chapters set the theoretical framework about clusters and value chains, the other chapters present an analysis of the relationship existing between cluster upgrading, global value chain and sector-specific characteristics based on a study of 40 clusters in Latin America.
<b>Key Sector</b>	
	Smart Specialisation Strategies
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.
✓	Cluster Economic Development
	Cluster Policy
	Social Innovation
	Place-Based Approach
	Territorial milieu
	Spatial Planning
✓	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
✓	Urban network
✓	Urban competitiveness
	Governance and cluster
Note:	Clustering helps local enterprises to overcome growth constraints and enhance competitiveness. In particular, this paper provides evidence of the important relationship between clusters and global buyers to foster cluster upgrading and economic development.
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.
✓	Cluster Economic Development
	Cluster Policy
	Social Innovation
	Place-Based Approach
	Territorial milieu
	Spatial Planning
✓	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
✓	Urban network
✓	Urban competitiveness
	Governance and cluster

Note:	Clustering helps local enterprises to overcome growth constraints and enhance competitiveness. In particular, this paper provides evidence of the important relationship between clusters and global buyers to foster cluster upgrading and economic development.
<b>Reference Typology</b>	
✓	Theory
✓	Methodology
	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	Section 1 and 2 of the paper describe the concepts of cluster and value chain, section 3 explain the notion of cluster upgrading, section 4 and 5 present the methodology, data and findings of the research.
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
✓	Governance
	Local innovation process
	Public Policy
	Others
Note:	The aim of the research is to investigate the hypothesis that cluster upgrading is affected by firm-specific capabilities and actions, mode of organization of external linkages and governance of value chains.
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
✓	Social networks
	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
✓	Governance schemes
	Innovation
	Smart technologies
	Local value chain
	PPP

✓	Others: Global value chains
<p>Notes : There are three characteristics that affect cluster development: the competitive advantage derived from joint action (“collective efficiency”, Schmitz, 1995), the governance scheme of the value chain in which the enterprises operate, and the particular features that characterize specific sectors.</p> <p>In particular, the authors distinguish three types of governance in the value chain: network, cooperation between firms that share their competencies within the chain; quasi-hierarchy, one firm is subordinated to the others; and hierarchy, an external firm owns the firm.</p>	
<b>Synthesis and Comments</b>	
<p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>The aim of the paper is to investigate how the participation of small enterprises in global markets may enhance economic growth and cluster upgrading.</p> <p>In particular, the authors define cluster upgrading as the “capacity of a firm to innovate to increase the value added of its products and processes (Humphrey &amp; Schmitz, 2002a; Kaplinsky &amp; Readman, 2001; Porter, 1990)”<sup>31</sup>. The research is focused on small Latin American enterprises located in clusters. Clustering helps these small enterprises to deal with some constraints that they usually face such as lack of specialized workforce, difficult access to inputs, technology, information, or credit.</p> <p>According to the authors the existent literature on clusters neglected the importance of external linkages. However, the spread of information technologies and the recent changes in production system, distribution channel and financial markets, have increased the importance of the relationship between clusters and global value chains.</p> <p>The research is based on the investigation of 40 case studies in Latin America.</p> <p>The authors found three characteristics that affect the upgrading of clusters integrated in global value chains: the collective efficiency of the cluster, the governance scheme of the value chain in which the enterprises operate, and the particular features of innovation patterns and technological complexity in specific sectors.</p> <p>According to the analysis of the case studies different value chains coexist in the same cluster; firms participate in local as well as in global value chains and have different patterns of governance (example: Sinos Valley footwear cluster).</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>The case studies analyzed in this paper provide evidence that both local and global dimensions matter to foster cluster development and competitiveness via learning and opportunities.</p> <p>Cluster upgrading is affected by firm-specific capabilities and by the environment in which they operate.</p> <p>Clustering helps small enterprises to overcome growth constraints and the integration of clusters in global value chains contributes to competitiveness and economic development. Local producers participating in value chains can learn and obtain information from the leaders of the chains on how to gain access to global markets,</p>

<sup>31</sup> Elisa Giuliani, Carlo Pietrobelli & Roberta Rabellotti, *Upgrading in Global Value Chains: Lessons from Latin American Clusters*, World Development, Elsevier, 2005, p. 550.

	how to innovate and upgrade firms, and how to be more competitive.
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Title	<i>Smart Specialisation Strategies: The Case of the Basque Country</i>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input type="checkbox"/>		
	Other <input checked="" type="checkbox"/> Report Study		
Author(s) name (s) (full)	Mikel Navarro Arancegui, Mari Jose Aranguren Querejeta, Edurne Magro Montero		
Year	2011		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Orkestra Working Paper Series, Territorial Competitiveness, Number 2011-R07		
Link to Publication	<a href="http://www.orkestra.deusto.es/images/publicaciones/archivos/WPS2011-R07.pdf">http://www.orkestra.deusto.es/images/publicaciones/archivos/WPS2011-R07.pdf</a>		
Keywords as they appear in the document	Strategy Territory Smart Specialisation Innovation		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	2. The strategy of smart specialisation, pp. 2-10 3. The case of the Basque Country, pp. 10-18		
Level	National	Regional	Local
		✓	
Case Study if indicated in the paper (Y)	Basque Country, S3		
Research Method applied	<input type="checkbox"/> Quantitative Method		
	<input checked="" type="checkbox"/> Qualitative Method – The research method is exploratory. While the first chapters analyses the content and the process of smart specialisation strategy (pp. 1-10), the others present the evolution of S3 in the Basque Country.		
	<input type="checkbox"/> Mixed approach		

<b>Key sectors</b>	
✓	Smart Specialisation Strategies
✓	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.
✓	Cluster Economic Development
	Cluster Policy
	Social Innovation
✓	Place-Based Approach
✓	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
	Urban competitiveness
✓	Governance and cluster
Note:	<p>The focus of the paper is the analysis of the process of S3 and the different roles of the government depending on the existing regional assets.</p> <p>The smart specialization strategy must take into account the context, so it would be a place-based policy. The recognition of the regional productive assets that could have competitive advantages is the basis of the strategy.</p>
<b>Reference Typology</b>	
	Theory
	Methodology
✓	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	<p>To analyse the smart specialization strategy, the authors explore the case of the Basque Country.</p> <p>In particular, the development and implementation of S3 since the early 1980s to 2000s.</p>
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
	Governance



✓	Local innovation process
	Public Policy
	Others
Note:	The main objective of the smart specialisation strategy applied in the Basque Country is to advance the diversification of all sectors of the economy through the development of research and innovation projects and through the implementation of the existing industries.
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
✓	Territorial milieu
	Social networks
✓	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
	Governance schemes
✓	Innovation
✓	Smart technologies
	Local value chain
	PPP
	Others
Notes :	
<p>The authors specified that Smart specialization strategy should be a participatory process and it should be based on existing and potential regional assets.</p> <p>The diversification strategies developed in the Basque Country from 1999 to the present are based on R&amp;D and on the production of new activities and products that are built on the existing capabilities of the region.</p>	
<b>Synthesis and Comments</b>	
Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.	<p>The first part of the paper explores the characteristics of the smart specialization strategy, and the different type of strategic objectives contained in the COM (2010) 553, document of the European Commission.</p> <p>These strategic objectives are "retooling", redesign and implementation of existing industries, "extending", discovery of new niches by applying research and innovation in a particular area, "emerging", discovery of new niches by taking advantage of economies of scope, and "cross-sectoral", trans-sectorial cooperation to develop new products and services.</p>

	<p>Then the authors analyse the case of the Basque Country, the different stages of the development of S3 and the implementation of the strategy from 1980s to 2000s.</p> <p>During the first period, 1980-1990, the government applied a “retooling” strategy. It established programs to support businesses and industries and it invested in machinery and organizational improvements. The government assumed a central role, in this case, since the private sector was unable to participate in the strategy due to the economic crisis.</p> <p>In the second period, 1991-1998, the Basque Government facilitated clustering in traditional sectors (“retooling”), and it developed new projects to boost industrial diversification (“extending”). With the help of a consulting firm, the government identified clusters that were activated only if the companies were willing to participate. The industries formed a partnership cluster, and the government continued to maintain a significant role in it.</p> <p>The diversification strategy went beyond industry and addressed the regeneration of cities, especially in Bilbao (Guggenheim effect).</p> <p>From 1999 to the present, the government continued to develop competitiveness strategies based on innovation, that now were designed through a participatory process. In 2011, the Department of Industry began to encourage inter-cluster initiatives (“cross-sectorial”).</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>According to the authors, a narrow approach to smart specialization strategies should be avoided so that regions at less advantages stages of development would be able to apply these strategies.</p> <p>The government should change his role in relation to the capabilities of the regional agents. If these agents have the scientific and technological capabilities to develop smart specialization strategies the government has to be a mere facilitator, in the opposite case it should assume a larger role.</p> <p>Furthermore, it is important to create a shared vision and use participatory processes during the development of the strategy since the single stakeholders do not have the knowledge and resources to execute unilaterally the strategy.</p> <p>From the analysis of the case study, the authors deduced that smart specialization strategy varies depending on the stage of regional development. In the first and second period of the development of S3 in the Basque Country, the strategy was not primarily reliant on R &amp; D.</p>

Title	<i>The Competitive Position of the Basque Aeroespacial Cluster in Global Value Chains: A Historical Analysis</i>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/>		
Author(s) name (s) (full)	Aitziber Elola, Jesús M Valdaliso & Santiago López		
Year	2013		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	European Planning Studies, Volume 21, Issue 7, pp. 1029-1045		
Link to Publication	<a href="http://www.tandfonline.com/doi/ref/10.1080/09654313.2013.733851">http://www.tandfonline.com/doi/ref/10.1080/09654313.2013.733851</a>		
Keywords as they appear in the document	-		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	<ul style="list-style-type: none"> <li>- Theoretical Background, pp. 1031-1034</li> <li>- The Basque Aerospace Cluster: Insertion in the GVC and Evolution over Time, pp. 1035-1040</li> </ul>		
Level	National	Regional	Local
	✓	✓	
Case Study if indicated in the paper (Y)	Aerospace cluster, Basque Country, Spain		
Research Method applied	<input type="checkbox"/> Quantitative Method		
	<input checked="" type="checkbox"/> Qualitative Method – The research method is exploratory. The paper seeks to explore how clusters emerge and develop over time.		
	<input type="checkbox"/> Mixed approach		
<b>Key sectors</b>			
	Smart Specialisation Strategies		
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.		

✓	Cluster Economic Development
	Cluster Policy
	Social Innovation
	Place-Based Approach
	Territorial milieu
	Spatial Planning
✓	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
✓	Urban competitiveness
	Governance and cluster
Note:	The authors analyse local factors and external linkages that affect the evolution of clusters and how they became insert in global value chain.
<b>Reference Typology</b>	
✓	Theory
	Methodology
	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	The first part of the paper provides a literature review about the evolution of clusters and their inclusion in global value chains. The second part examines the case study, the Basque aerospace cluster, and discusses the main findings of the analysis.
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
	Governance
	Local innovation process
	Public Policy
	Others
Note:	The authors found that local factors, internationalization processes (such as foreign investment or inflow of external knowledge and technology), and global competition were the most important factors for cluster development.
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
✓	Social networks

	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
	Governance schemes
✓	Innovation
	Smart technologies
	Local value chain
	PPP
✓	Others: Global value chains
Notes :	
The case study provides evidence of the importance of external linkages between clusters and global actors. These global networks helped the Basque firms to foster knowledge diffusion and innovation, improve their capabilities and had a positive effect on their local suppliers that created a regional value chain.	
<b>Synthesis and Comments</b>	
Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.	<p>The authors explore how clusters emerge and evolve over time based on the case study of the aerospace cluster of the Basque Country.</p> <p>They investigate what are the local and external factors that affect the development of clusters, and their inclusion in the global value chain; in particular, they consider cluster and region specific local factors, and institutional and technological changes.</p> <p>After the economic crisis of the 80's, an industrial restructuring took place in the Basque Country in the 90's and the regional government pioneered a competitive policy based on clusters. This policy involved the upgrading of its mature clusters and the promotion of new high-tech ones.</p> <p>The paper analyses the phases of emergence and development of the aerospace cluster to investigate what are the factors that affected his evolution and how it became inserted into the global value chain.</p> <p>The findings of the research show that supportive regional policy, accumulation of highly skilled human capital, local entrepreneurship, robust investment in R&amp;D, strong links to global value chains granted the success of the Basque aerospace cluster.</p>
Comments about the possible connection with the specific objectives of the WP1.	<p>The paper highlights the importance of endogenous and exogenous factors in the emergence and evolution of clusters.</p> <p>The economic development of clusters and their competitiveness is affected both by local factors, internal to the cluster and to the territory where it is located, and by external factors, such as external networks, knowledge and technologies.</p>

The analysis of the case study provides evidence of the importance of the inclusion of clusters in global value chains. The linkages between clusters and global actors contributed to the competitive growth of local production systems. The global leading firms helped the local firms to improve their capabilities and upgrade the cluster thanks to knowledge diffusion and innovation sharing.

Furthermore, the large investments in R&D and a rapid process of knowledge and capabilities' accumulation allowed the increase of the production scale and a major presence of the Braque firms in both national and international markets.

Title	<i>What can experience with clusters teach us about fostering regional smart specialisation?</i>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/>		
Author(s) name (s) (full)	Mari José Aranguren & James R. Wilson		
Year	2013		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Ekonomiaz, Volume 83, Issue 2, pp 127-145		
Link to Publication	<a href="https://ideas.repec.org/a/ekz/ekonoz/2013206.html">https://ideas.repec.org/a/ekz/ekonoz/2013206.html</a>		
Keywords as they appear in the document	Smart specialization Regional strategies Clusters Cluster policy Policy inertia		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	2. Concepts: smart specialisation and clusters, pp. 129-134 3. Learning from clusters for the development of regional s3, pp. 134-140		
Level	National	Regional	Local
		✓	
Case Study if indicated in the paper (Y)	Basque clusters		
Research Method applied	<input type="checkbox"/> Quantitative Method		
	<input checked="" type="checkbox"/> Qualitative Method – The research method is exploratory. The aim of the study is to analyse the links between cluster policy and RIS3.		
<b>Key sectors</b>			
✓	Smart Specialisation Strategies		
✓	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.		
	Cluster Economic Development		
✓	Cluster Policy		
	Social Innovation		

	Place-Based Approach
	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
	Urban competitiveness
	Governance and cluster
Note:	Research and Innovation Smart Specialisation Strategies are advocated in contexts where European regions have already established cluster policies. The authors analyse how clusters relate with RIS3 and what can be learned from the practice of cluster policies for the implementation of RIS3.
<b>Reference Typology</b>	
✓	Theory
	Methodology
	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	In the first section, the authors provide a theoretical background on cluster policy and RIS3; they explore the key similarities and differences between the two policies. The second part analyzes the Basque cluster policy for the development of a regional smart specialization strategy, and summarizes the key learning points.
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
	Governance
	Local innovation process
	Public Policy
	Others
Note:	
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
✓	Social networks
✓	Enabling technologies
	Law profiles



	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
✓	Governance schemes
	Innovation
	Smart technologies
	Local value chain
	PPP
	Others
Notes: The case study of the Basque cluster policy provides evidence of the importance of networks, inter-cluster connection, diffusion and application of key enabling technologies to facilitate the cooperation between different actors and the identification of priority areas in which firms can collaborate in developing new activities and strength local assets.	
<b>Synthesis and Comments</b>	
Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.	<p>The aim of the paper is to explore the links between RIS3 and clusters.</p> <p>RIS3 are advocated in European regions where cluster policies have already been implemented.</p> <p>According to the authors, cluster policies share some key characteristics with RIS3, which suggest the potential for learning from previous and existing experience for the design and implementation of RIS3.</p> <p>In the first part of the paper, the authors set a theoretical framework about RIS3 and clusters, and they highlight some key differences and synergies between cluster policies and smart specialization strategies.</p> <p>Cluster policies operate at the “cluster level” supporting cooperation between specific groups of agents, RIS3 operates instead with a “vertical logic” (Foray, 2013) and foster innovation-driven development strategy focused on region’s strength and competitive advantage.</p> <p>While the scale may be different, both cluster policies and RIS3 are place-specific therefore they develop strategies that rely on place-based assets and capabilities.</p> <p>In the second part of the paper, the authors analyse the Basque case study to explore the contribution of clustering experience to RIS3 design.</p>
Comments about the possible connection with the specific objectives of the WP1.	<p>Learning points from the existing cluster policies that can contribute to the development of policies supporting RIS3 include:</p> <ul style="list-style-type: none"> <li>- A solid basis for analysis and knowledge about regional context through cluster mapping and existing cluster case analyses;</li> <li>- A long experience of participation and governance;</li> </ul>

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|  | <ul style="list-style-type: none"><li>- The contribution of network and inter-cluster collaboration in the construction of a shared vision of the future development and the identification of vertical and horizontal priorities;</li><li>- The importance of policy flexibility witch ensure that policies are place-specific in order to strength existing assets and build new competitive advantages.</li></ul> |
|--|--|

<b>Title</b>	<b><i>The Quadruple/Quintuple Innovation Helixes and Smart Specialisation Strategies for Sustainable and Inclusive Growth in Europe and Beyond</i></b>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/>		
Author(s) name (s) (full)	Elias G. Carayannis & Ruslan Rakhmatullin		
Year	2014		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Journal of the Knowledge Economy, Volume 5, Issue 2, pp 212-239		
Link to Publication	<a href="http://link.springer.com/article/10.1007%2Fs13132-014-0185-8">http://link.springer.com/article/10.1007%2Fs13132-014-0185-8</a>		
Keywords as they appear in the document	Smart specialization strategies Smart sustainable inclusive growth Quadruple innovation helix Quintuple innovation helix		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	<ul style="list-style-type: none"> <li>- Setting the Policy Context, pp. 212-214</li> <li>- The Concept of Multi-helix Systems, pp. 214-216</li> <li>- From Triple to Quadruple Helix, pp. 216-220</li> <li>- The Quadruple Helix as an Architectural Innovation Blueprint to Support RIS3, pp. 220-226</li> <li>- Enacting and Evaluating Quadruple Helix Setups: Examples in Excellence from the Nordic Countries, pp. 226-230</li> </ul>		
Level	National	Regional	Local
	✓	✓	
Case Study if indicated in the paper (Y)	The case of Finland and the Nordic region (Example of Quadruple Helix. Innovation at the heart of the region economic growth, regional innovation smart specialization strategy)		
Research Method applied	<input type="checkbox"/> Quantitative Method		
	<input checked="" type="checkbox"/> Qualitative Method – The research method is exploratory. The objective of the study is to investigate the concept of Quadruple Helix System and his implication in the development of regional innovation smart specialization strategies.		
	<input type="checkbox"/> Mixed approach		
<b>Key sectors</b>			
✓	Smart Specialisation Strategies		

✓	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.
	Cluster Economic Development
	Cluster Policy
	Social Innovation
✓	Place-Based Approach
✓	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
	Urban competitiveness
✓	Governance and cluster
Note:	<p>The paper focuses on the policy context of research and innovation smart specialization strategies and on the concept of Quadruple Helix System.</p> <p>According to the authors, Smart specialization strategies imply a development based on regional strengths and a priority-setting process embedded in the context of national and regional innovation strategies. These strategies need to be conceptualised and implemented with a top-down view (government, university and industry) and complemented by a bottom-up approach.</p> <p>Government, university, industry and civil society are the components of the Quadruple Helix System, an operational strategy that emphasizes the networks between these different categories to develop new products and technologies and achieve regional development.</p>
<b>Reference Typology</b>	
✓	Theory
	Methodology
✓	Best Practices
	Guidelines
✓	Policy Analysis
	Others
Note:	<p>In the first part of the paper, the authors explore the policy context of smart specialization strategies. They analyse the Europe 2020 strategy, EU cohesion policy and the principle of research and innovation strategies for smart specialization.</p> <p>Furthermore, the focus of the paper is the concept of Multi-helix system, and in particular, the Quadruple Innovation Helix framework. The Multi-helix system is described in theory and in practice through the case of Finland.</p>
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development

✓	Governance
✓	Local innovation process
	Public Policy
	Others
Note:	<p>Smart specialization strategies imply that regions need to focus their efforts and resources on a limited number of priorities to enhance economic development and compete in the global economy.</p> <p>These strategies further require uniting national and regional stakeholders and resources around a shared vision of their future.</p> <p>The Quadruple Helix model focuses on cooperation in innovation between different actors that could serve as a foundation for smart specialization strategies.</p>
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
✓	Social networks
	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
✓	Governance schemes
✓	Innovation
	Smart technologies
	Local value chain
	PPP
	Others
<p>Notes :</p> <p>In the Quadruple Helix model, new innovative products, services and technologies are developed with the participation of different users. This model promotes networking between universities, industries, government and citizens to spur innovation and enhance economic development.</p> <p>The involvement of the civil society is the core of the strategy and the role of the other three helices (university, government and industries) would be to support citizens in the innovation process.</p> <p>Innovation, as described in this paper, not only means science and technologies innovation, but also social, public sector and service innovation.</p>	
<b>Synthesis and Comments</b>	

<p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>In this paper, the authors explore the policy context, the theory and the practice of RIS3 and the concept of the Quadruple Innovation Helix System.</p> <p>Research and innovation strategies for smart specialisation are the core of the new European cohesion policy. They are the main driver to deliver growth that is smart, sustainable and inclusive. These three mutually reinforcing priorities are the basis of the Europe 2020 strategy.</p> <p>The focus of the paper is the concept of Multi-helix system, and in particular, the Quadruple Innovation Helix framework that is the evolution of the Triple Helix concept.</p> <p>The Triple Helix concept has been used as an operational strategy for regional economic development.</p> <p>This approach places emphasis on the different role of authorities, industries and universities in the innovation process. A strong involvement of these three actors in the development and marketing of new technologies and products is the basis of the regional economic development.</p> <p>The Quadruple Helix system adds a further category of actors to the original Triple Helix model, i.e. the civil society.</p> <p>It places a stronger focus on cooperation in innovation between Government, university, industry and civil society that could serve as the foundation for smart specialisation strategies.</p> <p>An example of Quadruple Innovation Helix, analysed in the last part of the paper, is the case of Finland.</p> <p>In 2008, the Finnish government created an innovation and technology agency, established a venture-capital fund to promote start-ups and encouraged universities to commercialize new ideas and products to spur innovation. Since Finland had become dangerously dependent on Nokia, the government wanted to make the mobile-phone company decline painless and start a diversification of economic activities.</p> <p>As a result, Finland has produced a high number of start-ups and attracted investors and entrepreneurs.</p> <p>Put innovation at the core of the strategy and enhance networks between universities, industries, government and citizens were the main factors that created a successful economic development.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>According to the authors, the RIS3 promotes the formation of regional systems of innovation and these systems need to be conceptualized and implemented with a multi-level governance.</p> <p>The Quadruple Helix model, as operational strategy for RIS3, puts civil society at its heart and enhances the development of innovation that are pertinent for citizens. They are the driver of the innovation process.</p> <p>New products, services and technologies are developed with the involvement of citizens as lead users and with the participations of government, industry and university as complementary and supporting actors.</p>

	<p>Applying the Quadruple Helix approach in the RIS3 context, regional governments are more likely to enable a place-based entrepreneurial process of discovery, which would then generate an innovation process and the achievement of economic development.</p>
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<b>Title</b>	<i>Research Driven Clusters at the Heart of (Trans-) Regional Learning and Priority-Setting Processes - The Case of a Smart Specialisation Strategy of a German “Spitzen” Cluster</i>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/>		
Author(s) name (s) (full)	Günter Clar & Björn Sautter		
Year	2014		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Journal of the Knowledge Economy, Volume 5, Issue 1, pp 156-180		
Link to Publication	<a href="http://link.springer.com/article/10.1007%2Fs13132-014-0180-0">http://link.springer.com/article/10.1007%2Fs13132-014-0180-0</a>		
Keywords as they appear in the document	Smart Specialisation Regional Learning Innovation System Strategic Policy Intelligence Research Driven Clusters Multi-level Governance Baden-Württemberg Microsystems Technologies		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	<ul style="list-style-type: none"> <li>- ‘New’ Innovation Policies: Aiming at Smart Governance of Innovation Systems Focusing on Grand Societal Challenges, pp 158-163</li> <li>- (“Spitzen-”) Clusters at the Heart of Regionally Embedded and Multi-Actor Entrepreneurial Discovery and Priority-Setting Processes, pp 164-166</li> <li>- The “Spitzen” Cluster MicroTEC Südwest Harnessing the Potential of the Key Enabling Microsystems Technologies, pp 166-173</li> </ul>		
Level	National	Regional	Local
		✓	
Case Study if indicated in the paper (Y)	MicroTEC Südwest - German cluster (Smart Specialisation Strategy)		
	<input type="checkbox"/> Quantitative Method		



Research Method applied	<input checked="" type="checkbox"/> Qualitative Method – The paper seeks to explore objectives and characteristics of the analysed case study. <input type="checkbox"/> Mixed approach
<b>Key sectors</b>	
✓	Smart Specialisation Strategies
✓	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.
✓	Cluster Economic Development
	Cluster Policy
	Social Innovation
	Place-Based Approach
	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
✓	Urban competitiveness
	Governance and cluster
Note:	<p>This paper argues that research driven clusters as centre of the knowledge flows, are the basis of the strategic policy fostering smart specialisation.</p> <p>Smart specialisation strategies are focused on the existing knowledge capabilities of the territory in order to develop industrial and technological leadership. This can lead to increased return on public and private investments within regions and competitiveness on global markets.</p>
<b>Reference Typology</b>	
	Theory
	Methodology
✓	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	The authors outline the elements of Research and Innovations Strategies for Smart Specialisation through the analysis of MicroTEC Südwest, a German cluster.
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
	Governance
✓	Local innovation process

	Public Policy
	Others
Note:	
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
✓	Territorial milieu
✓	Social networks
✓	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
	Governance schemes
✓	Innovation
✓	Smart technologies
	Local value chain
	PPP
	Others
Notes :	
<p>The research &amp; innovation strategy applied in the MicroTEC Südwest cluster, have a participative, forward and outward-looking dimensions. The knowledge flow facilitated the development of a shared vision and the identification of common priorities for long-term investments and actions addressed to enhance unique regional assets.</p>	
<b>Synthesis and Comments</b>	
<p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>The paper seeks to investigate the characteristics of the Research and Innovation Strategies for Smart Specialisation (RIS3) analysing the German cluster MicroTEC Südwest.</p> <p>The research &amp; innovation strategy embedded in the cluster seems to bust the regional economy and to address global competition.</p> <p>The participatory process, implemented in the RIS3, was used to develop cross-sectorial long-term strategies. Priorities and objectives were addressed to enhance unique regional assets (i.e. Strategic Learning Cycle, p.169).</p> <p>The development of new technologies and the university-industry transfer of know-how contributed to the economic development of the region. In fact, the research driven cluster is the focal point of the local and regional knowledge flow that provide the base for address societal challenges and attract public and private investment in regional specialization.</p>

Comments about the possible connection with the specific objectives of the WP1.

The German cluster can be seen as an example of best practice concerning the Research and Innovation Strategies for Smart Specialisation (RIS3). The main features of the strategy are: the bottom-up process, the interlink between regional innovation system and global perspective, and the promotion of the unique regional innovation capacities.

The objectives were to enhance regional specialization and implement prioritized activities to face global competition.

<b>Title</b>	<i>Economic development and evolving state capacities in Central and Eastern Europe: can “smart specialization” make a difference?</i>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/>		
Author(s) name (s) (full)	Erkki Karo & Rainer Kattel		
Year	2015		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Journal of Economic Policy Reform, Volume 18, Issue 2, pp 172-187		
Link to Publication	<a href="http://www.tandfonline.com/doi/abs/10.1080/17487870.2015.1009068">http://www.tandfonline.com/doi/abs/10.1080/17487870.2015.1009068</a>		
Keywords as they appear in the document	Smart specialization State capacity Policy implementation Central and Eastern Europe		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	2. Unpacking state capacity: from institutional blueprints to contextual routines, pp. 173-175 3. State capacities for SS in CEE, pp. 175-178 4. Design and management of SS policies in CEE, pp. 178-183		
Level	National	Regional	Local
		✓	
Case Study if indicated in the paper (Y)	- Smart Specialization in the Baltic States - Smart Specialization in Slovenia - Smart Specialization in the Visegrad countries		
Research Method applied	<input type="checkbox"/> Quantitative Method		
	<input checked="" type="checkbox"/> Qualitative Method – The research method is exploratory. The aim of the paper is to analyse the concept of Smart Specialization (SS) strategies and discuss what are the state, policy and administrative capacities that SS presumes. In particular, the study is based on case studies of Central and Eastern Europe.		
	<input type="checkbox"/> Mixed approach		
<b>Key sectors</b>			
✓	Smart Specialisation Strategies		

	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.
	Cluster Economic Development
	Cluster Policy
	Social Innovation
✓	Place-Based Approach
✓	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
	Urban competitiveness
	Governance and cluster
Note:	The authors explore what is needed from governments to implement smart specialization strategies and investigate if the existing governance structures are equipped to apply and implement proper policy choices.
<b>Reference Typology</b>	
✓	Theory
	Methodology
	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	The first part of the paper discusses the concept of smart specialization, and the state, policy and administrative capacities that affect the adoption of smart specialization strategies.  The second part analyzes how different economies have implemented smart specialization strategies in Central and Eastern Europe presenting the case study of the Baltic States, Slovenia and Visegrad countries.
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
	Governance
	Local innovation process
	Public Policy
	Others
Note:	
<b>Reference Keywords according with the MAPS-LED Project</b>	

Key words (three to five keywords selected within the list below)	
✓	Territorial milieu
✓	Social networks
✓	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
	Governance schemes
✓	Innovation
	Smart technologies
	Local value chain
	PPP
	Others
<p>Notes: From the analysis of the case studies, the authors argue that some key principles of smart specialization strategies, as the entrepreneurial discovery process and the bottom-up public-private coordination, are missing in regions and countries of central and eastern Europe.</p> <p>They highlight the necessity of a more place-based approach, the enhancement of local and global networks, and the diffusion of key enabling technologies.</p>	
<b>Synthesis and Comments</b>	
<p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>The paper sets a theoretical framework about smart specialization strategies in central and eastern Europe and discusses the state, policy and administrative capacities that Smart Specialization strategies presumes.</p> <p>Furthermore, the study highlights some similarity in policies and routines across central and eastern Europe:</p> <ul style="list-style-type: none"> <li>- Existing smart specialization strategies seem to emphasize similar high-technology fields;</li> <li>- The process is mostly led by central governments, even in countries with regional levels of governance.</li> </ul> <p>This implies the development of a more generic innovation policy that exclude the potential of regional specific capabilities.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>The case studies provide evidence of the challenges related to the design and implementation of Smart Specialization in Central and Eastern Europe.</p> <p>The authors found that both public and private sectors lack experience in designing and supporting new types of policies and actions.</p> <p>Policy makers fitted smart specialization with existing policy and strategies. On the contrary, they need to implement institutional reforms and initiate new practices of context-specific policies.</p>

	<p>Regarding the policy and administrative capacities, the case studies provide evidence that research, development, and innovation policies have been traditionally centralized in central and eastern Europe, and there has been little regional and sectoral focus.</p> <p>The need for a place-based regional policy approach requires a reconceptualization of smart specialization strategies that bring to policy focus regional differences. Thus, not all regions should emphasize high-tech policies. Some of them do not have the capacities to implement high-tech strategies and they could instead benefit the most from targeted education and training programs, or from technological adoption and diffusion activities.</p> <p>Lastly, the authors advocate the necessity of a more flexible policy and administrative routines that allow for experimentation, the enhancement of networks between R&amp;D and industrial production, and the support of horizontal diffusion of key enabling technologies.</p>
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<b>Title</b>	
<i>Efforts to Implement Smart Specialization in Practice—Leading Unlike Horses to the Water</i>	
Source Typology	Book <input type="checkbox"/>
	Paper <input checked="" type="checkbox"/>
	Other <input type="checkbox"/>
Author(s) name (s) (full)	Henning Kroll
Year	2015
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	European Planning Studies, 24 January 2015, pp. 1-20
Link to Publication	<a href="http://publica.fraunhofer.de/documents/N-323973.html">http://publica.fraunhofer.de/documents/N-323973.html</a>
Keywords as they appear in the document	-
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	<ol style="list-style-type: none"> <li>1. Introduction, pp. 1-3</li> <li>2. RIS3: Open Issues, pp. 3-6</li> <li>4. Success on the Surface and Challenges Below, pp. 9-16</li> <li>5. A Typology of RIS3 Regions, pp. 16-17</li> </ol>
Level	National
	Regional
Case Study if indicated in the paper (N)	-
Research Method applied	<input checked="" type="checkbox"/> Quantitative Method - The research method is mainly explanatory. The author investigates <ul style="list-style-type: none"> <li>- What is the current state of RIS3 process in Europe,</li> <li>- What are the policy changes that regional stakeholders' attribute to the RIS3 agenda and the degree of congruence between those and the initial suggestions of the RIS3 agenda,</li> <li>- What are the benefits and pitfalls of the approach.</li> </ul>
	<input type="checkbox"/> Qualitative Method
	<input type="checkbox"/> Mixed approach
<b>Key sectors</b>	



✓	Smart Specialisation Strategies
✓	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.
	Cluster Economic Development
	Cluster Policy
	Social Innovation
✓	Place-Based Approach
	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
	Urban competitiveness
	Governance and cluster
Note:	The article analyses the development and implementation of RIS3 in Europe. In particular, the introduction of smart specialization strategies dismissed the concept of “one-size-fits-all” policies in favour of a place-based approach; i.e. regional policies would have to differ according to the local context.
<b>Reference Typology</b>	
✓	Theory
	Methodology
	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	In the first part of the article, the author describes the notion of smart specialization strategy and the process of translation from concept to policy. In the second part, he investigates what is the current state of RIS3 in Europe explaining the methodology and the findings of his research.
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
✓	Governance
	Local innovation process
	Public Policy
	Others
Note:	The findings of the research demonstrate that the implementation of RIS3 contributed mainly in changing routines and practices of governance in Europe in favour of a more

	participatory and place-based approach, and that the RIS3 agenda has a high potential to trigger economic development.
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
✓	Social networks
✓	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
	Governance schemes
✓	Innovation
	Smart technologies
	Local value chain
	PPP
	Others
Notes:	
<p>According to the author, there is evidence of differentiation across country groups regarding the types of RIS3 objectives adopted.</p> <p>Enabling technologies and the networks between research infrastructures and industries are necessary requirements for the approval of any RIS3 strategy, so these aspects are common in all places.</p> <p>In Southern and Eastern Europe there are accomplishments which are significantly more commonly claimed, such as the adoption of outward-looking approaches and a more future-oriented analysis of challenges and potentials.</p> <p>Furthermore, there are some of the more demanding aspects such as the reconsideration of the role of non-technological innovation that are less prevalently implemented.</p>	
<b>Synthesis and Comments</b>	
<p>Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.</p>	<p>After a brief introduction about the notion of Research and Innovation Smart Specialisation Strategies and the description of the translation from concept to policy, the author discusses and examines the findings of his research.</p> <p>He seeks to confirm whether there is a persistent failure in achieving the RIS3 agenda's objectives or not, what was accomplished, and what is the policy changes that regional stakeholders' attribute to the RIS3 agenda.</p> <p>The research is based on surveys and interviews conducted in 2013 and 2014. Findings underline some divergences in implementation and outcomes of RIS3 in Europe.</p> <p>The author found evidence that Southern and Eastern European regions have changed their policy approaches more strongly than</p>

	<p>others by involving the private sector and by taking a more outward-looking and future-oriented approach.</p> <p>The research suggests that diversity in implementation is determined by differences in general institutions and specific modes of governance.</p>
<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>The article seeks to investigate the current state of implementation of the RIS3 policy agenda in Europe, providing evidence of the need for further research to translate the concept of RIS3 in a more place-sensitive manner.</p> <p>During the last years, the European Commission became aware that structural funding failed to increase cohesion at the macro level and at the micro level gave evidence of non-strategic investment decisions.</p> <p>Best-practice learning gave rise to the imitation of successful strategies in places where these strategies cannot be implemented due to the lack of regional capabilities. Against this background, smart specialization strategies were introduced to provide a different approach based on local assets.</p> <p>However, the author argues they were adopted as a policy framework before that the concept had been fully developed.</p> <p>Finding of his research seems to confirm that there were some failures in achieving the RIS3 agenda's objectives in the past years.</p> <p>Many regional entities do not have the necessary resources to adequately deal with the complex strategy process. The economically weaker regions outlined a number of priorities that are inadequate given their technological and economic capacities, and some others still fail to grasp core concepts like the role of enabling technologies or the outward-looking approach.</p> <p>He distinguished three main groups of regions according to the different implementation process of RIS3:</p> <ul style="list-style-type: none"> <li>- "Starters" - Eastern European regions. The RIS3 agenda represented an entirely new approach to policy-making. New governance practices met "with traditional planning cultures and centralist governance systems, which made them difficult to implement. Although RIS3 processes were in the end mostly realized, much more effort had to be invested in setting them up there than elsewhere."<sup>32</sup></li> <li>- "Active Beneficiaries" - Southern European regions. "The RIS3 agenda brought a new impetus to governance systems where bottom-up approaches were so far less prevalent in economic and</li> </ul>

<sup>32-2</sup> Henning Kroll, *Efforts to Implement Smart Specialization in Practice—Leading Unlike Horses to the Water*, European Planning Studies, European Planning Studies, 24 January 2015, p.17.

	<p>S&amp;T policy while the overall “hard” institutional framework was more suitable.”<sup>3</sup></p> <p>- “Drivers” - Central and Northern European Regions. “Long experience and strong capacities in strategy building (they) did not gain substantially new insights through their RIS3 processes. Overall, they provided input to, rather than drew lessons from, the RIS3 process.”<sup>3</sup></p> <p>Lastly, he argues that the main merit of RIS3 lies in his contribution to changing routines and practices of governance in a more inclusive process.</p> <p>According to the survey respondents, successful bottom-up consultation processes have been implemented following the RIS3 guidelines’ requirements.</p>
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<sup>3</sup> Henning Kroll, *Efforts to Implement Smart Specialization in Practice—Leading Unlike Horses to the Water*, European Planning Studies, European Planning Studies, 24 January 2015, p.18.

<b>Title</b>	<b><i>Universities and Smart Specialisation: challenges, tensions and opportunities for the innovation strategies of European regions</i></b>		
Source Typology	Book <input type="checkbox"/>		
	Paper <input checked="" type="checkbox"/>		
	Other <input type="checkbox"/>		
Author(s) name (s) (full)	John Goddard, Louise Kempton & Paul Vallance		
Year	2013		
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	Ekonomiaz, vol. 83, issue 02, pages 83-102		
Link to Publication	<a href="http://econpapers.repec.org/article/ekzekonoz/2013204.htm">http://econpapers.repec.org/article/ekzekonoz/2013204.htm</a>		
Keywords as they appear in the document	Universities Regional innovation policy Smart Specialisation		
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	<ul style="list-style-type: none"> <li>- Smart Specialisation, pp. 86-87</li> <li>- Universities and Smart Specialisation, pp. 88-94</li> <li>- Barriers to engagement of universities in Smart Specialisation, pp. 94-98</li> </ul>		
Level	National	Regional	Local
		✓	
Case Study if indicated in the paper (N)	-		
Research Method applied	<input type="checkbox"/> Quantitative Method		
	<input checked="" type="checkbox"/> Qualitative Method – The research method is exploratory. The authors seek to explore the contribution of universities in regional innovation policy and the limit of their engagement in Smart Specialisation Strategies.		
	<input type="checkbox"/> Mixed approach		
<b>Key sectors</b>			
✓	Smart Specialisation Strategies		

	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.
	Cluster Economic Development
	Cluster Policy
✓	Social Innovation
✓	Place-Based Approach
	Territorial milieu
	Spatial Planning
	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
	Urban network
✓	Urban competitiveness
	Governance and cluster
Note:	The authors explore the challenges and opportunities of the engagement of universities in Smart Specialization Strategies. Universities are the core of the national and regional innovation systems. In particular, the analysis focuses on three elements of Smart Specialisation such as the entrepreneurial process of discovery, the specific areas of R&D and innovation that can generate distinctive competitive advantage within regional economy, and the trans-regional links.
<b>Reference Typology</b>	
✓	Theory
	Methodology
	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	The first part of the paper provides a general background about Smart Specialization Strategies and the role of universities in regional innovation policies, the last part emphasizes the challenges of universities in the context of Smart Specialization Strategies.
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
✓	Governance
✓	Local innovation process
	Public Policy
	Others
Note:	Universities are part of the research infrastructure of regions. They generate growth opportunities in different ways: provide advice and services to small and medium

	enterprises, promote training and employment of high-level graduates in innovative businesses, stimulate entrepreneurial spirit, and provide input to innovative clusters and networks.
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
	Territorial milieu
✓	Social networks
✓	Enabling technologies
	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
	Governance schemes
✓	Innovation
	Smart technologies
	Local value chain
	PPP
	Others
Notes :	
Universities play a preeminent role in organizing networks between regions in order to maximize knowledge flows and to create new technologies. They contribute also to skills development and promote social innovation.	
<b>Synthesis and Comments</b>	
Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.	<p>The aim of the paper is to discuss the role of universities in Smart Specialization Strategies.</p> <p>After a general analysis of the characteristics of Smart Specialization, the authors highlight some critiques about the contribution of universities in regional innovation policies, in particular, the “one size fits all” model.</p> <p>This model is based on efforts to replicate successful regional cases, such as Silicon Valley in California. However, each region faces different policy challenges, economic development and institutional problems; therefore, there is not a single ideal model that can be followed by all regions.</p> <p>The contribution of universities in Smart Specialisation policies should vary depending on the strategic objectives adopted in each specific region.</p> <p>A successful strategy depends on the presence of strong research universities and other non-university related factors supporting entrepreneurship and industrial development, such as access to finance, availability of human capital, and supportive governance environment.</p>

<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>Universities are part of the research infrastructure of a region and they can contribute to the assessment of local's knowledge assets and capabilities playing a key role in Smart Specialization Strategy.</p> <p>Furthermore, they foster networks for the development of the regional innovation system. In particular, the authors talk about trans-regional links, i.e. non-geographical relational proximity. This links support knowledge transfers across larger scales promoting networking between organizations and individuals in different nations and regions.</p> <p>In the last part of the paper, the authors advocate a strong engagement of universities in regional governance. It is important, according with them, to match the academic profile of universities with regional smart specialisation priorities; universities can contribute to skills development, promote social innovation, and generate knowledge to meet specific regional specialisation opportunities.</p>
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Title		<b>Perspectives on Cluster Evolution: Critical Review and Future Research Issues</b>		
Source Typology	Book	<input type="checkbox"/>		
	Paper	<input checked="" type="checkbox"/>		
	Other	<input type="checkbox"/>		
Author(s) name (s) (full)	Michaela Trippla, Markus Grillitscha, Arne Isaksenb & Tanja Sinozicc			
Year	2015			
Details of the source typology selected (i.e. Journal name, Volume n°, Issue n°, pages)	European Planning Studies, 13 January 2015, pp. 1-17			
Link to Publication	<a href="https://ideas.repec.org/p/hhs/lucirc/2014_012.html">https://ideas.repec.org/p/hhs/lucirc/2014_012.html</a>			
Keywords as they appear in the document	-			
Index of the Document (selected which chapter or paragraph is more related with the main objective of the MAPS-LED project and with the specific objectives of the WP1)	2. Cluster Life-Cycle Approach, pp. 2-5 3. Limitations of the Cluster Life-Cycle Approach, pp. 5-8 4. Key Issues for Future Research, pp. 8-13			
Level	National	Regional	Local	
		✓		
Case Study if indicated in the paper (Y)	<ul style="list-style-type: none"> <li>- Revitalization of the old metal cluster in Styria (Austria)</li> <li>- Globally competitive clusters in Norway</li> <li>- The Antwerp diamond district</li> <li>- ICT cluster in Sardinia</li> </ul>			
Research Method applied	<input type="checkbox"/> Quantitative Method			
	<input checked="" type="checkbox"/> Qualitative Method – The research method is exploratory. The aim of the article is to discuss the key ideas of the cluster life-cycle approach and identify critical elements.			
	<input type="checkbox"/> Mixed approach			
Key sectors				
	Smart Specialisation Strategies			
	RIS3 – Research and Innovation Smart Specialisation Strategies – Regional Plan.			
✓	Cluster Economic Development			
	Cluster Policy			

	Social Innovation
	Place-Based Approach
	Territorial milieu
	Spatial Planning
✓	Urban Cluster
	Urban Regeneration and economic development
	Metropolitan city
✓	Urban network
	Urban competitiveness
	Governance and cluster
Note:	The cluster life-cycle approach tries to provide explanations about how cluster change and develop over time.
<b>Reference Typology</b>	
✓	Theory
	Methodology
✓	Best Practices
	Guidelines
	Policy Analysis
	Others
Note:	The authors examine the characteristics of the life-cycle approach, its origin and its main criticism. In the last sections of the article, they highlight a set of factors that have been underappreciated by research works on cluster long-term development and investigate some case studies.
<b>Reference Field of interest</b>	
	Spatial dimension
	Social context
	Environmental aspects
✓	Economic Development
	Governance
	Local innovation process
	Public Policy
	Others
Note:	The cluster life-cycle approach has contributed to enhance the understanding of the main factors that may trigger the rise and further development of regional clusters. According to this approach, clusters are influenced by cluster-specific processes and factors or by industries and technology growth cycles.
<b>Reference Keywords according with the MAPS-LED Project</b>	
Key words (three to five keywords selected within the list below)	
✓	Territorial milieu
✓	Social networks
	Enabling technologies

	Law profiles
	Regeneration strategies
	Urban-rural link
	Assessment models
	Supply chains
	Governance schemes
	Innovation
	Smart technologies
✓	Local value chain
	PPP
	Others
Notes :	
The authors, after a critical review of the actual literature of cluster evolution, identify three factors that have so far been underappreciated and that contribute to the cluster development. These elements are regional context-specific factors, multi-scalar influences, and human agents and their activities.	
<b>Synthesis and Comments</b>	
Synthesis of the document with the indication of the main aspects that could be interesting for the state of art of the project.	<p>The authors analyse the key characteristics of the cluster life-cycle approach and discuss the main criticisms.</p> <p>This approach tries to provide explanations about how cluster change and develop over time.</p> <p>The main hypothesis is that clusters change according to cyclical phases of growth. The development of cluster is connected with innovation patterns that follow the evolution of new key technologies, industry profit and life cycles.</p> <p>The authors identify life-cycle approaches that focus on industry-driven explanations, i.e. the growth of the clusters is related to developmental stages of specific industries and technologies, and those that emphasize processes specific of clusters, i.e. clusters can grow or decline independently of the industrial development (homogeneity or heterogeneity in competencies, cluster-specific technological or institutional lock-ins).</p> <p>The main criticisms of the cluster life-cycle approach discussed in the article are the deterministic logic of cluster development, such a view would not allow for capturing other development patterns observable in the real world;</p> <p>little attention given to the influence of multiple factors at various spatial scales on cluster development paths; indifference to the development dynamics influenced by region-specific factors that clusters operating in the same industries may display.</p> <p>After this critical review, the authors argue that further studies are needed to investigate the impact of the regional environment on cluster evolution, explore the factors at various spatial scales that influence clusters and pay attention to the role of human agents that affect long-term development.</p>

<p>Comments about the possible connection with the specific objectives of the WP1.</p>	<p>The article provides a theoretical review about recent studies on the long-term cluster evolution.</p> <p>In particular, the authors make a critical assessment about the cluster life-cycle approach and identify some case study that could be relevant for the project.</p> <p>The main criticisms of the cluster development theory are the indifference to place-specific factors, the neglect of multi-scalar impacts and the under appreciation of the role of human agency.</p> <p>To highlight the importance of this missing elements the authors provide some case studies that are:</p> <ul style="list-style-type: none"> <li>- The revitalization of the old metal cluster in Styria (Austria), provides evidence on how regional characteristics such as the presence of research institutes, regional innovation culture and proactive policy approaches, have facilitated cluster development;</li> <li>- Globally competitive clusters in Norway, example of multi-scalar impacts. The national system was important for the start of the clusters since initial demand was based on national firms, while the regional and international levels were important for the cluster growth. Firms recruited new employees locally from similar firms and from universities that have created special programs for the needs of cluster firms.</li> <li>- Antwerp diamond district and ICT cluster in Sardinia. Strategic actions taken by key persons mainly contributed to the cluster development.</li> </ul>
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## Annex 2 - Preliminary Case Study

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Marie Skłodowska-Curie RISE  
**MAPS-LED Project**



### **MAPS-LED**

Multidisciplinary Approach To Plan Smart Specialisation Strategies for  
Local Economic Development

WP1

“Research and Innovation Strategies in Cluster Policy”  
**Preliminary Case Study**

## Index

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3. [Main Indicators/filter \(Traded Cluster – Boston\)](#)\_\_\_\_\_
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## 2. Glossary of terms– [www.clustermapping.us](http://www.clustermapping.us)

Definition	Meaning	Classification, Indicator, Concept, Spatial Dimension, Other specified
Annual Wage	Annual Wage is the Average payroll divided by total employment in a particular year.	Indicator
Cluster	A cluster is a regional concentration of related industries that arise out of the various types of linkages or externalities that span across industries in a particular location. The U.S. Benchmark Cluster Definitions are designed to enable systemic comparison across regions.	Concept
Cluster, Local	Local Clusters are industries that serve the local market. They are prevalent in every region of the country, regardless of the competitive advantages of a particular location. The majority of a region's employment comes from jobs in local clusters. Examples include <a href="#">Local Entertainment</a> such as video rental services and movie theaters, <a href="#">Local Health Services</a> such as drug stores and hospitals, and <a href="#">Local Commercial Services</a> such as drycleaners.	Classification
Cluster, Traded	Traded Clusters are the "engines" of regional economies that serve markets in other regions or nations. They are concentrated in regions that afford specific competitive advantages and they are exposed to competition from other regions. Example of traded clusters include <a href="#">Financial Services</a> in New York City, <a href="#">Information Technology</a> in Silicon Valley, and <a href="#">Video Production and Distribution</a> in Los Angeles.	Classification
Employment	Paid employment consists of private, non-agricultural employment by full- and part-time employees, including salaried officers and executives of corporations, who are on the payroll. Included are employees on paid sick leave, holidays, and vacations. Not included are proprietors and partners of unincorporated businesses.	Indicator
Establishment	An establishment is a single physical location at which business is conducted or services or industrial operations are performed. It is not necessarily identical with a company or enterprise, which may consist of one or more establishments. When two or more activities are carried on at a single location under a single ownership, all activities generally are grouped together as a single establishment. The entire establishment is classified on the basis of its major activity, and all data are included in that classification.	Indicator
Innovation	Innovation is defined by the number of patents per employee. Number of patents and employees can be	Concept

	restricted to a certain cluster and region to determine the innovation for a cluster in a region.	
Job Creation	Job Creation is the absolute number of private job generated.	Indicator
Location Quotient	<p>The ratio of an industry's share of total state employment in a location relative to its share of total national employment. The LQ measures the Specialisation or concentration of a cluster in a particular location relative to the national average. An LQ &gt; 1 indicates a higher than average cluster concentration in a location. The formula for the LQ in a state <i>i</i> for industry <i>j</i> is:</p> $LQ = \frac{E_{i,j} / E_i}{E_{us,j} / E_{us}}$ <p>where <math>E_{i,j}</math> refers to state <i>i</i>'s employment in industry <i>j</i>, <math>E_i</math> is the total employment in state <i>i</i>, <math>E_{us,j}</math> is the total U.S. employment in industry <i>j</i>, and <math>E_{us}</math> is the total U.S. employment.</p>	Indicator
Organizations–Cluster initiative	A cluster initiative is an organized effort by a group of companies, public sector entities, and other related institutions with the objective to improve the competitiveness of a specific regional cluster.	Classification
Patent	A patent grants to the owner an exclusive right to make, use, or sell the invention embodied by the patent, and is issued by the United States Patent and Trademark Office. The patent data provided on <a href="http://clustermapping.us">clustermapping.us</a> are for utility patents only, which may be granted to anyone who invents or discovers any new and useful process, machine, article of manufacture, or compositions of matters.	Other
Patent Count <sup>34</sup>	An economic Indicator used to express Innovation (See the above concept of Innovation).	Indicator
Region	A region is broadly defined as a county, economic area (EA), metro/micropolitan statistical area (MSA), or state. The U.S. Benchmark Cluster Definitions use the U.S. Bureau of Economic Analysis defined economic areas.	Spatial dimension
Share of National Employment	<p>Share of national employment is a measure of the relative industry presence in a particular location to its overall presence in the nation.</p> <p>The industry's state share of national industry employment SHR is:</p> $SHR = \frac{E_{i,j}}{E_{us,j}}$	Indicator

<sup>34</sup> The Cluster Mapping Website does not mention this term within its glossary; however, it has been added in order to clarify the Innovation concept.



	where $E_{i,j}$ refers to state $i$ 's employment in industry $j$ , and $E_{us,j}$ is the total U.S. employment in industry $j$ .	
Specialisation <sup>35</sup>	Measured by the value of a cluster's location quotient. Each regional economy has a particular pattern of specialisation in a number of clusters, which drives productivity and growth in the economy.	Concept

(in case of indicator, the column meaning shows what that indicator is supposed to measure and which are its composition in terms of data)

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<sup>35</sup> The Indicators used for this concept are National Employment Share and Location Quotient.

### 3. List of Traded Cluster<sup>36</sup> Boston - Metropolitan Area (MA)

Cluster	Subcluster	Related Organizations	Region Code	Cluster Code
<b>Aerospace Vehicles and Defense (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Aircraft</li> <li>- Search and Navigation Equipment</li> <li>- Missiles and Space Vehicles</li> </ul>	-	57022	1
<b>Agricultural Inputs and Services (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Agricultural Services</li> <li>- Fertilizers</li> <li>- Farm Management and Labor Services</li> </ul>	-	14460	2
<b>Apparel (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Men's Clothing</li> <li>- Accessories and Specialty Apparel</li> <li>- Apparel Contractors</li> <li>- Women's Clothing</li> </ul>	-	14460	3
<b>Automotive (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Motor Vehicles</li> <li>- Military Vehicles and Tanks</li> <li>- Small Vehicles</li> <li>- Gasoline Engines and Engine Parts</li> <li>- Metal Mills and Foundries</li> <li>- Automotive Parts</li> </ul>	-	14460	4
<b>Biopharmaceutical (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Biopharmaceutical Products</li> <li>- Biological Products</li> <li>- Diagnostic Substances</li> </ul>	-	14460	5
<b>Business Services (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Corporate Headquarters</li> <li>- Computer Services</li> <li>- Consulting Services</li> <li>- Engineering Services</li> <li>- Business Support Services</li> <li>- Architectural and Drafting Services</li> </ul>	-	14460	6

<sup>36</sup> Source: <http://www.clustermapping.us/cluster> definition: "THE ENGINES OF REGIONAL ECONOMIES Serve markets in other regions or nations; Concentrated in regions that afford specific competitive advantages; Example industries: aircraft manufacturing, management consulting, iron ore mining."

	<ul style="list-style-type: none"> <li>- Employment Placement Services</li> <li>- Ground Passenger Transportation</li> </ul>			
<b>Coal Mining (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- - Coal Mining</li> </ul>	-	14460	7
<b>Communications Equipment and Services (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Communications Equipment Components</li> <li>- Communications Services</li> <li>- Communications Equipment</li> </ul>	-	14460	8
<b>Construction Products and Services (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Construction Components</li> <li>- Construction Products</li> <li>- Water, Sewage, and Other Systems</li> <li>- Construction Materials</li> </ul>	-	14460	9
<b>Distribution and Electronic Commerce (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Wholesale Trade Agents and Brokers</li> <li>- Warehousing and Storage</li> <li>- Wholesale of Drugs and Druggists' Sundries</li> <li>- Wholesale of Electrical and Electronic Goods</li> <li>- Support Services</li> <li>- Wholesale of Petroleum and Petroleum Products</li> <li>- Electronic and Catalog Shopping</li> <li>- Wholesale of Toy and Hobby Goods and Supplies</li> <li>- Wholesale of Transportation Equipment and Supplies (except Motor Vehicles)</li> <li>- Wholesale of Jewelry, Watches, Precious Stones, and Precious Metals</li> <li>- Rental and Leasing</li> <li>- Warehousing and Storage</li> </ul>	-	14460	10

	<ul style="list-style-type: none"> <li>- Wholesale of Farm and Garden Machinery and Equipment</li> <li>- Wholesale of Furniture and Home Furnishing</li> <li>- Wholesale of Service Establishment Equipment, and Supplies</li> <li>- Wholesale of Construction and Mining Machinery and Equipment</li> <li>- Wholesale of Farm Products and Supplies</li> <li>- Wholesale of Metals and Minerals (except Petroleum)</li> <li>- Wholesale of Sporting and Recreational Goods and Supplies</li> <li>- Wholesale of Chemical and Allied Products</li> <li>- Wholesale of Other Merchandise</li> <li>- Wholesale of Books, Periodicals, and Newspapers</li> <li>- Wholesale of Apparel and Accessories</li> <li>- Wholesale of Paper and Paper Products</li> <li>- Wholesale of Food Products</li> <li>- Wholesale of Industrial Machinery, Equipment, and Supplies</li> <li>- Wholesale of Professional and Commercial Equipment and Supplies</li> </ul>			
<b>Downstream Chemical Products (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Dyes, Pigments and Coating</li> <li>- Lubricating Oils and Greases</li> <li>- Explosive</li> </ul>	-	14460	11

	<ul style="list-style-type: none"> <li>- Personal Care and Cleaning Products</li> <li>- - Processed Chemical Products</li> </ul>			
<b>Downstream metal products (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Fabricated Metal Structures</li> <li>- Metal Containers</li> <li>- Ammunition</li> <li>- Metal Products</li> </ul>	-	14460	<b>12</b>
<b>Education and Knowledge Creation (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Colleges, Universities, and Professional Schools</li> <li>- Research Organizations</li> <li>- Training Programs</li> <li>- Educational Support Services</li> <li>- Professional Organizations</li> </ul>	-	57022	<b>13</b>
<b>Electric Power Generation and Transmission (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Fossil Fuel Electric Power</li> <li>- Alternative Electric Power</li> <li>- Electric Power Transmission</li> </ul>	-	14460	<b>14</b>
<b>Environmental Services (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Waste Processing</li> <li>- Waste Collection</li> <li>- Other Waste Management Services</li> </ul>	-	14460	<b>15</b>
<b>Financial Services (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Financial Investment Activities</li> <li>- Credit Intermediation</li> <li>- Credit Bureaus</li> <li>- Monetary Authorities -Central Bank</li> <li>- Securities Brokers</li> <li>- Dealers</li> <li>- Exchanges</li> </ul>	-	14460	<b>16</b>
<b>Fishing and Fishing Products (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- - Fishing and Fishing Products</li> </ul>	-	14460	<b>17</b>
<b>Food Processing (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Specialty Foods and Ingredient</li> <li>- Packaged Fruit and Vegetables</li> <li>- Distilleries</li> <li>- Candy and Chocolate</li> <li>- Malt Beverages</li> <li>- Wineries</li> <li>- Coffee and Tea</li> <li>- Glass Containers</li> </ul>	-	14460	<b>18</b>

	<ul style="list-style-type: none"> <li>- Milling and Refining of Sugar</li> <li>- Farm Wholesalers</li> <li>- Milling and Refining of Cereals and Oilseeds</li> <li>- Animal Foods</li> <li>- Baked Goods</li> <li>- Dairy Products</li> <li>- Soft Drinks and Ice</li> </ul>			
<b>Footwear (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Footwear Components</li> <li>- Footwear</li> </ul>	-	14460	19
<b>Forestry (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Forestry</li> </ul>	-	14460	20
<b>Furniture (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Office Furniture</li> <li>- Mobile Homes</li> <li>- Wood Cabinets and Woodwork</li> <li>- Household Furniture</li> <li>- Institutional Furniture</li> </ul>	-	14460	21
<b>Hospitality and Tourism (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Spectator Sports</li> <li>- Amusement Parks and Arcades</li> <li>- Cultural and Educational Entertainment</li> <li>- Gambling Facilities</li> <li>- Other Tourism Attractions</li> <li>- Accommodations and Related Services</li> <li>- Tourism Related Services</li> </ul>	-	14460	22
<b>Information technology and Analytical Instruments (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Medical Apparatus</li> <li>- Software Publishers</li> <li>- Software reproducing</li> <li>- Audio and Video Equipment</li> <li>- Computers and Peripherals</li> <li>- Semiconductors</li> <li>- Process and Laboratory Instruments</li> <li>- Electronic Components</li> </ul>	-	14460	23
<b>Insurance Services (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Insurance Related Services</li> <li>- Reinsurance Carriers</li> <li>- Insurance Carriers</li> </ul>	-	14460	24

<b>Jewelry and Precious Metals (Boston-Cambridge-Newton, MA-NH)</b>	- Jewelry and Precious Metals Products	-	14460	<b>25</b>
<b>Leather and Related Products (Boston-Cambridge-Newton, MA-NH)</b>	- Women's Handbags and Purses - Textile Bags and Canvas Products - Personal Leather Goods and Luggage	-	14460	<b>26</b>
<b>Lighting and Electrical Equipment (Boston-Cambridge-Newton, MA-NH)</b>	- Storage Batteries - Lighting Fixtures and Parts - Electrical Components - Electrical Equipment	-	14460	<b>27</b>
<b>Livestock Processing (Boston-Cambridge-Newton, MA-NH)</b>	- Meat Processing - Livestock Merchant Wholesalers	-	14460	<b>28</b>
<b>Marketing, Design and Publishing (Boston-Cambridge-Newton, MA-NH)</b>	- Advertising Related Services - Other Marketing Related Services - Design Services - Publishing	-	14460	<b>29</b>
<b>Medical Devices (Boston-Cambridge-Newton, MA-NH)</b>	- Optical Instruments and Ophthalmic Goods - Surgical and Dental Instruments and Supplies	-	14460	<b>30</b>
<b>Metal Mining (Boston-Cambridge-Newton, MA-NH)</b>	- Metal Mining	-	14460	<b>31</b>
<b>Metalworking Technology (Boston-Cambridge-Newton, MA-NH)</b>	- Metalworking Machinery - Hand Tools - Fasteners - Machine Tools and Accessories - Metal Processing	-	14460	<b>32</b>
<b>Music and Sound Recording (Boston-Cambridge-Newton, MA-NH)</b>	- Music and Sound Recording	-	14460	<b>33</b>
<b>Non Metal Mining (Boston-Cambridge-Newton, MA-NH)</b>	- Non-metal Mining	-	14460	<b>34</b>
<b>Oil and Gas Production and Transportation (Boston-Cambridge-Newton, MA-NH)</b>	- Pipeline Transportation - Oil and Gas Extraction - Support Activities for Oil and Gas Operations	-	14460	<b>35</b>

	<ul style="list-style-type: none"> <li>- Petroleum Processing</li> <li>- Oil and Gas Machinery</li> <li>- Drilling Wells</li> </ul>			
<b>Paper and Packaging (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Packaging</li> <li>- Paper Mills</li> <li>- - Paper Products</li> </ul>	-	14460	<b>36</b>
<b>Performing Arts (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Promoters and Managers</li> <li>- - Performing Artists</li> </ul>	-	14460	<b>37</b>
<b>Printing Services (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Printing Services</li> <li>- Support Activities for Printing</li> <li>- Printing Inputs</li> <li>- Greeting Card Printing and Publishing</li> </ul>	-	14460	<b>39</b>
<b>Production Technology and Heavy Machinery (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Air Handling Equipment</li> <li>- Moving and Material Handling Equipment</li> <li>- Agricultural and Construction Machinery and Components</li> <li>- Commercial and Service Industry Machinery</li> <li>- Process Equipment and Components</li> <li>- Industrial Machinery</li> </ul>	-	14460	<b>40</b>
<b>Recreational and Small Electric Goods (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Sporting and Athletic Goods</li> <li>- Recreational and Decorative Goods</li> <li>- Electric Housewares</li> <li>- Games, Toys, and Children's Vehicles</li> <li>- Motorcycles and Bicycles</li> <li>- Office Supplies</li> </ul>	-	14460	<b>41</b>
<b>Textile Manufacturing (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Fabric Mills</li> <li>- Fibers</li> <li>- Other Textile Products</li> <li>- Knitting Mills</li> <li>- Yarn and Thread Mills</li> <li>- Household Textile Products</li> <li>- - Textile and Fabric Finishing</li> </ul>	-	14460	<b>42</b>
<b>Tobacco</b>	<ul style="list-style-type: none"> <li>- Tobacco</li> </ul>	-	14460	<b>43</b>



<b>(Boston-Cambridge-Newton, MA-NH)</b>				
<b>Trailers, Motor Homes &amp; Appliances (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Trailers and Motor Homes</li> <li>- Household Appliances</li> <li>- Burial Caskets</li> </ul>	-	14460	<b>44</b>
<b>Transportation and Logistics (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Trucking</li> <li>- Specialty Air Transportation</li> <li>- Ground Transportation Support Activities</li> <li>- Bus Transportation</li> <li>- - Air Transportation</li> </ul>	-	14460	<b>45</b>
<b>Upstream Chemical Products (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Organic Chemicals</li> <li>- Inorganic Chemicals</li> <li>- Industrial Gas</li> <li>- - Agricultural Chemicals</li> </ul>	-	14460	<b>46</b>
<b>Upstream Metal Manufacturing (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Iron and Steel Mills and Forging</li> <li>- Metal Processing</li> <li>- Wires and Springs</li> <li>- - Metal Products</li> </ul>	-	14460	<b>47</b>
<b>Video Production and Distribution (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Video Production and Distribution</li> </ul>	-	14460	<b>48</b>
<b>Video Production and Distribution (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Video Production and Distribution</li> </ul>	-	14460	<b>48</b>
<b>Vulcanized &amp; Fired Materials (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Rubber Products</li> <li>- Glass Products</li> <li>- Clay Products and Refractories</li> </ul>	-	14460	<b>49</b>
<b>Water Transportation (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Marine Transportation Services</li> <li>- Boat Building and Repairing</li> <li>- Water Passenger Transportation</li> </ul>	-	14460	<b>50</b>
<b>Wood Products (Boston-Cambridge-Newton, MA-NH)</b>	<ul style="list-style-type: none"> <li>- Wood Components and Products</li> <li>- Wood Processing</li> <li>- - Prefabricated Wood Building</li> </ul>	-	14460	<b>51</b>

## 4. Main Indicators/filter (Traded Cluster – Boston)

Dynamic Indicators – Innovation led explanatory variables

Cluster Code	Year	Employment	Annual Wage	Job creation	National Employment Share	Location Quotient	Patent Count	Patent Count Growth	Establishments Growth rate
1	1998	22687	\$ 51,935.00	-	3.21%	1.37	202	-	-
	1999	22900	-	213	3.27%	1.41	193	-5.36%	-9.78%
	2000	26388	\$ 48,313.00	3488	4.24%	1.78	196	-1.67%	-8.38%
	2001	22700	-	-3688	3.63%	1.49	213	18.60%	-9.60%
	2002	16154	\$ 59,730.00	-6546	2.91%	1.22	199	-3.92%	-8.82%
	2003	15736	\$ 77,978.00	-418	3.00%	1.33	253	-10.20%	5.53%
	2004	10701	\$ 82,767.00	-5035	2.07%	0.93	216	-4.55%	-10.38%
	2005	9471	\$ 71,069.00	-123	1.78%	0.8	187	-4.76%	-25.92%
	2006	9666	\$ 78,844.00	195	1.81%	0.81	251	5.00%	22.35%
	2007	9355	\$ 72,706.00	-311	1.73%	0.77	220	-	-20.27%
	2008	11417	\$ 80,240.00	2062	2.04%	0.93	221	4.76%	-13.29%
	2009	11177	\$ 96,362.00	-240	2.05%	0.92	237	2.27%	7.13%
	2010	9518	\$ 98,658.00	-1659	1.80%	0.8	320	-	35.11%
2011	7100	\$ 86,770.00	-2418	1.36%	0.62	323	-4.44%	1.04%	
2012	12236	\$ 79,176.00	5136	2.34%	1.09	-	13.95%	-	
2013	12128	\$ 79,708.00	-108	2.28%	1.07	392	-2.04%	13.02%	
2	1998	411	\$ 11,523.00	-	0.42%	0.18	2	-	-
	1999	354	\$ 11,032.00	-57	0.35%	0.15	3	1.43%	38.65%
	2000	343	\$ 13,441.00	-11	0.38%	0.16	3	-8.45%	3.91%
	2001	478	\$ 14,149.00	135	0.50%	0.21	2	16.92%	-24.91%
	2002	528	\$ 14,564.00	50	0.55%	0.23	2	9.21%	-2.85%
	2003	516	\$ 13,952.00	-12	0.54%	0.24	2	-2.41%	-3.63%
	2004	488	\$ 17,969.00	-28	0.51%	0.23	2	-9.86%	-19.87%
	2005	547	\$ 21,588.00	59	0.60%	0.27	2	9.59%	-8.93%
	2006	517	\$ 21,112.00	-30	0.57%	0.26	2	-6.25%	10.53%
	2007	429	\$ 23,453.00	-88	0.43%	0.19	2	4.00%	2.36%
	2008	425	\$ 18,957.00	-4	0.42%	0.2	2	6.41%	-7.31%
	2009	524	\$ 21,588.00	99	0.54%	0.25	2	-9.64%	35.56%
	2010	385	\$ 26,662.00	-139	0.39%	0.18	3	-4.00%	36.49%
2011	325	\$ 23,462.00	-60	0.33%	0.15	3	-2.78%	5.67%	
2012	299	\$ 22,935.00	-26	0.29%	0.14	4	12.86%	12.20%	
2013	319	\$ 23,297.00	20	0.33%	0.16	6	2.53%	49.06%	
3	1998	5628	\$ 33,248.00	-	0.896%	0.38	4	-	-
	1999	5600	\$ 39,255.00	-28	1.03%	0.44	7	3.25%	95.81%
	2000	5296	\$ 36,976.00	-304	1.09%	0.46	6	3.96%	-12.76%
	2001	4396	\$ 28,858.00	-900	1.05%	0.43	6	-5.71%	-7.80%
	2002	3951	\$ 34,673.00	-445	1.15%	0.48	5	-24.24%	-14.59%
	2003	3211	\$ 29,712.00	-740	1.06%	0.47	5	5.33%	9.83%
	2004	2829	\$ 24,795.00	-382	0.997%	0.45	5	0.63%	-17.09%
	2005	2563	\$ 22,030.00	-266	1.02%	0.46	4	-13.84%	-8.08%
	2006	1745	\$ 22,145.00	-818	0.774%	0.35	4	4.38%	1.20%
	2007	2573	\$ 24,991.00	828	1.23%	0.55	3	-3.50%	-40.81%
	2008	1631	\$ 27,077.00	-942	0.857%	0.39	4	-3.19%	65.58%
	2009	1906	\$ 27,583.00	275	1.28%	0.58	3	-2.83%	-16.11%
	2010	1856	\$ 35,360.00	-50	1.35%	0.61	5	-13.89%	33.25%
2011	1557	\$ 29,333.00	-299	1.17%	0.54	5	-8.99%	16.34%	
2012	1178	\$ 31,596.00	-379	0.892%	0.41	5	-16.05%	-12.17%	
2013	1210	\$ 37,973.00	121	0.902%	0.42	7	20.59%	38.58%	
4	1998	4963	\$ 39,593.00	-	36.00%	0.16	65	-	-
	1999	4648	\$ 45,937.00	-315	35.00%	0.15	67	-8.00%	2.34%
	2000	4649	\$ 45,360.00	1	34.00%	0.14	71	-4.35%	6.82%
	2001	4652	\$ 48,368.00	3	37.00%	0.15	73	-5.45%	2.23%
	2002	4098	\$ 50,216.00	-554	36.00%	0.15	74	-7.69%	0.69%
	2003	3533	\$ 46,950.00	-565	3.00%	0.13	68	-14.58%	-7.56%
	2004	3241	\$ 45,657.00	-292	28.00%	0.13	60	-2.44%	-11.68%
	2005	2833	\$ 53,263.00	-408	24.00%	0.11	55	-6.25%	-7.92%
	2006	3784	\$ 46,585.00	951	34.00%	0.15	69	2.67%	25.54%
	2007	3271	\$ 44,431.00	-513	31.00%	0.14	60	-3%	-13.27%
	2008	2972	\$ 46,275.00	-299	3.00%	0.14	63	-8.00%	4.08%
	2009	2557	\$ 41,961.00	-415	32.00%	0.15	52	-1.45%	-17.70%
	2010	3117	\$ 47,163.00	560	42.00%	0.19	76	3.12%	47.64%
2011	3228	\$ 34,699.00	111	42.00%	0.19	89	5.88%	17.20%	
2012	3344	\$ 59,061.00	116	4.00%	0.19	88	5.56%	-0.98%	
2013	2705	\$ 71,118.00	-639	31.00%	0.15	88	-1.32%	0.05%	

Cluster Code	Year	Employment	Annual Wage	Job creation	National Employment Share	Location Quotient	Patent Count	Patent Count Growth	Establishments Growth rate
5	1998	5735	\$ 67,940.00	-	2.64%	1.12	311	-	-
	1999	6256	\$ 59,404.00	521	2.86%	1.23	304	-2%	14%
	2000	6747	\$ 74,955.00	491	2.97%	1.25	265	-13%	-3%
	2001	7760	\$ 94,464.00	1013	3.32%	1.37	296	12%	8%
	2002	6913	\$ 94,795.00	-847	2.91%	1.22	287	-3%	-13%
	2003	9194	\$ 82,348.00	2281	3.65%	1.61	274	-4%	7%
	2004	9024	\$ 113,287.00	-170	3.66%	1.65	224	-18%	-
	2005	9498	\$ 110,355.00	474	3.83%	1.73	197	-12%	3%
	2006	11064	\$ 101,254.00	1142	4.26%	1.91	262	33%	3%
	2007	11902	\$ 104,653.00	1262	4.93%	2.2	220	-16%	7%
	2008	8221	\$ 95,209.00	-3681	3.25%	1.48	221	0%	-7%
	2009	7545	\$ 100,103.00	-676	3.11%	1.4	232	5%	-6%
	2010	8797	\$ 106,778.00	1252	3.81%	1.7	279	20%	-5%
2011	9710	\$ 106,660.00	913	4.26%	1.96	293	5%	7%	
2012	8810	\$ 87,776.00	-900	3.74%	1.74	337	15%	6%	
2013	8971	\$ 97,104.00	161	3.88%	1.81	413	23%	-3%	
6	1998	193101	\$ 65,760.00	-	2.60%	1.11	6	-	-
	1999	209290	\$ 66,819.00	16189	2.62%	1.13	6	8%	1%
	2000	217694	\$ 74,677.00	8404	2.51%	1.05	6	4%	-2%
	2001	239476	\$ 71,213.00	21782	2.65%	1.09	7	10%	12%
	2002	221065	\$ 70,270.00	-18411	2.52%	1.06	6	-8%	-14%
	2003	206006	\$ 72,921.00	-15059	2.25%	0.99	7	-7%	12%
	2004	215550	\$ 77,785.00	9544	2.34%	1.05	7	5%	8%
	2005	224210	\$ 78,824.00	866	2.34%	1.06	6	4%	-20%
	2006	255112	\$ 76,961.00	30902	2.53%	1.13	8	14%	34%
	2007	267673	\$ 80,559.00	12561	2.56%	1.15	6	5%	-16%
	2008	218034	\$ 96,518.00	-49639	2.11%	0.96	7	-19%	14%
	2009	209420	\$ 94,024.00	-8614	2.10%	0.95	8	-4%	6%
	2010	210640	\$ 99,357.00	122	2.14%	0.96	11	1%	37%
2011	207024	\$ 105,477.00	-3616	2.05%	0.94	10	-2%	-8%	
2012	225342	\$ 105,158.00	18318	2.15%	1	11	9%	12%	
2013	229718	\$ 105,134.00	4376	2.09%	0.98	12	2%	9%	
7	1998	10	-	-	0.0115%	0	0	-	-
	1999	10	-	-	0.0122%	0.01	0	-50%	-8%
	2000	20	-	10	0.0263%	0.01	0	-	-1%
	2001	10	-	-10	0.0131%	0.01	0	-50%	11%
	2002	-	-	-10	0.00%	-	0	-	-13%
	2003	-	-	-	0.00%	-	0	-	-16%
	2004	-	-	-	0.00%	-	0	-	11%
	2005	-	-	-	0.00%	-	0	-	2%
	2006	-	-	-	0.00%	-	0	-	-23%
	2007	-	-	-	0.00%	-	0	-	6%
	2008	-	-	-	0.00%	-	0	-	-5%
	2009	-	-	-	0.00%	-	0	-	43%
	2010	-	-	-	0.00%	-	0	-	12%
2011	-	-	-	0.00%	-	0	-	6%	
2012	-	-	-	0.00%	-	0	-	7%	
2013	-	-	-	0.00%	-	0	-	34%	
8	1998	23872	\$ 70,721.00	-	4.78%	2.03	215	-	-
	1999	24915	\$ 63,566.00	1043	4.75%	2.04	207	15%	-4%
	2000	28042	\$ 98,724.00	3127	5.15%	2.16	232	6%	12%
	2001	24773	\$ 83,486.00	-3269	4.03%	1.86	247	5%	6%
	2002	18317	\$ 76,604.00	-6456	3.51%	1.47	249	-5%	1%
	2003	11962	\$ 77,653.00	-6355	2.41%	1.06	307	4%	24%
	2004	11274	\$ 73,050.00	-688	2.30%	1.04	312	-7%	1%
	2005	8734	\$ 87,395.00	-254	1.89%	0.85	281	0%	-10%
	2006	8522	\$ 107,010.00	-212	1.83%	0.82	398	-17%	41%
	2007	10459	\$ 78,004.00	1937	2.07%	0.92	364	5%	-8%
	2008	7298	\$ 91,902.00	-3161	1.47%	0.67	338	16%	-7%
	2009	7444	\$ 98,043.00	146	1.45%	0.65	358	1%	6%
	2010	6653	\$ 118,811.00	-791	1.47%	0.66	451	-10%	26%
2011	7419	\$ 80,637.00	766	1.62%	0.74	437	1%	-3%	
2012	6549	\$ 115,702.00	-870	1.52%	0.7	475	6%	9%	
2013	6655	\$ 103,259.00	106	1.43%	0.67	530	3%	11%	

Cluster Code	Year	Employment	Annual Wage	Job creation	National Employment Share	Location Quotient	Patent Count	Patent Count Growth	Establishments Growth rate
9	1998	8025	\$ 48,855.00	-	-	0.41	17	-	-
	1999	8622	\$ 50,394.00	597	1.01%	0.44	16	2%	0%
	2000	8404	\$ 55,138.00	-218	0.94%	0.4	17	3%	3%
	2001	7397	\$ 54,007.00	-1007	0.92%	0.38	20	-6%	19%
	2002	8731	\$ 52,461.00	1334	1.23%	0.52	17	-16%	-16%
	2003	7718	\$ 64,217.00	-1013	1.10%	0.49	17	-27%	1%
	2004	7427	\$ 68,658.00	-291	1.08%	0.49	18	-4%	2%
	2005	7649	\$ 66,239.00	222	1.12%	0.5	15	2%	-13%
	2006	7827	\$ 71,293.00	178	1.03%	0.46	15	10%	0%
	2007	7038	\$ 70,568.00	-789	0.88%	0.4	13	2%	-12%
	2008	6382	\$ 77,713.00	-656	0.80%	0.37	12	-4%	-7%
	2009	5309	\$ 78,235.00	-1073	0.72%	0.33	11	-5%	-9%
	2010	5172	\$ 68,621.00	-137	0.75%	0.33	15	-1%	37%
2011	5244	\$ 80,535.00	72	0.73%	0.34	16	4%	1%	
2012	5152	\$ 82,458.00	-92	0.72%	0.33	19	-4%	21%	
2013	5757	\$ 88,575.00	605	0.73%	0.34	22	1%	14%	
10	1998	102675	\$ 53,824.00	-	2.20%	0.94	5	-	-
	1999	101944	\$ 56,540.00	-731	2.14%	0.92	6	0%	18%
	2000	110990	\$ 65,894.00	9046	2.16%	0.96	6	-1%	-7%
	2001	116015	\$ 60,888.00	5025	2.32%	0.95	6	-2%	5%
	2002	100932	\$ 60,835.00	-15083	2.15%	0.9	6	-3%	-11%
	2003	107824	\$ 62,856.00	6892	2.08%	0.92	6	1%	11%
	2004	107006	\$ 62,022.00	-818	2.04%	0.92	5	-2%	-12%
	2005	109989	\$ 67,813.00	2983	2.08%	0.94	5	0%	-3%
	2006	102776	\$ 72,030.00	-7213	1.92%	0.86	6	-2%	9%
	2007	103235	\$ 74,374.00	459	1.92%	0.86	5	0%	-14%
	2008	105234	\$ 76,988.00	1999	1.88%	0.86	6	0%	10%
	2009	99387	\$ 74,424.00	-5847	1.86%	0.84	5	-2%	-6%
	2010	94889	\$ 82,596.00	-4498	1.85%	0.83	7	-2%	37%
2011	89958	\$ 85,098.00	-4931	1.74%	0.8	8	-2%	7%	
2012	92045	\$ 84,752.00	2087	1.72%	0.8	9	1%	13%	
2013	98817	\$ 90,391.00	6772	1.79%	0.84	9	1%	9%	
11	1998	8253	\$ 48,590.00	-	1.84%	0.79	89	-	-
	1999	6583	\$ 51,890.00	330	1.97%	0.85	95	2%	7%
	2000	7436	\$ 57,826.00	853	2.25%	0.94	89	-	-7%
	2001	7385	\$ 52,604.00	-51	2.29%	0.94	96	-3%	7%
	2002	7310	\$ 47,862.00	-75	2.46%	1.03	83	3%	-13%
	2003	7628	\$ 53,156.00	318	2.54%	1.12	93	-6%	12%
	2004	6412	\$ 59,491.00	-1216	2.15%	0.97	83	-7%	-11%
	2005	5928	\$ 56,652.00	-484	2.06%	0.93	68	-11%	-19%
	2006	5839	\$ 64,948.00	-89	2.02%	0.9	80	3%	19%
	2007	4183	\$ 76,057.00	-1656	1.49%	0.67	70	-3%	-13%
	2008	3908	\$ 73,502.00	-275	1.43%	0.65	74	2%	6%
	2009	3210	\$ 79,390.00	-698	1.28%	0.58	77	-10%	4%
	2010	3205	\$ 80,770.00	-5	1.36%	0.61	107	3%	38%
2011	3226	\$ 84,557.00	21	1.36%	0.62	110	5%	3%	
2012	2116	\$ 70,022.00	-111	0.89%	0.41	125	1%	13%	
2013	1891	\$ 67,239.00	-225	0.79%	0.37	150	-7%	20%	
12	1998	8237	\$ 42,796.00	-	1.46%	0.62	27	-	-
	1999	8189	\$ 43,155.00	-48	1.44%	0.62	21	-	-
	2000	8312	\$ 46,873.00	123	1.46%	0.61	23	-	-
	2001	7915	\$ 51,036.00	-397	1.43%	0.59	26	-	-
	2002	8030	\$ 43,904.00	115	1.55%	0.65	25	-	-
	2003	8563	\$ 41,239.00	533	1.69%	0.75	25	-	-
	2004	7745	\$ 46,461.00	-818	1.55%	0.7	18	-	-
	2005	7400	\$ 45,353.00	-345	1.52%	0.69	19	-	-
	2006	5270	\$ 47,205.00	-213	1.06%	0.47	18	-	-
	2007	4959	\$ 50,433.00	-311	1%	0.45	14	-	-
	2008	4728	\$ 53,903.00	-231	0.942%	0.43	15	-	-
	2009	4081	\$ 49,235.00	-647	0.917%	0.41	15	-	-
	2010	4656	\$ 52,537.00	575	1.17%	0.52	19	-	-
2011	4722	\$ 53,911.00	66	1.19%	0.55	23	-	-	
2012	4051	\$ 56,284.00	-671	1.06%	0.49	27	-	-	
2013	3708	\$ 58,146.00	-343	0.95%	0.44	25	-	-	

Cluster Code	Year	Employment	Annual Wage	Job creation	National Employment Share	Location Quotient	Patent Count	Patent Count Growth	Establishments Growth rate
13	1998	122473	\$ 35,321.00	-	6.42%	2.73	15	-	-
	1999	125209	\$ 38,550.00	2736	6.25%	2.69	15	1%	3%
	2000	133586	\$ 43,643.00	8377	6.41%	2.69	13	3%	-13%
	2001	137123	\$ 41,640.00	3537	6.35%	2.61	14	2%	8%
	2002	138438	\$ 43,045.00	1315	6.27%	2.63	13	2%	-7%
	2003	157874	\$ 45,716.00	19436	6.41%	2.83	14	6%	8%
	2004	156763	\$ 49,828.00	-1111	6.09%	2.74	13	0%	-7%
	2005	156989	\$ 48,960.00	226	6.03%	2.72	11	0%	-15%
	2006	160148	\$ 53,441.00	3159	5.99%	2.68	17	1%	55%
	2007	160160	\$ 57,329.00	12	5.88%	2.63	13	5%	-24%
	2008	168973	\$ 60,964.00	8813	6.15%	2.81	17	1%	31%
	2009	172352	\$ 62,379.00	3379	6.12%	2.76	15	0%	-12%
	2010	172231	\$ 64,197.00	-121	6.00%	2.88	17	1%	13%
2011	178168	\$ 66,882.00	5937	5.94%	2.73	17	0%	-	
2012	168559	\$ 68,620.00	-9609	5.65%	2.63	19	7%	12%	
2013	170429	\$ 66,948.00	187	5.74%	2.68	20	2%	5%	
14	1998	2255	-	-	1.47%	0.62	4	-	-
	1999	2318	\$ 62,283.00	63	1.52%	0.65	4	6%	-4%
	2000	1840	-	-415	1.23%	0.52	4	-8%	3%
	2001	1805	-	-450	1.24%	0.51	5	-1%	6%
	2002	1855	-	-400	1.20%	0.5	5	-6%	4%
	2003	1750	-	-505	1.27%	0.56	4	-1%	1%
	2004	1615	-	-640	1.24%	0.56	4	-1%	0%
	2005	1325	-	-930	1.05%	0.47	4	-5%	0%
	2006	1355	-	-900	1.11%	0.5	5	-2%	2%
	2007	1755	-	-500	1.30%	0.58	4	-2%	1%
	2008	2475	-	220	1.92%	0.88	5	-3%	2%
	2009	2325	-	70	1.90%	0.86	5	-2%	1%
	2010	2700	-	445	1.89%	0.85	6	1%	3%
2011	2792	\$ 277,635.00	537	1.91%	0.88	5	1%	2%	
2012	2605	\$ 121,435.00	350	1.77%	0.82	6	1%	3%	
2013	2651	\$ 158,860.00	396	1.78%	0.83	7	2%	4%	
15	1998	3121	\$ 31,954.00	-	5.65%	2.4	3	-	-
	1999	1910	\$ 46,495.00	-1211	3.33%	1.43	3	-5%	-3%
	2000	1840	\$ 48,820.00	-70	3.40%	1.43	3	-10%	-10%
	2001	1845	\$ 46,115.00	5	3.24%	1.34	3	-5%	15%
	2002	1715	\$ 65,009.00	-130	2.96%	1.24	2	3%	-28%
	2003	2248	\$ 41,959.00	533	3.38%	1.49	3	16%	8%
	2004	2014	\$ 52,987.00	-234	2.92%	1.32	3	7%	1%
	2005	1787	\$ 49,412.00	-227	2.55%	1.15	3	-1%	-6%
	2006	2097	\$ 53,963.00	310	2.71%	1.22	2	9%	-4%
	2007	2025	\$ 51,075.00	-72	2.67%	1.19	2	-5%	-7%
	2008	1618	\$ 62,175.00	-407	2.18%	1	2	11%	3%
	2009	1575	\$ 63,287.00	-43	2.22%	1	2	-7%	-13%
	2010	1614	\$ 60,740.00	39	2.24%	1	2	-1%	24%
2011	1369	\$ 61,917.00	-245	1.76%	0.81	3	2%	12%	
2012	1332	\$ 67,612.00	-37	1.51%	0.7	3	8%	0%	
2013	1683	\$ 67,043.00	351	1.96%	0.91	4	-1%	31%	
16	1998	88352	\$ 87,210.00	-	4.82%	2.05	1	-	-
	1999	83940	\$ 104,353.00	-4412	4.24%	1.82	1	3%	-8%
	2000	96695	\$ 117,071.00	12755	4.78%	2.01	1	10%	9%
	2001	97924	\$ 108,444.00	1229	4.55%	1.87	1	-1%	17%
	2002	107574	\$ 93,008.00	965	4.76%	2	1	10%	-21%
	2003	93649	\$ 106,524.00	-13925	4.11%	1.82	1	3%	-6%
	2004	92507	\$ 119,407.00	-1142	4.07%	1.83	1	0%	3%
	2005	91300	\$ 128,376.00	-1207	3.96%	1.75	1	3%	-13%
	2006	90704	\$ 132,401.00	-596	3.77%	1.69	1	3%	35%
	2007	92628	\$ 141,143.00	1924	3.92%	1.75	1	2%	-18%
	2008	95823	\$ 138,769.00	3195	4.36%	1.99	1	0%	20%
	2009	90605	\$ 135,811.00	-5218	4.49%	2.02	1	-6%	-6%
	2010	85033	\$ 151,925.00	-5572	4.48%	2.01	1	-3%	51%
2011	82673	\$ 160,077.00	-236	4.38%	2.01	1	-1%	0%	
2012	84629	\$ 156,547.00	1956	4.43%	2.06	1	0%	13%	

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17	1998	1676	\$ 29,686.00	-	3.29%	1.4	1	-	-
	1999	1845	\$ 29,046.00	169	3.68%	1.58	1	3%	52%
	2000	2660	\$ 34,463.00	815	5.40%	2.27	2	-3%	14%
	2001	2727	\$ 34,498.00	67	5.78%	2.38	2	3%	18%
	2002	2904	\$ 35,925.00	177	6.42%	2.7	2	-3%	-7%
	2003	3173	\$ 27,311.00	269	6.93%	3.06	1	15%	-27%
	2004	2287	\$ 48,424.00	-886	5.18%	2.33	1	-4%	18%
	2005	1943	\$ 39,843.00	-344	4.50%	2.03	1	-7%	-26%
	2006	1913	\$ 47,311.00	-30	4.61%	2.06	1	-1%	29%
	2007	1684	\$ 56,402.00	-229	4.38%	1.96	1	-1%	-21%
	2008	1841	\$ 53,150.00	157	4.73%	2.16	1	-9%	9%
	2009	1727	\$ 55,720.00	-114	4.75%	2.14	1	-6%	15%
	2010	1784	\$ 54,071.00	57	4.71%	2.11	1	-1%	6%
2011	1779	\$ 56,978.00	-5	4.77%	2.19	2	-2%	18%	
2012	1196	\$ 53,462.00	-583	3.22%	1.5	2	-3%	-6%	
2013	1238	\$ 53,297.00	42	3.31%	1.55	1	-6%	-39%	
18	1998	11064	\$ 28,359.00	-	1.16%	0.49	16	-	-
	1999	10542	\$ 25,872.00	-522	1.1%	0.47	16	-2%	-2%
	2000	11041	\$ 30,466.00	499	1.17%	0.49	16	-2%	-2%
	2001	11222	\$ 27,289.00	181	1.2%	0.49	17	3%	9%
	2002	10214	\$ 32,647.00	-1008	1.12%	0.47	14	-5%	-18%
	2003	9993	\$ 35,106.00	-221	1.08%	0.48	20	7%	40%
	2004	10305	\$ 52,544.00	312	1.12%	0.5	17	6%	-14%
	2005	11850	\$ 39,245.00	1545	1.3%	0.59	12	-6%	-27%
	2006	11933	\$ 41,214.00	83	1.31%	0.59	15	-	19%
	2007	11220	\$ 32,374.00	-713	1.23%	0.55	11	1%	-23%
	2008	11278	\$ 32,397.00	58	1.21%	0.55	11	1%	-5%
	2009	11747	\$ 32,874.00	469	1.29%	0.58	11	-7%	1%
	2010	11565	\$ 33,956.00	-182	1.27%	0.57	17	-3%	53%
2011	11383	\$ 31,964.00	-182	1.24%	0.57	13	4%	-21%	
2012	9836	\$ 51,864.00	-1547	1.08%	0.5	15	-2%	14%	
2013	10471	\$ 48,582.00	635	1.11%	0.52	21	8%	37%	
19	1998	3005	-	-	5.82%	2.48	10	-	-
	1999	3189	\$ 29,873.00	184	6.57%	2.63	9	8%	-4%
	2000	3000	-	-189	6.78%	2.84	11	-7%	21%
	2001	2249	\$ 29,633.00	-751	5.82%	2.4	9	-8%	-18%
	2002	1110	\$ 32,545.00	-1139	3.65%	1.53	6	-14%	-38%
	2003	1119	\$ 32,218.00	9	4.21%	1.86	10	-3%	73%
	2004	1102	\$ 37,929.00	-17	4.32%	1.94	10	-13%	-2%
	2005	1116	\$ 31,759.00	14	4.59%	2.07	5	-8%	-44%
	2006	1375	-	259	6.13%	2.75	15	4%	166%
	2007	902	\$ 45,224.00	-473	4.53%	2.03	10	4%	-31%
	2008	843	\$ 33,398.00	-59	4.80%	2.19	18	-23%	80%
	2009	780	\$ 40,787.00	-63	5.08%	2.29	12	-	-36%
	2010	790	\$ 35,789.00	10	5.14%	2.3	14	-15%	19%
2011	771	\$ 37,868.00	-19	5.00%	2.29	8	-	-39%	
2012	748	\$ 41,281.00	-23	5.03%	2.34	13	-12%	54%	
2013	752	\$ 39,211.00	4	4.92%	2.3	17	-	31%	
20	1998	96	\$ 54,333.00	-	0.09%	0.04	1	-	-
	1999	86	\$ 18,333.00	-10	0.08%	0.04	1	-6%	-28%
	2000	78	\$ 26,625.00	-8	0.07%	0.03	1	-19%	-19%
	2001	110	-	32	0.11%	0.05	1	15%	-8%
	2002	163	\$ 36,226.00	53	0.18%	0.08	1	-	39%
	2003	141	\$ 42,129.00	-22	0.15%	0.07	1	-19%	-4%
	2004	134	\$ 45,676.00	-7	0.14%	0.07	1	-8%	10%
	2005	180	-	46	0.21%	0.1	1	-	-5%
	2006	161	\$ 36,854.00	-19	0.20%	0.09	1	13%	-20%
	2007	220	-	59	0.28%	0.13	1	-7%	-11%
	2008	261	\$ 79,000.00	41	0.35%	0.16	0	-	-30%
	2009	194	\$ 40,353.00	-67	0.30%	0.14	1	-4%	49%
	2010	224	\$ 43,432.00	30	0.35%	0.16	1	-13%	36%
2011	228	\$ 42,421.00	4	0.35%	0.16	1	5%	-6%	
2012	273	\$ 62,564.00	45	0.42%	0.2	1	5%	62%	
2013	270	\$ 67,480.00	-3	0.41%	0.19	2	4%	7%	

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21	1998	5148	\$ 36,370.00	-	0.798%	0.34	13	-	-
	1999	5204	\$ 36,621.00	56	0.778%	0.33	14	3%	1%
	2000	4744	\$ 37,553.00	-460	0.704%	0.3	13	-2%	-7%
	2001	4894	\$ 37,543.00	150	0.764%	0.31	13	0%	1%
	2002	4894	\$ 44,815.00	-	0.818%	0.34	12	2%	-7%
	2003	3864	\$ 41,587.00	-1030	0.675%	0.3	15	-3%	26%
	2004	4157	\$ 44,507.00	293	0.737%	0.33	14	-4%	-8%
	2005	4115	\$ 46,084.00	-43	0.735%	0.33	11	-2%	-20%
	2006	4132	\$ 46,771.00	17	0.743%	0.33	12	-3%	11%
	2007	3710	\$ 48,989.00	-422	0.710%	0.32	10	-1%	-14%
	2008	2738	\$ 39,390.00	-972	0.594%	0.27	10	-18%	1%
	2009	2328	\$ 38,862.00	-410	0.648%	0.29	11	-8%	5%
	2010	2223	\$ 40,392.00	-105	0.690%	0.31	17	1%	56%
	2011	2185	\$ 38,793.00	-38	0.709%	0.33	18	-1%	4%
2012	1977	\$ 42,376.00	-208	0.632%	0.29	18	-1%	3%	
2013	2016	\$ 43,927.00	39	0.64%	0.3	20	-7%	8%	
22	1998	39047	\$ 22,576.00	-	1.54%	0.61	4	-	-
	1999	40970	\$ 23,948.00	1923	1.73%	0.64	5	-1%	29%
	2000	40547	\$ 27,244.00	-423	1.68%	0.6	4	1%	-11%
	2001	42695	\$ 27,110.00	2148	1.72%	0.61	4	0%	1%
	2002	38367	\$ 28,110.00	-4328	1.73%	0.59	4	-3%	-2%
	2003	38389	\$ 27,340.00	22	2.03%	0.59	4	-7%	-15%
	2004	38515	\$ 29,793.00	126	2.00%	0.6	3	-4%	-8%
	2005	39036	\$ 30,089.00	521	2.10%	0.6	3	-2%	-1%
	2006	39219	\$ 31,726.00	183	2.10%	0.59	4	0%	13%
	2007	39612	\$ 43,515.00	393	2.01%	0.59	4	1%	-1%
	2008	40714	\$ 42,345.00	1102	1.93%	0.61	4	-3%	0%
	2009	37952	\$ 42,547.00	-2762	1.87%	0.59	4	1%	-3%
	2010	37317	\$ 48,300.00	-635	1.81%	0.58	4	-1%	18%
	2011	37609	\$ 47,223.00	292	1.84%	0.59	6	1%	37%
2012	38147	\$ 51,041.00	538	1.83%	0.59	-	1%	-	
2013	-	-	-	-	-	-	-	-	
23	1998	94098	\$ 60,064.00	-	6.01%	2.56	651	-	-
	1999	90440	\$ 65,204.00	-3658	5.97%	2.57	666	-5%	2%
	2000	89915	\$ 80,518.00	-525	5.93%	2.49	697	-4%	5%
	2001	90571	\$ 69,538.00	656	5.82%	2.4	751	-2%	8%
	2002	84516	\$ 72,901.00	-6055	6.57%	2.76	646	-6%	-14%
	2003	78016	\$ 78,147.00	-65	6.21%	2.74	779	-2%	20%
	2004	70067	\$ 83,074.00	-7959	5.96%	2.68	791	-8%	2%
	2005	70131	\$ 81,045.00	64	6.17%	2.78	680	-3%	-14%
	2006	67725	\$ 87,278.00	-2406	5.94%	2.66	992	-5%	46%
	2007	63415	\$ 99,208.00	-431	5.57%	2.49	873	-1%	-12%
	2008	69396	\$ 97,305.00	5981	5.97%	2.73	918	1%	5%
	2009	66276	\$ 98,231.00	-312	6.20%	2.8	976	-5%	6%
	2010	61435	\$ 106,360.00	-4841	6.13%	2.74	1323	-4%	36%
	2011	60184	\$ 109,337.00	-1251	6.01%	2.76	1329	0%	0%
2012	62496	\$ 107,504.00	2312	6.05%	2.81	-	6%	-	
24	1998	45851	\$ 53,252.00	-	2.84%	1.21	0	-	-
	1999	44582	\$ 56,947.00	-1269	2.74%	1.18	0	-2%	7%
	2000	42967	\$ 59,235.00	-1615	2.74%	1.15	0	-4%	1%
	2001	39090	\$ 68,899.00	-3877	2.45%	1.01	0	1%	12%
	2002	44630	\$ 70,467.00	554	2.82%	1.18	0	-	-15%
	2003	40810	\$ 74,086.00	-382	2.59%	1.14	0	0%	23%
	2004	41268	\$ 90,177.00	458	2.65%	1.19	0	1%	6%
	2005	39054	\$ 84,512.00	-2214	2.65%	1.19	0	-6%	-15%
	2006	41582	\$ 85,776.00	2528	2.75%	1.23	0	-	57%
	2007	41421	\$ 99,139.00	-161	2.77%	1.24	0	0%	-16%
	2008	45888	\$ 97,810.00	4467	2.90%	1.32	0	8%	12%
	2009	40095	\$ 94,897.00	-5793	2.59%	1.17	0	5%	11%
	2010	36472	\$ 99,159.00	-3623	2.46%	1.1	0	-3%	39%
	2011	38214	\$ 105,098.00	1742	2.65%	1.22	0	-4%	2%
2012	38954	\$ 101,572.00	740	2.62%	1.22	0	3%	7%	
2013	41202	\$ 106,776.00	2248	2.74%	1.28	0	-1%	9%	

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25	1998	1267	\$ 35,086.00	-	2.11%	0.9	0	-	-
	1999	1079	\$ 44,239.00	-188	1.80%	0.77	0	-15%	-45%
	2000	1269	\$ 41,748.00	190	2.19%	0.92	0	18%	-
	2001	1292	\$ 34,697.00	23	2.33%	0.96	0	2%	-54%
	2002	600	\$ 37,892.00	-692	1.27%	0.53	0	-54%	37%
	2003	1243	\$ 34,615.00	643	2.65%	1.17	0	-	-41%
	2004	820	\$ 39,809.00	-423	1.80%	0.81	0	-34%	-33%
	2005	737	\$ 37,239.00	-83	1.80%	0.81	0	-10%	-4%
	2006	737	\$ 35,967.00	737	1.85%	0.83	0	-	-
	2007	324	\$ 39,435.00	-413	0.86%	0.39	0	-56%	35%
	2008	326	\$ 37,176.00	2	1.01%	0.46	0	1%	3%
	2009	281	\$ 42,223.00	-45	1.01%	0.46	0	-14%	-6%
	2010	299	\$ 40,939.00	18	1.15%	0.51	0	6%	84%
2011	289	\$ 36,582.00	-10	1.12%	0.51	0	-3%	-39%	
2012	225	\$ 41,493.00	-64	0.92%	0.43	1	-22%	-	
2013	245	\$ 38,016.00	20	0.98%	0.46	1	9%	-31%	
26	1998	1423	\$ 23,954.00	-	2.41%	1.03	3	-	-
	1999	1285	\$ 24,681.00	-138	2.25%	0.97	3	-4%	-10%
	2000	969	\$ 26,154.00	-454	1.74%	0.73	2	-6%	-15%
	2001	908	\$ 17,685.00	-515	1.74%	0.72	2	-7%	-17%
	2002	933	\$ 19,409.00	-490	2.12%	0.89	3	2%	57%
	2003	599	\$ 24,020.00	-824	1.36%	0.6	2	-17%	-44%
	2004	578	\$ 42,574.00	-845	1.31%	0.59	2	-4%	-4%
	2005	542	\$ 45,403.00	-881	1.27%	0.58	1	-16%	-5%
	2006	549	\$ 43,203.00	-874	1.28%	0.57	2	-	23%
	2007	1317	\$ 44,405.00	-106	3.05%	0.36	2	5%	-1%
	2008	707	\$ 38,000.00	-716	1.80%	0.82	1	-18%	-67%
	2009	612	\$ 37,071.00	-811	1.77%	0.8	2	3%	159%
	2010	543	\$ 38,032.00	-880	1.71%	0.76	2	-16%	20%
2011	597	\$ 40,830.00	-826	1.82%	0.84	2	3%	-1%	
2012	445	\$ 40,359.00	-978	1.34%	0.63	3	-	57%	
2013	467	\$ 43,425.00	22	1.53%	0.71	2	3%	-33%	
27	1998	13477	\$ 44,981.00	-	2.74%	1.17	104	-	-
	1999	10636	\$ 46,292.00	-2841	2.22%	0.96	96	3%	-8%
	2000	10872	\$ 48,500.00	236	2.26%	0.95	96	-1%	0%
	2001	14096	\$ 52,662.00	3224	2.98%	1.23	112	-4%	17%
	2002	10262	\$ 48,302.00	-3834	2.54%	1.07	110	-17%	-2%
	2003	9733	\$ 46,699.00	-529	2.7%	1.19	119	8%	9%
	2004	7814	\$ 48,978.00	-1919	2.27%	1.02	118	1%	-1%
	2005	8503	\$ 54,396.00	689	2.53%	1.14	110	-8%	-7%
	2006	7687	\$ 57,144.00	-816	2.29%	1.02	127	1%	15%
	2007	7305	\$ 64,022.00	-382	2.19%	0.98	119	-3%	-6%
	2008	9637	\$ 58,232.00	2332	2.84%	1.3	114	8%	-4%
	2009	7859	\$ 57,994.00	-1778	2.55%	1.15	128	-7%	12%
	2010	6583	\$ 63,572.00	-1276	2.37%	1.06	145	-2%	13%
2011	6398	\$ 66,336.00	-185	2.28%	1.05	146	-5%	1%	
2012	5609	\$ 67,369.00	-789	1.96%	0.91	145	2%	-1%	
2013	5115	\$ 66,123.00	-494	1.81%	0.85	173	-3%	19%	
28	1998	1317	\$ 33,534.00	-	0.26%	0.11	4	-	-
	1999	1496	\$ 37,026.00	179	0.30%	0.13	4	-	-16%
	2000	1559	\$ 34,461.00	63	0.30%	0.13	5	-6%	22%
	2001	1470	\$ 34,559.00	-89	0.28%	0.12	4	7%	-9%
	2002	1266	\$ 42,272.00	-204	0.24%	0.1	3	-19%	-23%
	2003	1650	-	384	0.32%	0.14	5	8%	53%
	2004	1460	-	-190	0.28%	0.13	4	-	-28%
	2005	1695	-	235	0.32%	0.15	3	-19%	-18%
	2006	1645	-	-50	0.32%	0.14	4	-	34%
	2007	1601	\$ 82,000.00	-44	0.32%	0.14	3	9%	-24%
	2008	1960	-	359	0.38%	0.18	3	-13%	9%
	2009	1760	-	-200	0.34%	0.16	3	-	-6%
	2010	1970	-	210	0.39%	0.18	4	14%	31%
2011	1970	-	197	0.40%	0.18	4	-13%	-10%	
2012	2370	-	400	0.48%	0.22	4	-14%	13%	
2013	2156	\$ 39,155.00	-214	0.44%	0.21	5	-	18%	



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29	1998	32388	\$ 51,238.00	-	2.96%	1.26	9	-	-
	1999	34067	\$ 55,910.00	1679	3.05%	1.31	10	-1%	8%
	2000	36339	\$ 65,410.00	2272	3.05%	1.28	10	2%	-3%
	2001	37234	\$ 63,076.00	895	3.04%	1.25	10	0%	3%
	2002	30355	\$ 64,221.00	-6879	2.67%	1.12	9	1%	-14%
	2003	29105	\$ 65,657.00	-125	2.49%	1.1	9	3%	7%
	2004	27933	\$ 73,022.00	-1172	2.40%	1.08	9	0%	-2%
	2005	29569	\$ 73,219.00	1636	2.44%	1.1	9	2%	-19%
	2006	31377	\$ 76,813.00	1808	2.48%	1.11	7	-1%	19%
	2007	31036	\$ 79,037.00	-341	2.42%	1.08	7	2%	-21%
	2008	38325	\$ 78,599.00	7289	2.89%	1.32	8	1%	15%
	2009	34819	\$ 72,371.00	-3506	2.87%	1.3	8	-6%	1%
	2010	32629	\$ 79,651.00	-219	2.83%	1.26	11	4%	35%
2011	32988	\$ 85,538.00	359	2.75%	1.26	11	-3%	4%	
2012	36859	\$ 88,221.00	3871	2.98%	1.39	-	-1%	-	
30	1998	8824	\$ 49,468.00	-	3.40%	1.45	104	-	-
	1999	9578	\$ 46,796.00	754	3.68%	1.59	109	1%	5%
	2000	9188	\$ 56,133.00	-390	3.52%	1.48	101	-7%	-7%
	2001	8860	\$ 60,600.00	-328	3.38%	1.39	105	-12%	4%
	2002	8340	\$ 54,146.00	-520	3.31%	1.39	94	4%	-10%
	2003	8064	\$ 59,849.00	-276	3.17%	1.4	114	-6%	21%
	2004	7822	\$ 65,998.00	-242	3.06%	1.38	97	1%	-15%
	2005	8738	\$ 75,218.00	916	3.40%	1.53	81	13%	-16%
	2006	9808	\$ 75,971.00	107	3.73%	1.67	95	-1%	17%
	2007	10941	\$ 78,709.00	1133	4.07%	1.82	79	-1%	-17%
	2008	10147	\$ 94,158.00	-794	3.64%	1.66	84	2%	6%
	2009	10224	\$ 76,117.00	77	3.71%	1.67	85	-1%	2%
	2010	9068	\$ 80,208.00	-1156	3.52%	1.58	123	-5%	45%
2011	8248	\$ 95,478.00	-820	3.16%	1.45	135	1%	9%	
2012	7121	\$ 85,006.00	-1127	2.67%	1.24	142	-1%	5%	
2013	7018	\$ 76,722.00	-103	2.71%	1.27	167	-1%	17%	
31	1998	-	-	-	0.00%	-	2	-	-
	1999	-	-	-	0.00%	-	1	-	-16%
	2000	40	-	-	0.10%	0.05	1	-	3%
	2001	40	-	-	0.11%	0.05	2	-	5%
	2002	10	-	-30	0.03%	0.02	1	-	-11%
	2003	10	-	-	0.03%	0.02	1	-	1%
	2004	10	-	-	0.03%	0.02	1	-	-22%
	2005	10	-	-	0.03%	0.02	1	-	3%
	2006	10	-	-	0.03%	0.01	1	-	-10%
	2007	10	-	-	0.02%	0.01	1	-	4%
	2008	20	-	10	0.05%	0.02	1	-	0%
	2009	10	-	-10	0.02%	0.01	1	-	36%
	2010	10	-	-	0.02%	0.01	2	-	11%
2011	10	-	-	0.02%	0.01	2	-	15%	
2012	10	-	-	0.02%	0.01	2	-	-15%	
2013	10	-	-	0.02%	0.01	2	-	44%	
32	1998	7927	\$ 34,309.00	-	1.24%	0.53	48	-	-
	1999	7522	\$ 37,286.00	-405	1.23%	0.53	54	-3%	12%
	2000	7892	\$ 40,233.00	370	1.32%	0.55	54	-4%	0%
	2001	7861	\$ 38,708.00	-31	1.36%	0.56	58	-3%	8%
	2002	6528	\$ 39,070.00	-1333	1.30%	0.54	50	-4%	-14%
	2003	5741	\$ 40,770.00	-787	1.15%	0.51	55	-3%	10%
	2004	6057	\$ 43,240.00	316	1.24%	0.56	47	-3%	-14%
	2005	6571	\$ 46,305.00	514	1.32%	0.6	40	0%	-15%
	2006	6438	\$ 47,550.00	-133	1.29%	0.58	38	-4%	-6%
	2007	6331	\$ 46,257.00	-107	1.28%	0.57	32	-3%	-16%
	2008	6559	\$ 48,443.00	228	1.27%	0.58	33	0%	5%
	2009	5610	\$ 46,972.00	-949	1.25%	0.57	32	-2%	-5%
	2010	5992	\$ 52,313.00	382	1.47%	0.66	42	-3%	33%
2011	6108	\$ 55,887.00	116	1.38%	0.63	49	-3%	16%	
2012	5575	\$ 54,366.00	-533	1.17%	0.54	50	5%	4%	
2013	5669	\$ 52,820.00	94	1.17%	0.55	58	0%	16%	

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33	1998	293	\$ 29,023.00	-	1.11%	0.47	0	-	-
	1999	362	\$ 31,822.00	69	1.56%	0.67	0	38%	5%
	2000	446	\$ 30,455.00	84	1.62%	0.68	0	-5%	-3%
	2001	583	\$ 21,875.00	137	2.16%	0.89	0	-3%	-3%
	2002	337	\$ 30,299.00	-246	1.35%	0.57	0	-5%	-12%
	2003	272	\$ 40,122.00	-65	1.03%	0.46	0	-31%	6%
	2004	294	\$ 44,143.00	22	1.17%	0.53	0	14%	0%
	2005	367	\$ 46,316.00	73	1.65%	0.74	0	-17%	-23%
	2006	350	-	-17	1.56%	0.7	0	6%	20%
	2007	243	\$ 58,978.00	-107	1.10%	0.49	0	14%	-22%
	2008	456	\$ 50,056.00	213	1.88%	0.86	0	17%	23%
	2009	446	\$ 43,086.00	-10	1.89%	0.85	0	-4%	0%
	2010	463	\$ 64,510.00	17	1.98%	0.88	0	12%	30%
2011	340	-	-123	1.50%	0.69	0	-2%	5%	
2012	356	\$ 53,631.00	16	1.55%	0.72	0	-2%	14%	
2013	220	\$ 50,314.00	-136	0.95%	0.45	0	7%	7%	
34	1998	916	\$ 58,946.00	-	0.89%	0.38	0	-	-
	1999	949	\$ 50,881.00	33	0.93%	0.4	0	10%	1%
	2000	765	\$ 53,147.00	-184	0.75%	0.32	0	2%	-1%
	2001	747	\$ 62,269.00	-18	0.75%	0.31	0	-7%	-6%
	2002	795	\$ 59,680.00	48	0.83%	0.35	0	12%	-11%
	2003	1002	\$ 52,914.00	207	1.06%	0.47	0	2%	13%
	2004	968	\$ 67,550.00	-34	0.98%	0.44	0	-4%	6%
	2005	970	-	2	0.96%	0.44	0	-6%	-3%
	2006	812	\$ 54,755.00	-158	0.77%	0.35	0	-16%	-18%
	2007	648	\$ 55,679.00	-164	0.59%	0.26	0	-14%	-13%
	2008	770	\$ 72,656.00	122	0.82%	0.37	0	6%	16%
	2009	646	\$ 64,536.00	-124	0.74%	0.34	0	-3%	22%
	2010	586	\$ 64,055.00	-60	0.72%	0.32	0	-	6%
2011	559	\$ 62,899.00	-27	0.68%	0.31	0	-3%	27%	
2012	427	\$ 69,464.00	-132	0.54%	0.25	0	-	-1%	
2013	384	\$ 67,909.00	-43	0.47%	0.22	0	-	25%	
35	1998	612	\$ 39,250.00	-	0.142%	0.06	11	-	-
	1999	533	\$ 38,278.00	-79	0.139%	0.06	11	7%	3%
	2000	691	\$ 64,182.00	158	0.174%	0.07	12	19%	5%
	2001	565	\$ 53,700.00	-126	0.132%	0.05	12	-8%	1%
	2002	652	\$ 45,730.00	87	0.158%	0.07	11	23%	-7%
	2003	729	\$ 97,976.00	77	0.184%	0.08	11	-7%	-2%
	2004	504	\$ 57,128.00	-225	0.123%	0.06	12	-10%	13%
	2005	435	-	-69	0.102%	0.05	9	-	-26%
	2006	495	-	60	0.103%	0.05	10	-8%	10%
	2007	419	\$ 53,940.00	-76	0.067%	0.03	9	-	-11%
	2008	555	\$ 72,072.00	136	0.097%	0.04	10	6%	14%
	2009	320	-	-235	0.058%	0.03	12	-	16%
	2010	320	-	-	0.06%	0.03	13	-	15%
2011	420	-	100	0.07%	0.03	16	3%	16%	
2012	353	\$ 35,184.00	-67	0.05%	0.02	17	-	9%	
2013	370	\$ 40,857.00	17	0.053%	0.02	19	25%	11%	
36	1998	7703	\$ 36,075.00	-	1.36%	0.58	20	-	-
	1999	7527	\$ 33,949.00	-176	1.35%	0.58	22	-5%	11%
	2000	7756	\$ 37,501.00	229	1.40%	0.59	21	-1%	-4%
	2001	7097	\$ 37,647.00	-659	1.33%	0.55	20	-8%	-6%
	2002	6468	\$ 34,695.00	-629	1.30%	0.55	18	-	-10%
	2003	5648	\$ 38,310.00	-820	1.17%	0.52	22	-11%	25%
	2004	5280	\$ 42,165.00	-368	1.14%	0.51	19	-4%	-15%
	2005	5090	\$ 42,138.00	-190	1.12%	0.51	15	-2%	-22%
	2006	4957	\$ 42,733.00	-133	1.12%	0.5	18	-9%	23%
	2007	4655	\$ 45,210.00	-302	1.10%	0.49	12	5%	-35%
	2008	4240	\$ 42,139.00	-415	1.03%	0.47	13	-6%	10%
	2009	3291	\$ 42,906.00	-949	0.86%	0.39	14	-10%	10%
	2010	3500	\$ 49,222.00	209	0.95%	0.43	20	-2%	38%
2011	3275	\$ 50,378.00	-225	0.90%	0.41	26	-7%	33%	
2012	2468	\$ 64,528.00	-807	0.69%	0.32	25	-4%	-5%	
2013	2510	\$ 54,665.00	42	0.70%	0.33	29	2%	15%	

Cluster Code	Year	Employment	Annual Wage	Job creation	National Employment Share	Location Quotient	Patent Count	Patent Count Growth	Establishments Growth rate
37	1998	5224	\$ 43,036.00	-	2.36%	1.01	2	-	-
	1999	6246	\$ 45,789.00	1022	2.61%	1.12	2	3%	-2%
	2000	6565	\$ 39,279.00	319	2.61%	1.09	1	5%	-12%
	2001	7202	\$ 40,125.00	637	2.80%	1.15	1	1%	9%
	2002	7269	\$ 50,540.00	67	2.70%	1.13	1	9%	-21%
	2003	4610	\$ 34,127.00	-2659	1.61%	0.71	1	0%	-35%
	2004	4955	\$ 32,658.00	345	1.74%	0.78	1	3%	70%
	2005	5048	\$ 36,274.00	93	1.70%	0.77	1	-4%	-40%
	2006	6703	\$ 44,060.00	1655	2.20%	0.99	1	-2%	74%
	2007	7164	\$ 29,989.00	461	2.31%	1.03	1	6%	-2%
	2008	7436	\$ 35,165.00	272	2.29%	1.04	2	4%	35%
	2009	7239	\$ 31,889.00	-197	2.36%	1.07	2	-7%	5%
	2010	7623	\$ 31,603.00	384	2.49%	1.11	2	-5%	-12%
2011	7334	\$ 34,815.00	-289	2.42%	1.11	2	3%	14%	
2012	7223	\$ 44,771.00	-111	2.28%	1.06	2	8%	12%	
2013	7322	\$ 55,260.00	99	2.24%	1.04	2			
39	1998	17260	\$ 36,585.00	-	1.97%	0.84	14	-	-
	1999	16309	\$ 39,559.00	-951	1.89%	0.81	15	-2%	12%
	2000	15924	\$ 42,177.00	-385	1.89%	0.79	17	-5%	9%
	2001	14711	\$ 43,106.00	-1213	1.81%	0.74	13	-6%	-23%
	2002	12338	\$ 41,064.00	-2373	1.68%	0.7	11	-1%	-14%
	2003	12753	\$ 41,849.00	415	1.75%	0.77	13	-5%	13%
	2004	11427	\$ 41,936.00	-1326	1.64%	0.74	15	-1%	16%
	2005	10322	\$ 44,636.00	-1105	1.51%	0.68	8	-7%	-42%
	2006	10584	\$ 46,980.00	262	1.59%	0.71	10	-6%	15%
	2007	10213	\$ 50,072.00	-371	1.59%	0.7	8	-1%	-22%
	2008	10820	\$ 47,169.00	607	1.66%	0.76	8	4%	0%
	2009	9251	\$ 45,500.00	-1569	1.60%	0.72	7	-7%	-12%
	2010	8684	\$ 45,717.00	-567	1.66%	0.74	11	-7%	65%
2011	7929	\$ 47,007.00	-755	1.57%	0.72	9	-7%	-20%	
2012	7436	\$ 48,692.00	-493	1.51%	0.7	10	-4%	10%	
2013	7506	\$ 50,889.00	70	1.54%	0.72	13	-4%	28%	
40	1998	16863	\$ 46,378.00	-	1.34%	0.57	219	-	-
	1999	16491	\$ 46,499.00	-372	1.33%	0.57	230	-1%	5%
	2000	16347	\$ 51,252.00	-144	1.34%	0.56	234	-3%	1%
	2001	18021	\$ 50,373.00	1674	1.52%	0.63	243	-2%	4%
	2002	15559	\$ 53,995.00	-2462	1.49%	0.63	218	-9%	-10%
	2003	14698	\$ 56,860.00	-861	1.45%	0.64	218	-10%	9%
	2004	13215	\$ 62,350.00	-1483	1.34%	0.61	215	-5%	-10%
	2005	13163	\$ 61,946.00	-52	1.30%	0.59	183	1%	-15%
	2006	12140	\$ 65,112.00	-1023	1.18%	0.53	198	-6%	8%
	2007	12409	\$ 58,471.00	269	1.20%	0.53	165	-4%	-17%
	2008	11696	\$ 62,193.00	-713	1.11%	0.51	166	-	1%
	2009	11016	\$ 62,012.00	-680	1.16%	0.52	153	-3%	-8%
	2010	9969	\$ 66,191.00	-1047	1.16%	0.52	210	-1%	38%
2011	9306	\$ 65,943.00	-663	1.05%	0.48	232	-5%	10%	
2012	9098	\$ 62,951.00	-208	0.954%	0.44	260	4%	12%	
2013	9301	\$ 76,110.00	203	0.959%	0.45	279	-1%	7%	
41	1998	3037	\$ 40,472.00	-	1.03%	0.44	29	-	-
	1999	2994	\$ 38,958.00	-43	1.07%	0.46	34	-1%	18%
	2000	3013	\$ 42,758.00	19	1.08%	0.45	35	1%	1%
	2001	3034	\$ 43,697.00	21	1.16%	0.48	34	1%	-3%
	2002	3413	\$ 43,887.00	379	1.42%	0.6	29	12%	-13%
	2003	3724	\$ 46,611.00	311	1.38%	0.61	30	9%	4%
	2004	3786	\$ 47,934.00	62	1.44%	0.65	27	2%	-12%
	2005	3693	\$ 51,551.00	-93	1.47%	0.66	22	-2%	-19%
	2006	3523	\$ 58,926.00	-170	1.45%	0.65	25	-5%	16%
	2007	4049	\$ 56,022.00	526	1.75%	0.78	26	15%	1%
	2008	3524	\$ 51,152.00	-525	1.65%	0.76	26	-13%	1%
	2009	3084	\$ 47,382.00	-440	1.69%	0.76	26	-12%	0%
	2010	3106	\$ 51,179.00	22	1.86%	0.83	34	1%	31%
2011	3122	\$ 56,299.00	16	1.85%	0.85	39	1%	17%	
2012	2897	\$ 55,279.00	-225	1.80%	0.84	42	-7%	7%	
2013	2367	\$ 60,418.00	-530	1.53%	0.72	49	-18%	16%	

Cluster Code	Year	Employment	Annual Wage	Job creation	National Employment Share	Location Quotient	Patent Count	Patent Count Growth	Establishments Growth rate
42	1998	6356	\$ 35,142.00	-	0.97%	0.41	13	-	-
	1999	6359	\$ 39,192.00	3	1.02%	0.44	19	2%	44%
	2000	7157	\$ 35,717.00	798	1.22%	0.51	14	-7%	-27%
	2001	6249	\$ 37,202.00	-908	1.16%	0.48	14	-2%	5%
	2002	4458	\$ 40,265.00	-1791	0.97%	0.41	11	-8%	-21%
	2003	5306	\$ 45,764.00	848	1.20%	0.53	15	-3%	32%
	2004	3989	\$ 51,822.00	-1317	1.02%	0.46	15	-1%	2%
	2005	3930	\$ 51,467.00	-59	1.10%	0.5	11	-8%	-24%
	2006	3728	\$ 51,324.00	-202	1.15%	0.51	12	5%	1%
	2007	3532	\$ 50,958.00	-196	1.19%	0.53	11	-2%	-3%
	2008	5008	\$ 52,215.00	1476	1.90%	0.87	10	-10%	-15%
	2009	3279	\$ 58,212.00	-1729	1.51%	0.68	10	-	1%
	2010	3014	\$ 68,766.00	-265	1.52%	0.68	11	-9%	9%
2011	3345	\$ 65,072.00	331	1.70%	0.78	15	-2%	46%	
2012	3031	\$ 55,599.00	-314	1.59%	0.74	13	-2%	-19%	
2013	3038	\$ 60,317.00	7	1.60%	0.75	17	4%	35%	
43	1998	-	-	-	0%	-	1	-	-
	1999	-	-	-	0%	-	3	-	191%
	2000	-	-	-	0%	-	1	-	-44%
	2001	10	-	10	0.04%	0.02	0	-	-74%
	2002	60	-	50	0.25%	0.1	0	-	2%
	2003	10	-	-50	0.042%	0.02	1	-	52%
	2004	60	-	50	0.267%	0.12	1	-	94%
	2005	-	-	-60	0%	-	0	-10%	-67%
	2006	-	-	-	0%	-	0	-	8%
	2007	-	-	-	0%	-	0	-	-42%
	2008	-	-	-	0%	-	0	-	51%
	2009	-	-	-	0%	-	0	-	-17%
	2010	-	-	-	0%	-	1	-	184%
2011	11	\$ 355,000.00	-	0.073%	0.03	0	-	-53%	
2012	10	-	-1	0.068%	0.03	1	-8%	122%	
2013	10	-	0	0.07%	0.03	2	-	107%	
44	1998	360	-	-	0.21%	0.09	6	-	-
	1999	360	-	-	0.20%	0.09	8	7%	35%
	2000	350	-	-10	0.19%	0.08	8	-7%	-2%
	2001	340	-	-10	0.20%	0.09	7	-7%	-5%
	2002	336	\$ 34,161.00	-4	0.22%	0.09	7	-	-7%
	2003	370	-	34	0.22%	0.1	8	8%	10%
	2004	380	-	10	0.21%	0.1	7	7%	-14%
	2005	360	-	-20	0.20%	0.09	6	-	-9%
	2006	360	-	-	0.20%	0.09	6	-7%	-5%
	2007	445	-	85	0.27%	0.12	6	-7%	4%
	2008	535	-	90	0.38%	0.17	6	15%	-5%
	2009	310	-	-225	0.31%	0.14	6	13%	6%
	2010	800	-	-10	0.31%	0.14	6	-12%	2%
2011	350	-	50	0.33%	0.15	8	-13%	31%	
2012	230	\$ 34,240.00	-120	0.20%	0.09	9	-8%	14%	
2013	234	\$ 35,981.00	4	0.19%	0.09	12	8%	23%	
45	1998	26365	\$ 34,619.00	-	1.72%	0.73	1	-	-
	1999	26547	\$ 36,844.00	182	1.66%	0.71	1	2%	-6%
	2000	26830	\$ 38,522.00	283	1.59%	0.67	2	1%	13%
	2001	27481	\$ 40,347.00	651	1.63%	0.67	2	3%	0%
	2002	17386	\$ 41,712.00	-10095	1.10%	0.46	1	-1%	-8%
	2003	17527	\$ 40,003.00	141	1.07%	0.47	2	-2%	14%
	2004	18373	\$ 42,227.00	846	1.14%	0.51	1	5%	-19%
	2005	17444	\$ 51,467.00	-929	1.06%	0.5	1	3%	-10%
	2006	17596	\$ 44,803.00	152	1.04%	0.47	1	2%	22%
	2007	17131	\$ 45,337.00	-465	1.03%	0.46	1	1%	-16%
	2008	17810	\$ 47,140.00	679	1.05%	0.48	1	1%	2%
	2009	16679	\$ 46,842.00	-1131	1.06%	0.48	1	-	1%
	2010	16169	\$ 48,797.00	-510	1.07%	0.48	2	-6%	24%
2011	16683	\$ 48,796.00	514	1.08%	0.49	2	-2%	13%	
2012	16512	\$ 48,553.00	-171	1.07%	0.5	2	-3%	6%	
2013	16673	\$ 51,585.00	161	1.05%	0.49	2	3%	21%	

Cluster Code	Year	Employment	Annual Wage	Job creation	National Employment Share	Location Quotient	Patent Count	Patent Count Growth	Establishments Growth rate
46	1998	2000	-	-	0.89%	0,38	99	-	-
	1999	765	-	-1235	0.35%	0,15	99	-21%	0%
	2000	1100	-	335	0.52%	0,22	106	11%	8%
	2001	785	-	-315	0.39%	0,16	105	-7%	-1%
	2002	1535	-	750	0.81%	0,34	111	7%	6%
	2003	1795	-	260	0.97%	0,43	111	-10%	0%
	2004	1036	\$ 106,848,00	-759	0.57%	0,26	102	11%	-8%
	2005	995	-	-41	0.56%	0,25	90	-7%	-12%
	2006	860	-	-135	0.49%	0,22	105	-	17%
	2007	1740	\$ 58.100,00	880	0.93%	0,42	99	11%	-6%
	2008	1322	\$ 83.274,00	-418	0.73%	0,34	102	3%	3%
	2009	1126	\$ 159.667,00	-196	0.67%	0,3	112	6%	10%
	2010	1445	-	319	0.89%	0,4	126	-3%	13%
47	1998	3342	\$ 43.876,00	-	0.55%	0,23	12	-	-
	1999	3341	\$ 43.205,00	-1	0.56%	0,24	13	-3%	11%
	2000	3797	\$ 44.465,00	456	0.63%	0,27	13	6%	-2%
	2001	3655	\$ 44.396,00	-142	0.63%	0,26	16	-3%	21%
	2002	2583	\$ 46.330,00	-1072	0.51%	0,22	15	-3%	-7%
	2003	2055	\$ 46.169,00	-528	0.43%	0,19	16	-10%	13%
	2004	2096	\$ 45.830,00	41	0.46%	0,21	14	-4%	-14%
	2005	1846	\$ 45.908,00	-250	0.41%	0,19	13	-12%	-10%
	2006	1856	\$ 51.923,00	10	0.41%	0,18	13	6%	2%
	2007	1638	\$ 50.104,00	-218	0.37%	0,17	11	-10%	-13%
	2008	1530	\$ 43.416,00	-108	0.35%	0,16	10	-7%	-15%
	2009	2159	\$ 45.044,00	629	0.56%	0,25	10	4%	-1%
	2010	1607	\$ 48.761,00	-552	0.44%	0,2	12	3%	125%
48	1998	1570	\$ 41.398,00	-	1.26%	0,54	0	-	-
	1999	1438	\$ 46.614,00	-132	1.07%	0,46	0	-1%	19%
	2000	1533	\$ 53.042,00	95	1.14%	0,48	0	2%	-9%
	2001	1521	\$ 49.836,00	-12	1.09%	0,45	0	-8%	-7%
	2002	1094	\$ 56.575,00	-427	0.904%	0,38	0	-1%	-9%
	2003	1298	\$ 51.380,00	204	1.06%	0,47	0	2%	14%
	2004	1113	\$ 57.709,00	-185	0.267%	0,34	0	8%	-11%
	2005	886	\$ 64.310,00	-227	0.746%	0,25	0	-7%	-23%
	2006	1430	\$ 58.568,00	544	0.554%	0,36	0	-1%	51%
	2007	1312	\$ 59.357,00	-118	0.813%	0,35	0	9%	-19%
	2008	1263	\$ 65.269,00	-49	0.774%	0,3	0	4%	12%
	2009	1212	\$ 57.132,00	-51	0.652%	0,3	0	-4%	12%
	2010	1309	\$ 64.034,00	97	0.81%	0,36	0	-3%	52%
49	1998	3258	\$ 35.137,00	-	0.79%	0,34	20	-	-
	1999	2941	\$ 41.293,00	-317	0.72%	0,31	22	1%	7%
	2000	3101	\$ 41.836,00	160	0.75%	0,32	22	-5%	2%
	2001	3554	\$ 43.461,00	453	0.89%	0,37	25	-	12%
	2002	2854	\$ 41.455,00	-700	0.80%	0,34	20	2%	-18%
	2003	2414	\$ 37.957,00	-440	0.71%	0,32	23	-4%	11%
	2004	2389	\$ 44.013,00	-25	0.72%	0,33	21	-2%	-6%
	2005	2681	\$ 45.467,00	292	0.85%	0,39	17	1%	-20%
	2006	2507	\$ 45.144,00	-174	0.81%	0,36	19	-1%	9%
	2007	2469	\$ 35.004,00	-38	0.85%	0,38	19	-5%	4%
	2008	2465	\$ 39.974,00	-4	0.87%	0,4	21	14%	9%
	2009	2038	\$ 50.266,00	-427	0.84%	0,38	18	-4%	-14%
	2010	2133	\$ 45.489,00	95	0.95%	0,43	29	3%	62%
50	1998	1624	\$ 26.671,00	-	0.564%	0,24	8	-	-
	1999	1843	\$ 26.370,00	219	0.639%	0,28	9	5%	17%
	2000	1810	-	-33	0.611%	0,26	9	-	4%
	2001	1645	-	-165	0.571%	0,24	8	5%	-10%
	2002	1538	\$ 24.162,00	-107	0.564%	0,24	2	-7%	-70%
	2003	2026	\$ 45.000,00	488	0.735%	0,32	7	-3%	176%
	2004	2200	-	174	0.747%	0,34	4	3%	-44%
	2005	1995	-	-205	0.674%	0,3	5	-8%	33%
	2006	1551	\$ 21.915,00	-444	0.513%	0,23	5	5%	9%
	2007	1495	\$ 43.110,00	-56	0.472%	0,21	8	4%	41%
	2008	1638	\$ 38.526,00	143	0.511%	0,23	6	-5%	-18%
	2009	1497	\$ 34.193,00	-141	0.513%	0,23	4	-3%	-45%
	2010	1386	\$ 39.174,00	-111	0.502%	0,22	6	-8%	68%
2011	1370	\$ 54.700,00	-16	0.490%	0,23	7	-3%	14%	
2012	955	\$ 58.301,00	-415	0.322%	0,15	6	13%	-19%	
2013	826	\$ 60.107,00	-129	0.275%	0,13	9	-12%	59%	
	1998	2058	\$ 28.838,00	-	0.40%	0,17	7	-	-
	1999	2126	\$ 33.012,00	68	0.40%	0,17	7	5%	3%
	2000	2288	\$ 23.624,00	162	0.42%	0,18	6	2%	-16%
	2001	2078	\$ 37.424,00	-210	0.40%	0,17	7	-2%	28%
	2002	1895	\$ 38.566,00	-183	0.39%	0,16	6	-1%	-25%
	2003	2628	\$ 35.514,00	733	0.54%	0,24	7	9%	22%
	2004	2170	\$ 38.371,00	-458	0.43%	0,2	6	1%	-11%
2005	2135	\$ 44.949,00	-35	0.41%	0,19	5	-2%	-20%	

## 5. List of Traded Cluster<sup>37</sup> San Diego - Metropolitan Area (CA)

Cluster	Subcluster	Related Organizations	Region Code	Cluster Code
<b>Aerospace Vehicles and Defense (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Aircraft</li> <li>- Search and Navigation Equipment</li> <li>- Missiles and Space Vehicles</li> </ul>	<ul style="list-style-type: none"> <li>- The Maritime Alliance Foundation (TMA Foundation)</li> <li>- The Maritime Alliance</li> </ul>	41740	1
<b>Agricultural Inputs and Services (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Agricultural Services</li> <li>- Fertilizers</li> <li>- Farm Management and</li> <li>- Labor Services</li> </ul>	-	41740	2
<b>Apparel (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Men's Clothing</li> <li>- Accessories and Specialty Apparel</li> <li>- Apparel Contractors</li> <li>- Women's Clothing</li> </ul>	-	41740	3
<b>Automotive (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Motor Vehicles</li> <li>- Military Vehicles and Tanks</li> <li>- Small Vehicles</li> <li>- Gasoline Engines and Engine Parts</li> <li>- Metal Mills and Foundries</li> <li>- Automotive Parts</li> </ul>	-	41740	4
<b>Biopharmaceutical (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Biopharmaceutical Products</li> <li>- Biological Products</li> <li>- Diagnostic Substances</li> </ul>	-	41740	5
<b>Business Services (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Corporate Headquarters</li> <li>- Computer Services</li> <li>- Consulting Services</li> </ul>	<ul style="list-style-type: none"> <li>-The Maritime Alliance Foundation (TMA Foundation)</li> <li>-The Maritime Alliance</li> </ul>	41740	6

<sup>37</sup> Source: <http://www.clustermapping.us/cluster> definition: "THE ENGINES OF REGIONAL ECONOMIES Serve markets in other regions or nations; Concentrated in regions that afford specific competitive advantages; Example industries: aircraft manufacturing, management consulting, iron ore mining."

	<ul style="list-style-type: none"> <li>- Engineering Services</li> <li>- Business Support Services</li> <li>- Architectural and Drafting Services</li> <li>- Employment Placement Services</li> <li>- Ground Passenger Transportation</li> </ul>	-Beacon Economics LLC		
<b>Coal Mining (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Coal Mining</li> </ul>	-	41740	7
<b>Communications Equipment and Services (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Communications Equipment Components</li> <li>- Communications Services</li> <li>- Communications Equipment</li> </ul>	-	41740	8
<b>Construction Products and Services (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Construction Components</li> <li>- Water, Sewage, and Other Systems</li> <li>- Construction Materials</li> <li>- Construction Products</li> <li>- Construction</li> </ul>	-	41740	9
<b>Distribution and Electronic Commerce (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Wholesale Trade Agents and Brokers</li> <li>- Warehousing and Storage</li> <li>- Wholesale of Drugs and Druggists' Sundries</li> <li>- Wholesale of Electrical and Electronic Goods</li> <li>- Support Services</li> <li>- Wholesale of Petroleum and Petroleum Products</li> <li>- Electronic and Catalog Shopping</li> <li>- Wholesale of Toy and Hobby Goods and Supplies</li> <li>- Wholesale of Transportation</li> </ul>	-	41740	10

	<p>Equipment and Supplies (except Motor Vehicles)</p> <ul style="list-style-type: none"> <li>- Wholesale of Jewelry, Watches, Precious Stones, and Precious Metals</li> <li>- Rental and Leasing</li> <li>- Warehousing and Storage</li> <li>- Wholesale of Farm and Garden Machinery and Equipment</li> <li>- Wholesale of Furniture and Home Furnishing</li> <li>- Wholesale of Service Establishment Equipment, and Supplies</li> <li>- Wholesale of Construction and Mining Machinery and Equipment</li> <li>- Wholesale of Farm Products and Supplies</li> <li>- Wholesale of Metals and Minerals (except Petroleum)</li> <li>- Wholesale of Sporting and Recreational Goods and Supplies</li> <li>- Wholesale of Chemical and Allied Products</li> <li>- Wholesale of Other Merchandise</li> <li>- Wholesale of Books, Periodicals, and Newspapers</li> <li>- Wholesale of Apparel and Accessories</li> </ul>		
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	<ul style="list-style-type: none"> <li>- Wholesale of Paper and Paper Products</li> <li>- Wholesale of Food Products</li> <li>- Wholesale of Industrial Machinery, Equipment, and Supplies</li> <li>- Wholesale of Professional and Commercial Equipment and Supplies</li> </ul>			
<b>Downstream Chemical Products (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Dyes, Pigments and Coating</li> <li>- Lubricating Oils and Greases</li> <li>- Explosive</li> <li>- Personal Care and Cleaning Products</li> <li>- - Processed Chemical Products</li> </ul>	-	41740	11
<b>Downstream metal products (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Fabricated Metal Structures</li> <li>- Metal Containers</li> <li>- Ammunition</li> <li>- Metal Products</li> </ul>	-	41740	12
<b>Education and Knowledge Creation</b>	<ul style="list-style-type: none"> <li>- Colleges, Universities, and Professional Schools</li> <li>- Research Organizations</li> <li>- Training Programs</li> <li>- Educational Support Services</li> <li>- Professional Organizations</li> </ul>	-	41740	13
<b>Electric Power Generation and Transmission (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Fossil Fuel Electric Power</li> <li>- Alternative Electric Power</li> <li>- Electric Power Transmission</li> </ul>	-	41740	14
<b>Environmental Services (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Waste Processing</li> <li>- Waste Collection</li> <li>- Other Waste Management Services</li> </ul>	-	41740	15

<b>Financial Services (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Financial Investment Activities</li> <li>- Credit Intermediation</li> <li>- Credit Bureaus</li> <li>- Monetary Authorities - Central Bank</li> <li>- Securities Brokers</li> <li>- Dealers</li> <li>- Exchanges</li> </ul>	-	41740	16
<b>Fishing and Fishing Products (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- - Fishing and Fishing Products</li> </ul>	-	41740	17
<b>Food Processing (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Specialty Foods and Ingredient</li> <li>- Packaged Fruit and Vegetables</li> <li>- Distilleries</li> <li>- Candy and Chocolate</li> <li>- Malt Beverages</li> <li>- Wineries</li> <li>- Coffee and Tea</li> <li>- Glass Containers</li> <li>- Milling and Refining of Sugar</li> <li>- Farm Wholesalers</li> <li>- Milling and Refining of Cereals and Oilseeds</li> <li>- Animal Foods</li> <li>- Baked Goods</li> <li>- Dairy Products</li> <li>- Soft Drinks and Ice</li> </ul>	-	41740	18
<b>Footwear (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Footwear Components</li> <li>- Footwear</li> </ul>	-	41740	19
<b>Forestry (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- - Forestry</li> </ul>	-	41740	20
<b>Furniture (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Office Furniture</li> <li>- Mobile Homes</li> <li>- Wood Cabinets and Woodwork</li> <li>- Household Furniture</li> <li>- Institutional Furniture</li> </ul>	-	41740	21
<b>Hospitality and Tourism (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Spectator Sports</li> <li>- Amusement Parks and Arcades</li> </ul>	-	41740	22

	<ul style="list-style-type: none"> <li>- Cultural and Educational Entertainment</li> <li>- Gambling Facilities</li> <li>- Other Tourism Attractions</li> <li>- Accommodations and Related Services</li> <li>- Tourism Related Services</li> </ul>			
<b>Information technology and Analytical Instruments (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Medical Apparatus</li> <li>- Software Publishers</li> <li>- Software reproducing</li> <li>- Audio and Video Equipment</li> <li>- Computers and Peripherals</li> <li>- Semiconductors</li> <li>- Process and Laboratory Instruments</li> <li>- Electronic Components</li> </ul>	<ul style="list-style-type: none"> <li>- The Maritime Alliance Foundation (TMAF)</li> <li>- The Maritime Alliance (TMA)</li> </ul>	41740	23
<b>Insurance Services (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Insurance Related Services</li> <li>- Reinsurance Carriers</li> <li>- Insurance Carriers</li> </ul>	-	41740	24
<b>Jewelry and Precious Metals (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Jewelry and Precious Metals Products</li> </ul>	-	41740	25
<b>Leather and Related Products (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Women's Handbags and Purses</li> <li>- Textile Bags and Canvas Products</li> <li>- Personal Leather Goods and Luggage</li> </ul>	-	41740	26
<b>Lighting and Electrical Equipment (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Storage Batteries</li> <li>- Lighting Fixtures and Parts</li> <li>- Electrical Components</li> <li>- Electrical Equipment</li> </ul>	-	41740	27
<b>Livestock Processing (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Meat Processing</li> </ul>	-	41740	28

	- Livestock Merchant Wholesalers			
<b>Marketing, Design and Publishing (San Diego-Carlsbad, CA)</b>	- Advertising Related Services - Other Marketing Related Services - Design Services - Publishing	-	41740	<b>29</b>
<b>Medical Devices (San Diego-Carlsbad, CA)</b>	- Optical Instruments and Ophthalmic Goods - Surgical and Dental Instruments and Supplies	-	41740	<b>30</b>
<b>Metal Mining (San Diego-Carlsbad, CA)</b>	- - Metal Mining	-	41740	<b>31</b>
<b>Metalworking Technology (San Diego-Carlsbad, CA)</b>	- Metalworking Machinery - Hand Tools - Fasteners - Machine Tools and Accessories - - Metal Processing	-	41740	<b>32</b>
<b>Music and Sound Recording (San Diego-Carlsbad, CA)</b>	- Music and Sound Recording	-	41740	<b>33</b>
<b>Non Metal Mining (San Diego-Carlsbad, CA)</b>	- Non Metal Mining	-	41740	<b>34</b>
<b>Oil and Gas Production and Transportation (San Diego-Carlsbad, CA)</b>	- Pipeline Transportation - Oil and Gas Extraction - Support Activities for Oil and Gas Operations - Petroleum Processing - Oil and Gas Machinery - Drilling Wells	-	41740	<b>35</b>
<b>Paper and Packaging (San Diego-Carlsbad, CA)</b>	- Packaging - Paper Mills - - Paper Products	-	41740	<b>36</b>
<b>Performing Arts (San Diego-Carlsbad, CA)</b>	- Promoters and Managers - - Performing Artists	-	41740	<b>37</b>
<b>Performing Arts (San Diego-Carlsbad, CA)</b>	- Promoters and Managers - - Performing Artists	-	41740	<b>37</b>

<b>Printing Services (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Printing Services</li> <li>- Support Activities for Printing</li> <li>- Printing Inputs</li> <li>- Greeting Card Printing and Publishing</li> </ul>	-	41740	39
<b>Production Technology and Heavy Machinery (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Air Handling Equipment</li> <li>- Moving and Material Handling Equipment</li> <li>- Agricultural and Construction Machinery and Components</li> <li>- Commercial and Service Industry Machinery</li> <li>- Process Equipment and Components</li> <li>- Industrial Machinery</li> </ul>	-	41740	40
<b>Recreational and Small Electric Goods (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Sporting and Athletic Goods</li> <li>- Recreational and Decorative Goods</li> <li>- Electric Housewares</li> <li>- Games, Toys, and Children's Vehicles</li> <li>- Motorcycles and Bicycles</li> <li>- Office Supplies</li> </ul>	-	41740	41
<b>Textile Manufacturing (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Fabric Mills</li> <li>- Fibers</li> <li>- Other Textile Products</li> <li>- Knitting Mills</li> <li>- Yarn and Thread Mills</li> <li>- Household Textile Products</li> <li>- Textile and Fabric Finishing</li> </ul>		41740	42
<b>Tobacco (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Tobacco</li> </ul>	-	41740	43
<b>Trailers, Motor Homes &amp; Appliances (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Trailers and Motor Homes</li> <li>- Household Appliances</li> <li>- Burial Caskets</li> </ul>	-	41740	44

<b>Transportation and Logistics (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Trucking</li> <li>- Specialty Air Transportation</li> <li>- Ground Transportation Support Activities</li> <li>- Bus Transportation</li> <li>- - Air Transportation</li> </ul>	-	41740	45
<b>Upstream Chemical Products (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Organic Chemicals</li> <li>- Inorganic Chemicals</li> <li>- Industrial Gas</li> <li>- - Agricultural Chemicals</li> </ul>	-	41740	46
<b>Upstream Metal Manufacturing (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Iron and Steel Mills and Forging</li> <li>- Metal Processing</li> <li>- Wires and Springs</li> <li>- - Metal Products</li> </ul>	-	41740	47
<b>Video Production and Distribution (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Video Production and Distribution</li> </ul>	-	41740	48
<b>Vulcanized &amp; Fired Materials (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Rubber Products</li> <li>- Glass Products</li> <li>- Clay Products and Refractories</li> </ul>	-	41740	49
<b>Water Transportation (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Marine Transportation Services</li> <li>- Boat Building and Repairing</li> <li>- Water Passenger Transportation</li> </ul>	-	41740	50
<b>Wood Products (San Diego-Carlsbad, CA)</b>	<ul style="list-style-type: none"> <li>- Prefabricated Wood Building</li> <li>- Wood Processing</li> <li>- Wood Components and Products</li> </ul>	-	41740	51

## 6. Main Indicators/filter (Traded Cluster – San Diego)

Dynamic Indicators – Innovation led explanatory variables

Cluster Code	Year	Employment	Annual Wage	Job creation	National Employment Share	Location Quotient	Patent Count	Patent Count Growth	Establishments Growth rate
1	1998	11381	\$ 55,141.00	-	1,55%	1,87	112	-	-
	1999	10825	\$ 56,447.00	-556	1,67%	1,72	122	5,86%	9,26%
	2000	10403	\$ 63,008.00	-422	1,72%	1,83	129	-5,86%	5,82%
	2001	10765	\$ 65,562.00	362	1,74%	1,86	145	1,89%	12,04%
	2002	9627	\$ 58,486.00	-1,138	2,27%	1,79	140	-	-3,00%
	2003	11872	\$ 53,063.00	2,245	1,68%	2,29	166	-2,37%	18,35%
	2004	8719	\$ 62,772.00	-3,153	1,60%	1,7	178	-4,65%	7,09%
	2005	8518	\$ 76,086.00	-201	1,79%	1,62	154	2,44%	-13,47%
	2006	9574	\$ 68,152.00	1,056	2,34%	1,8	214	11,90%	38,99%
	2007	12664	\$ 86,821.00	3,09	1,84%	2,38	176	2,13%	-17,56%
	2008	10268	\$ 91,347.00	-2,396	1,93%	1,88	162	-12,50%	-7,84%
	2009	10559	\$ 95,350.00	291	2,32%	1,97	175	11,90%	7,48%
	2010	12285	\$ 73,373.00	1,726	3,30%	2,3	261	-	49,50%
2011	17253	\$ 52,649.00	4,968	3,14%	3,22	303	2,13%	16,12%	
2012	16468	\$ 83,060.00	-785	3,14%	3	-	6,25%	-	
2013	16745	\$ 86,253.00	277	3,15%	3,06	455	-	23,47%	
2	1998	634	\$ 29,560.00	-	0,66%	0,77	2	-	-
	1999	695	\$ 31,065.00	61	0,70%	0,78	2	9,82%	-8,03%
	2000	669	\$ 24,402.00	-26	0,74%	0,82	2	-3,74%	1,21%
	2001	722	\$ 24,147.00	53	0,76%	0,83	2	7,92%	9,78%
	2002	684	\$ 27,098.00	-38	0,71%	0,74	2	-5,26%	-12,89%
	2003	683	\$ 31,652.00	-1	0,72%	0,73	1	-0,15%	-14,68%
	2004	828	\$ 24,354.00	145	0,86%	0,87	1	21,23%	0,42%
	2005	719	\$ 20,228.00	-109	0,79%	0,8	1	-13,16%	-28,36%
	2006	784	\$ 36,335.00	65	0,86%	0,87	1	9,04%	-6,40%
	2007	740	\$ 29,623.00	-44	0,74%	0,76	1	-5,51%	13,83%
	2008	702	\$ 30,674.00	-38	0,70%	0,73	1	-5,14%	16,81%
	2009	640	\$ 30,146.00	-62	0,67%	0,68	1	-8,33%	-6,21%
	2010	759	\$ 28,006.00	119	0,77%	0,77	2	18,59%	75,77%
2011	701	\$ 30,739.00	-58	0,71%	0,7	2	-7,54%	-1,96%	
2012	831	\$ 32,327.00	130	0,81%	0,78	3	18,54%	31,08%	
2013	726	\$ 27,756.00	92	0,76%	0,75	3	-12,64%	18,78%	
3	1998	5301	\$ 24,505.00	-	0,84%	0,98	4	-	-
	1999	4816	\$ 23,431.00	-485	0,89%	0,99	3	0,49%	-27,17%
	2000	4689	\$ 21,457.00	-127	0,97%	1,06	3	-2,45%	-2,58%
	2001	4300	\$ 19,449.00	-389	1,02%	1,11	2	5,03%	-3,80%
	2002	3251	\$ 21,010.00	-1,049	0,98%	0,98	3	-14,83%	22,75%
	2003	2660	\$ 20,774.00	-591	0,88%	0,89	2	-5,06%	-38,45%
	2004	2796	\$ 28,086.00	136	0,99%	0,99	2	-3,55%	-5,56%
	2005	2394	\$ 30,717.00	-402	0,95%	0,96	2	-17,79%	35,53%
	2006	2140	\$ 27,380.00	-254	0,95%	0,96	2	-0,75%	-16,94%
	2007	2018	\$ 28,989.00	-122	0,96%	0,98	2	-6,02%	-5,77%
	2008	1889	\$ 23,586.00	-129	0,99%	1,02	2	-18,80%	-15,73%
	2009	1159	\$ 24,645.00	-730	0,78%	0,79	2	-5,77%	1,84%
	2010	1259	\$ 25,157.00	100	0,92%	0,91	3	10,20%	57,60%
2011	1368	\$ 25,665.00	109	1,03%	1	3	8,33%	14,37%	
2012	907	\$ 26,090.00	-461	0,69%	0,65	3	-9,40%	10,36%	
2013	901	\$ 23,386.00	-6	0,67%	0,65	2	0,94%	-23,43%	
4	1998	1761	\$ 31,976.00	-	0,13%	0,15	37	-	-
	1999	1827	\$ 31,530.00	66	0,13%	0,15	38	4,17%	3,75%
	2000	1833	\$ 32,703.00	6	0,13%	0,15	38	-2,67%	0,44%
	2001	1870	\$ 35,369.00	37	0,15%	0,16	41	2,74%	6,49%
	2002	1737	\$ 44,840.00	-133	0,15%	0,16	46	-8,00%	13,39%
	2003	1403	\$ 33,023.00	-334	0,12%	0,12	37	-	-19,22%
	2004	1319	\$ 34,895.00	-84	0,11%	0,12	42	-	11,84%
	2005	1370	\$ 38,958.00	51	0,12%	0,12	32	-8,70%	-22,30%
	2006	1400	\$ 41,426.00	30	0,12%	0,13	37	3,17%	13,83%
	2007	1406	\$ 38,759.00	6	0,13%	0,14	44	5%	19,58%
	2008	1374	\$ 37,369.00	-32	0,14%	0,14	39	-4,41%	-11,99%
	2009	1082	\$ 46,178.00	-292	0,14%	0,14	34	-10,77%	-11,38%
	2010	1183	\$ 40,421.00	101	0,16%	0,16	43	-6,90%	24,61%
2011	1239	\$ 36,304.00	56	0,16%	0,16	39	3,70%	-9,54%	
2012	1417	\$ 47,241.00	178	0,17%	0,16	49	1,79%	26,29%	
2013	1251	\$ 41,475.00	-166	0,14%	0,14	56	-	15,10%	

Cluster Code	Year	Employment	Annual Wage	Job creation	National Employment Share	Location Quotient	Patent Count	Patent Count Growth	Establishments Growth rate
5	1998	3355	\$ 49,290.00	-	1.55%	1.8	227	-	-
	1999	3447	\$ 47,866.00	92	1.58%	1.75	219	5%	-4%
	2000	3476	\$ 51,047.00	29	1.53%	1.78	206	-	-6%
	2001	3738	\$ 51,839.00	262	1.60%	1.73	217	1%	5%
	2002	5394	\$ 54,935.00	1,656	2.27%	2.14	233	6%	-1%
	2003	4689	\$ 55,484.00	-709	1.86%	1.88	193	-	-10%
	2004	4526	\$ 66,853.00	-163	1.84%	1.85	150	-5%	-22%
	2005	4696	\$ 67,061.00	170	1.89%	1.91	138	2%	-8%
	2006	5321	\$ 68,552.00	625	2.13%	2.14	166	3%	3%
	2007	5318	\$ 78,598.00	-3	2.20%	2.24	167	5%	1%
	2008	5490	\$ 73,482.00	172	2.17%	2.22	166	1%	-1%
	2009	5317	\$ 76,973.00	-173	2.19%	2.23	156	8%	-6%
	2010	6570	\$ 69,377.00	1253	2.84%	2.83	227	-1%	44%
2011	6732	\$ 72,243.00	162	2.95%	2.89	230	10%	2%	
2012	6880	\$ 83,043.00	148	2.92%	2.78	259	3%	12%	
2013	6578	\$ 90,059.00	-154	2.84%	2.76	253	2%	5%	
6	1998	55391	\$ 45,501.00	-	0.74%	0.87	3	-	-
	1999	69697	\$ 45,361.00	14,306	0.87%	0.97	3	26%	-6%
	2000	75536	\$ 53,367.00	5,839	0.87%	0.96	3	8%	4%
	2001	76211	\$ 56,331.00	675	0.84%	0.91	4	1%	10%
	2002	80147	\$ 54,357.00	3,936	0.91%	0.94	3	5%	-4%
	2003	85764	\$ 56,638.00	5,617	0.93%	0.95	4	7%	19%
	2004	82669	\$ 57,168.00	-3,095	0.89%	0.9	4	1%	-11%
	2005	81411	\$ 60,747.00	-1,258	0.85%	0.86	3	-2%	-9%
	2006	86688	\$ 62,650.00	5,277	0.85%	0.86	4	6%	16%
	2007	89321	\$ 64,930.00	2,633	0.85%	0.87	4	3%	-3%
	2008	91619	\$ 68,185.00	2,298	0.88%	0.91	4	3%	13%
	2009	87058	\$ 68,152.00	-4,561	0.87%	0.89	3	-5%	-19%
	2010	89031	\$ 73,380.00	1,973	0.90%	0.9	6	2%	65%
2011	88684	\$ 76,684.00	-347	0.88%	0.86	5	0%	-5%	
2012	96647	\$ 75,570.00	7,963	0.92%	0.88	6	9%	20%	
2013	95997	\$ 81,274.00	-650	0.87%	0.85	7	-1%	7%	
7	1998	-	-	-	0.00%	-	0	-	-
	1999	-	-	-	0.00%	-	0	-	-6%
	2000	-	-	-	0.00%	-	0	-	-12%
	2001	-	-	-	0.00%	-	0	-	9%
	2002	-	-	-	0.00%	-	0	-	6%
	2003	-	-	-	0.00%	-	0	-	10%
	2004	-	-	-	0.00%	-	0	-	-19%
	2005	-	-	-	0.00%	-	0	-	-1%
	2006	-	-	-	0.00%	-	0	-	25%
	2007	10	-	10	0.01%	0.01	0	-	-41%
	2008	10	-	-	0.01%	0.01	0	-	12%
	2009	-	-	-10	0.00%	-	0	-	-9%
	2010	-	-	-	0.00%	-	0	-	30%
2011	-	-	-	0.00%	-	0	-	76%	
2012	-	-	-	0.00%	-	0	-	-33%	
2013	-	-	-	0.00%	-	0	-	11%	
8	1998	8947	\$ 42,924.00	-	1.79%	2.09	139	-	-
	1999	9188	\$ 45,778.00	241	1.75%	1.95	177	16%	27%
	2000	9926	\$ 57,082.00	738	1.82%	2	181	7%	3%
	2001	10734	\$ 51,798.00	808	1.74%	1.89	233	12%	29%
	2002	10524	\$ 53,762.00	-210	2.02%	2.07	241	3%	3%
	2003	7214	\$ 64,913.00	-3,31	1.45%	1.47	276	13%	15%
	2004	8506	\$ 71,081.00	1,292	1.74%	1.75	349	1%	26%
	2005	8260	\$ 63,539.00	-246	1.79%	1.81	293	9%	-16%
	2006	6553	\$ 84,759.00	-1,707	1.41%	1.42	449	18%	53%
	2007	7497	\$ 83,137.00	944	1.48%	1.51	349	10%	-22%
	2008	7186	\$ 88,216.00	-311	1.45%	1.48	336	7%	-4%
	2009	6671	\$ 94,797.00	-515	1.30%	1.33	330	-2%	-2%
	2010	6720	\$ 89,818.00	49	1.48%	1.47	446	-1%	35%
2011	6684	\$ 91,574.00	-36	1.46%	1.43	521	-	17%	
2012	7472	\$ 104,452.00	788	1.73%	1.65	646	1%	24%	
2013	7488	\$ 106,390.00	16	1.61%	1.56	834	14%	29%	



Cluster Code	Year	Employment	Annual Wage	Job creation	National Employment Share	Location Quotient	Patent Count	Patent Count Growth	Establishments Growth rate
9	1998	4976	\$ 39,225.00	-	0.60%	0.7	9	-	-
	1999	5127	\$ 39,225.00	151	0.60%	0.67	8	-3%	-14%
	2000	5091	\$ 42,791.00	115	0.57%	0.63	11	4%	7%
	2001	5165	\$ 42,272.00	189	0.64%	0.7	10	1%	2%
	2002	4557	\$ 29,890.00	-419	0.64%	0.66	9	-3%	-1%
	2003	3027	\$ 46,278.00	-1,949	0.43%	0.44	9	-7%	-2%
	2004	2980	\$ 48,326.00	-1,996	0.43%	0.44	8	-7%	-2%
	2005	3150	\$ 53,662.00	-1,826	0.46%	0.46	8	-4%	-1%
	2006	4424	\$ 49,072.00	-552	0.58%	0.59	9	-4%	-1%
	2007	3898	\$ 52,495.00	-1,078	0.49%	0.5	7	-2%	-4%
	2008	3057	\$ 53,594.00	-1,919	0.38%	0.4	7	-3%	-3%
	2009	2340	\$ 56,291.00	-2,636	0.32%	0.33	6	-4%	-3%
	2010	2885	\$ 51,833.00	-2,291	0.38%	0.39	9	-3%	-1%
2011	3305	\$ 53,966.00	-1,671	0.46%	0.45	10	-2%	0%	
2012	3330	\$ 65,851.00	-1,646	0.46%	0.44	11	-3%	1%	
2013	2980	\$ 84,173.00	-1,996	0.38%	0.37	12	-3%	2%	
10	1998	49064	\$ 46,390.00	-	1.05%	1.22	3	-	-
	1999	50453	\$ 71,508.00	1,389	1.06%	1.18	3	-1%	9%
	2000	50416	\$ 62,022.00	-37	1.03%	1.13	3	1%	-5%
	2001	51043	\$ 66,089.00	627	1.02%	1.11	3	-1%	8%
	2002	49513	\$ 62,123.00	-1,53	1.05%	1.08	3	2%	-2%
	2003	52355	\$ 62,072.00	2,842	1.01%	1.02	3	7%	2%
	2004	54160	\$ 72,464.00	1,805	1.03%	1.04	3	-	-1%
	2005	55418	\$ 74,874.00	1,258	1.05%	1.06	3	2%	-8%
	2006	58160	\$ 79,122.00	2,742	1.09%	1.09	3	2%	7%
	2007	56241	\$ 79,433.00	-1,919	1.05%	1.07	3	1%	-9%
	2008	56970	\$ 82,090.00	729	1.02%	1.04	3	1%	0%
	2009	57408	\$ 77,168.00	438	1.07%	1.09	3	-3%	8%
	2010	54339	\$ 79,276.00	-3,069	1.06%	1.05	4	-2%	36%
2011	56037	\$ 102,002.00	1,698	1.08%	1.06	5	-1%	1%	
2012	60410	\$ 95,000.00	4,373	1.13%	1.07	6	6%	29%	
2013	58107	\$ 82,203.00	-2,303	1.05%	1.02	7	1%	17%	
11	1998	1208	\$ 27,636.00	-	0.35%	0.41	52	-	-
	1999	1301	\$ 27,689.00	93	0.39%	0.43	53	2%	2%
	2000	1036	\$ 34,364.00	-265	0.31%	0.34	53	-5%	0%
	2001	1018	\$ 37,874.00	-18	0.31%	0.34	56	-	6%
	2002	1039	\$ 24,849.00	21	0.34%	0.36	55	4%	-2%
	2003	1039	\$ 55,568.00	-	0.34%	0.35	60	13%	9%
	2004	1069	\$ 60,490.00	30	0.35%	0.36	46	-5%	-24%
	2005	649	\$ 49,103.00	-420	0.22%	0.23	41	-3%	-10%
	2006	618	\$ 48,283.00	-31	0.21%	0.22	43	10%	5%
	2007	784	\$ 48,373.00	166	0.28%	0.29	46	-1%	7%
	2008	600	\$ 47,309.00	-184	0.21%	0.22	43	-2%	-8%
	2009	579	\$ 50,444.00	-21	0.23%	0.23	44	-5%	3%
	2010	530	\$ 45,803.00	-49	0.22%	0.22	70	-	59%
2011	578	\$ 48,484.00	48	0.24%	0.24	70	-5%	0%	
2012	547	\$ 48,061.00	-31	0.23%	0.22	80	-	14%	
2013	651	\$ 62,174.00	104	0.27%	0.26	86	-2%	8%	
12	1998	3286	\$ 35,255.00	-	0.58%	0.68	18	-	-
	1999	2885	\$ 36,149.00	-401	0.51%	0.57	18	-3%	4%
	2000	3125	\$ 34,454.00	240	0.55%	0.6	15	1%	-17%
	2001	2862	\$ 41,132.00	-263	0.52%	0.56	18	-1%	18%
	2002	2915	\$ 40,687.00	53	0.56%	0.58	23	6%	26%
	2003	2643	\$ 40,855.00	-272	0.52%	0.53	21	-3%	-7%
	2004	2472	\$ 43,257.00	-171	0.50%	0.5	18	-2%	-17%
	2005	2158	\$ 41,113.00	-314	0.45%	0.45	16	-7%	-10%
	2006	2189	\$ 47,039.00	31	0.44%	0.44	19	14%	18%
	2007	2150	\$ 53,799.00	-39	0%	0.44	16	-1%	-14%
	2008	2254	\$ 53,001.00	104	0.45%	0.46	14	4%	-14%
	2009	1943	\$ 49,040.00	-311	0.44%	0.44	16	-4%	14%
	2010	1741	\$ 52,624.00	-202	0.44%	0.43	23	-5%	43%
2011	1696	\$ 58,040.00	-45	0.43%	0.42	24	-2%	5%	
2012	1530	\$ 62,185.00	-166	0.40%	0.38	30	-10%	28%	
2013	1594	\$ 46,279.00	64	0.41%	0.4	32	9%	5%	

Cluster Code	Year	Employment	Annual Wage	Job creation	National Employment Share	Location Quotient	Patent Count	Patent Count Growth	Establishments Growth rate
13	1998	30235	\$ 43,962.00	-	1.58%	1.84	8	-	-
	1999	32865	\$ 51,318.00	2,63	1.64%	1.82	9	5%	13%
	2000	34752	\$ 61,563.00	1,887	1.67%	1.83	8	6%	-11%
	2001	40149	\$ 56,817.00	5,397	1.86%	2.01	9	6%	13%
	2002	42200	\$ 54,766.00	2,051	1.91%	1.97	8	4%	-11%
	2003	42612	\$ 57,403.00	412	1.73%	1.75	9	1%	13%
	2004	41896	\$ 65,948.00	-716	1.63%	1.64	8	4%	-11%
	2005	40920	\$ 67,867.00	-976	1.57%	1.59	7	3%	-13%
	2006	41623	\$ 72,174.00	703	1.56%	1.57	14	3%	100%
	2007	44017	\$ 78,814.00	2,394	1.62%	1.65	12	5%	-16%
	2008	39499	\$ 72,048.00	-4,518	1.44%	1.47	10	1%	-17%
	2009	41105	\$ 72,382.00	1,606	1.46%	1.49	10	4%	-
	2010	40309	\$ 75,318.00	-796	1.40%	1.39	10	0%	-
2011	45021	\$ 78,803.00	4,712	1.50%	1.47	10	4%	-	
2012	39316	\$ 83,051.00	-5,705	1.32%	1.26	12	3%	20%	
2013	37880	\$ 91,631.00	-1,436	1.28%	1.24	11	1%	-8%	
14	1998	130	-	-	0.08%	0.1	2	-	-
	1999	120	-	-10	0.07%	0.09	2	4%	24%
	2000	120	-	-10	0.08%	0.09	2	-	14%
	2001	120	-	-10	0.08%	0.09	2	-	10%
	2002	180	-	50	0.11%	0.12	2	14%	0%
	2003	248	\$ 134,839.00	118	0.18%	0.18	2	16%	5%
	2004	221	\$ 143,965.00	91	0.17%	0.17	2	15%	5%
	2005	255	-	125	0.20%	0.5	2	7%	4%
	2006	130	-	130	0.10%	0.11	3	7%	6%
	2007	250	\$ 140,800.00	120	0.18%	0.19	2	10%	2%
	2008	120	-	-10	0.09%	0.1	2	3%	1%
	2009	230	\$ 183,145.00	100	0.18%	0.19	2	3%	2%
	2010	235	-	105	0.16%	0.16	3	4%	4%
2011	235	-	105	0.16%	0.16	3	5%	5%	
2012	430	-	300	0.29%	0.28	4	6%	7%	
2013	430	-	300	0.29%	0.28	5	5%	7%	
15	1998	374	\$ 19,646.00	-	0.67%	0.79	1	-	-
	1999	220	-	-154	0.34%	0.43	1	-	0%
	2000	282	\$ 40,471.00	62	0.52%	0.57	2	5%	49%
	2001	210	\$ 36,079.00	-72	0.36%	0.4	2	16%	11%
	2002	322	\$ 22,852.00	112	0.55%	0.57	1	-	-36%
	2003	348	\$ 26,326.00	26	0.52%	0.53	1	5%	23%
	2004	332	\$ 42,881.00	-16	0.48%	0.49	1	4%	-10%
	2005	322	\$ 41,286.00	-10	0.45%	0.46	1	2%	-5%
	2006	402	\$ 42,828.00	80	0.52%	0.52	1	24%	-1%
	2007	539	\$ 41,771.00	137	0.71%	0.72	1	8%	-18%
	2008	521	\$ 48,284.00	-18	0.70%	0.72	1	5%	14%
	2009	521	\$ 44,077.00	521	0.73%	0.75	1	7%	-30%
	2010	542	\$ 54,550.00	21	0.75%	0.75	1	13%	47%
2011	536	\$ 52,163.00	-6	0.68%	0.67	1	5%	-1%	
2012	671	\$ 48,574.00	135	0.76%	0.73	2	5%	32%	
2013	678	\$ 48,856.00	7	0.78%	0.76	2	7%	8%	
16	1998	19469	\$ 63,303.00	-	1.06%	1.24	1	-	-
	1999	21215	\$ 61,923.00	1,748	1.07%	1.19	1	3%	-15%
	2000	19921	\$ 75,818.00	-1,294	0.99%	1.08	1	3%	-20%
	2001	20518	\$ 75,009.00	597	1.00%	1.03	0	9%	12%
	2002	22562	\$ 74,378.00	2044	1.18%	1.03	0	14%	6%
	2003	25136	\$ 78,143.00	2,574	1.28%	1.03	0	7%	-6%
	2004	29056	\$ 71,314.00	3,92	1.18%	1.29	0	7%	6%
	2005	27083	\$ 74,573.00	-1,973	1.11%	1.19	0	5%	16%
	2006	26612	\$ 73,574.00	-471	1.10%	1.11	0	3%	-14%
	2007	26087	\$ 71,971.00	-525	1.07%	1.12	0	3%	16%
	2008	23649	\$ 78,615.00	-2,438	0.99%	1.1	0	0%	-9%
	2009	19898	\$ 72,644.00	-3,751	1.01%	1.01	0	1%	-8%
	2010	19106	\$ 109,402.00	-792	1.03%	1	1	1%	73%
2011	19437	\$ 80,766.00	331	1.03%	1.01	1	1%	0%	
2012	15099	\$ 97,502.00	-4,338	0.79%	0.75	1	4%	33%	

Cluster Code	Year	Employment	Annual Wage	Job creation	National Employment Share	Location Quotient	Patent Count	Patent Count Growth	Establishments Growth rate
17	1998	288	\$ 70.968,00	-	0,56%	0,66	1	-	-
	1999	243	\$ 99.145,00	-45	0,48%	0,54	1	-4%	18%
	2000	215	\$ 70.471,00	-28	0,43%	0,48	1	-5%	-19%
	2001	232	\$ 76.455,00	17	0,49%	0,53	2	2%	96%
	2002	235	\$ 67.696,00	3	0,52%	0,54	1	-4%	-41%
	2003	181	\$ 54.574,00	-54	0,39%	0,4	1	-8%	-32%
	2004	140	\$ 63.675,00	-41	0,31%	0,32	1	-3%	-16%
	2005	90	-	-50	0,20%	0,21	1	-6%	61%
	2006	80	-	-10	0,19%	0,19	0	-4%	-51%
	2007	81	\$ 101.639,00	1	0,21%	0,21	1	8%	46%
	2008	81	\$ 147.902,00	81	0,20%	0,21	1	4%	77%
	2009	82	\$ 90.000,00	1	0,22%	0,23	1	-4%	-51%
	2010	90	-	8	0,23%	0,24	1	8%	111%
	2011	87	\$ 142.596,00	-3	0,23%	0,23	1	-7%	-5%
2012	241	\$ 140.143,00	154	0,65%	0,62	1	19%	2%	
2013	234	\$ 159.306,00	-7	0,62%	0,61	1	-5%	-7%	
18	1998	3768	\$ 33.812,00	-	0,40%	0,46	8	-	-
	1999	4104	\$ 34.342,00	336	0,43%	0,48	9	4%	13%
	2000	3981	\$ 38.873,00	-123	0,42%	0,46	11	1%	21%
	2001	3656	\$ 46.231,00	-325	0,39%	0,42	10	2%	-6%
	2002	3740	\$ 30.402,00	84	0,41%	0,42	11	9%	-3%
	2003	5148	\$ 21.855,00	1400	0,56%	0,56	11	7%	4%
	2004	4741	\$ 24.463,00	-407	0,52%	0,52	8	-5%	-22%
	2005	4746	\$ 32.273,00	5	0,52%	0,52	8	-3%	-10%
	2006	4250	\$ 33.408,00	-496	0,47%	0,47	7	-8%	-12%
	2007	4068	\$ 29.377,00	-182	0,45%	0,45	8	-4%	15%
	2008	4251	\$ 31.104,00	183	0,45%	0,47	9	5%	12%
	2009	3806	\$ 37.462,00	-445	0,42%	0,43	5	-4%	-39%
	2010	3564	\$ 37.992,00	-242	0,39%	0,39	14	6%	159%
	2011	3592	\$ 36.662,00	28	0,39%	0,38	10	-1%	-27%
2012	3346	\$ 38.880,00	-246	0,37%	0,35	9	-8%	-5%	
2013	3829	\$ 42.911,00	479	0,41%	0,39	11	28%	12%	
19	1998	30	-	-	0,06%	0,07	3	-	-
	1999	30	-	-	0,06%	0,07	0	-7%	-87%
	2000	31	\$ 18.000,00	1	0,07%	0,08	1	20%	187%
	2001	34	\$ 14.571,00	3	0,09%	0,1	3	33%	138%
	2002	20	-	-14	0,07%	0,07	2	-	-19%
	2003	20	-	20	0,08%	0,08	3	-50%	18%
	2004	70	-	50	0,27%	0,28	4	50%	31%
	2005	70	-	-	0,29%	0,29	3	33%	-20%
	2006	43	\$ 19.385,00	-27	0,19%	0,19	2	-	-13%
	2007	30	-	-13	0,15%	0,15	2	-13%	-16%
	2008	31	\$ 12.190,00	1	0,18%	0,18	3	-29%	30%
	2009	20	-	-11	0,13%	0,13	3	-20%	15%
	2010	14	\$ 30.500,00	-6	0,09%	0,09	4	25%	43%
	2011	9	\$ 42.222,00	-5	0,06%	0,06	3	40%	-35%
2012	16	\$ 84.333,00	7	0,11%	0,1	4	-29%	34%	
2013	20	-	4	0,13%	0,13	4	-	12%	
20	1998	10	-	-	0,01%	0,01	1	-	-
	1999	10	-	-	0,01%	0,01	1	-	55%
	2000	20	-	10	0,02%	0,02	1	-	-52%
	2001	70	-	50	0,07%	0,08	1	33%	13%
	2002	30	-	-40	0,03%	0,03	1	-	15%
	2003	12	\$ 14.500,00	-18	0,01%	0,01	1	-	41%
	2004	30	-	18	0,03%	0,03	1	-	-35%
	2005	20	-	-10	0,02%	0,02	0	-50%	-48%
	2006	20	-	-	0,02%	0,03	1	-	66%
	2007	10	-	-10	0,01%	0,01	1	-	31%
	2008	10	-	-	0,01%	0,01	1	-	10%
	2009	20	-	10	0,03%	0,03	1	50%	6%
	2010	20	-	-	0,03%	0,03	1	-	8%
	2011	10	-	-10	0,01%	0,02	1	-67%	-18%
2012	20	-	10	0,03%	0,03	1	-	5%	
2013	20	-	-	0,03%	0,03	1	-	62%	

Cluster Code	Year	Employment	Annual Wage	Job creation	National Employment Share	Location Quotient	Patent Count	Patent Count Growth	Establishments Growth rate
21	1998	3291	\$ 25,288.00	-	0.51%	0.59	8	-	-
	1999	3536	\$ 24,623.00	-	0.52%	0.59	7	-1%	-13%
	2000	3554	\$ 26,856.00	1	0.54%	0.58	6	-1%	-7%
	2001	3577	\$ 28,981.00	3	0.57%	0.6	7	7%	13%
	2002	3547	\$ 29,398.00	-14	0.59%	0.61	7	9%	-2%
	2003	3472	\$ 28,587.00	20	0.62%	0.61	7	2%	4%
	2004	4364	\$ 31,569.00	50	0.77%	0.78	7	1%	-1%
	2005	2490	\$ 31,071.00	-	0.46%	0.45	6	1%	-20%
	2006	2398	\$ 34,076.00	-27	0.43%	0.43	7	-1%	25%
	2007	2285	\$ 35,964.00	-13	0.45%	0.45	6	-1%	-17%
	2008	2056	\$ 37,982.00	1	0.46%	0.46	6	0%	2%
	2009	1411	\$ 33,635.00	-11	0.39%	0.4	6	-2%	1%
	2010	1067	\$ 32,515.00	-6	0.33%	0.33	8	-3%	40%
2011	1093	\$ 31,971.00	-5	0.37%	0.35	9	4%	10%	
2012	1070	\$ 32,953.00	7	0.34%	0.33	12	-2%	29%	
2013	1072	\$ 35,460.00	4	0.35%	0.33	12	-1%	-2%	
22	1998	42004	\$ 19,145.00	-	1.54%	1.8	4	-	-
	1999	47999	\$ 19,622.00	5,995	1.73%	1.92	4	1%	-10%
	2000	48090	\$ 21,368.00	91	1.72%	1.85	4	-1%	2%
	2001	49254	\$ 22,997.00	1,164	1.73%	1.86	5	-2%	39%
	2002	47532	\$ 23,596.00	-1,722	2.03%	1.78	6	-1%	18%
	2003	57742	\$ 21,115.00	10,21	2.00%	2.05	7	-3%	3%
	2004	57950	\$ 23,053.00	208	2.10%	2.1	6	-1%	-16%
	2005	61332	\$ 25,215.00	3,382	2.10%	2.1	4	1%	-21%
	2006	62280	\$ 26,622.00	948	2.01%	2.1	6	3%	40%
	2007	60386	\$ 27,797.00	-1,894	1.93%	2.05	6	-	-7%
	2008	59293	\$ 27,913.00	-1,093	1.87%	1.98	5	0%	-9%
	2009	53967	\$ 29,105.00	-5,326	1.81%	1.91	6	-2%	6%
	2010	51777	\$ 29,360.00	-2,19	1.84%	1.8	8	-2%	44%
2011	53611	\$ 30,958.00	1,834	1.83%	1.8	8	-	6%	
2012	54762	\$ 30,877.00	1,151	-	1.74	-	0%	-	
2013	-	-	-	-	-	-	-	-	
23	1998	26476	\$ 53.77	-	1.69%	1.97	275	-	-
	1999	26683	\$ 58.61	207	1.83%	1.96	310	-1%	2%
	2000	27780	\$ 77.90	1,097	1.81%	2.01	310	0%	5%
	2001	28125	\$ 62.28	345	2.12%	1.95	350	-2%	8%
	2002	27292	\$ 62.73	-833	1.99%	2.11	355	-1%	-14%
	2003	25057	\$ 69.53	-2,235	1.98%	2.02	411	-2%	20%
	2004	23245	\$ 75.53	-1,812	2.07%	1.99	434	1%	2%
	2005	23573	\$ 71.58	328	2.01%	2.09	392	-3%	-14%
	2006	22872	\$ 74.50	-701	1.85%	2.02	497	-5%	46%
	2007	21016	\$ 84.47	-1,856	1.94%	1.88	448	-1%	-12%
	2008	22592	\$ 86.10	1,576	1.99%	1.99	438	1%	5%
	2009	21317	\$ 81.55	-1,275	2.26%	2.03	459	-5%	6%
	2010	22669	\$ 84.06	1,352	2.19%	2.25	739	-1%	36%
2011	21906	\$ 86.88	-763	2.12%	2.14	757	0%	0%	
2012	21900	\$ 91.78	-6	-	2.02	-	0%	-	
24	1998	9078	\$ 41,406.00	-	0.56%	0.65	0	-	-
	1999	10860	\$ 40,447.00	1,782	0.67%	0.74	0	16%	11%
	2000	11202	\$ 41,668.00	342	0.71%	0.78	0	-3%	4%
	2001	11591	\$ 38,447.00	389	0.73%	0.79	0	-5%	-7%
	2002	10654	\$ 41,224.00	-937	0.67%	0.69	0	-1%	20%
	2003	10816	\$ 60,673.00	162	0.69%	0.69	0	8%	33%
	2004	9941	\$ 48,371.00	-875	0.64%	0.64	0	3%	12%
	2005	9277	\$ 53,754.00	-664	0.63%	0.63	0	0%	5%
	2006	10582	\$ 64,842.00	1,305	0.70%	0.7	0	2%	28%
	2007	10205	\$ 57,215.00	-377	0.68%	0.7	0	2%	-9%
	2008	12427	\$ 59,374.00	2,222	0.79%	0.8	0	2%	-1%
	2009	11584	\$ 59,713.00	-843	0.75%	0.76	0	0%	15%
	2010	11274	\$ 61,466.00	-310	0.76%	0.76	0	0%	76%
2011	10859	\$ 67,349.00	-415	0.75%	0.73	0	4%	-7%	
2012	11570	\$ 71,065.00	711	0.78%	0.74	0	-1%	31%	
2013	11875	\$ 73,319.00	305	0.79%	0.77	0	-3%	21%	

Cluster Code	Year	Employment	Annual Wage	Job creation	National Employment Share	Location Quotient	Patent Count	Patent Count Growth	Establishments Growth rate
25	1998	385	\$ 31,468.00	-	0.64%	0.75	0	-	-
	1999	333	\$ 38,926.00	-52	0.55%	0.62	0	-4%	-
	2000	314	\$ 41,869.00	-19	0.54%	0.59	0	30%	-
	2001	277	\$ 34,899.00	-37	0.50%	0.54	0	-4%	-
	2002	310	\$ 36,822.00	33	0.65%	0.68	0	20%	-
	2003	162	\$ 33,659.00	-148	0.34%	0.35	0	-	-
	2004	168	\$ 36,020.00	6	0.36%	0.37	0	25%	-
	2005	110	\$ 36,822.00	-58	0.26%	0.27	0	-	-
	2006	148	\$ 43,926.00	38	0.37%	0.37	0	11%	-
	2007	140	-	-8	0.37%	0.38	0	-10%	-
	2008	263	\$ 44,750.00	123	0.81%	0.83	0	11%	-
	2009	170	\$ 29,020.00	-93	0.61%	0.62	0	-	-
	2010	128	\$ 67,021.00	-42	0.49%	0.49	0	-5%	-
	2011	144	\$ 46,113.00	16	0.55%	0.54	0	9%	-
2012	141	\$ 46,887.00	-3	0.57%	0.55	0	-10%	-	
2013	175	-	-	0.70%	0.68	1	-	-	
26	1998	922	\$ 22,864.00	-	1.56%	1.82	2	-	-
	1999	845	\$ 24,962.00	-77	1.48%	1.64	3	-2%	26%
	2000	943	\$ 25,106.00	98	1.70%	1.86	2	-	-14%
	2001	929	\$ 26,093.00	-14	1.78%	1.93	2	9%	-11%
	2002	703	\$ 28,397.00	-226	1.60%	1.64	2	-	-7%
	2003	706	\$ 25,009.00	3	1.60%	1.62	2	-4%	-7%
	2004	678	\$ 25,656.00	-28	1.54%	1.55	2	-2%	30%
	2005	526	\$ 28,396.00	-152	1.24%	1.25	1	2%	-47%
	2006	667	\$ 29,372.00	141	1.56%	1.57	1	-	-39%
	2007	590	\$ 27,345.00	-77	1.36%	1.39	1	7%	17%
	2008	644	\$ 28,840.00	54	1.64%	1.68	0	-5%	-44%
	2009	621	\$ 29,926.00	-23	1.80%	1.83	1	-7%	169%
	2010	590	\$ 33,112.00	-31	1.86%	1.84	1	-5%	-42%
	2011	599	\$ 33,320.00	9	1.83%	1.79	1	9%	18%
2012	599	\$ 27,440.00	-	1.81%	1.72	2	-	132%	
2013	519	\$ 31,489.00	-80	1.70%	1.65	2	9%	15%	
27	1998	3466	\$ 31,599.00	-	0.71%	0.82	38	-	-
	1999	3694	\$ 36,101.00	228	0.77%	0.86	47	9%	25%
	2000	3995	\$ 40,427.00	301	0.83%	0.91	50	6%	5%
	2001	4607	\$ 35,991.00	612	0.97%	1.05	48	3%	-3%
	2002	3805	\$ 32,254.00	-802	0.94%	0.97	55	-2%	15%
	2003	2869	\$ 43,630.00	-936	0.80%	0.8	60	23%	9%
	2004	2182	\$ 62,019.00	-687	0.63%	0.64	66	5%	11%
	2005	2761	\$ 58,898.00	579	0.82%	0.83	59	20%	-11%
	2006	3083	\$ 56,662.00	322	0.92%	0.92	67	9%	14%
	2007	2627	\$ 63,544.00	-456	0.79%	0.8	58	-1%	-14%
	2008	3144	\$ 68,596.00	517	0.93%	0.95	50	-	-13%
	2009	3027	\$ 59,647.00	-117	0.98%	1	49	-	-3%
	2010	3546	\$ 54,480.00	519	1.28%	1.27	69	8%	42%
	2011	3432	\$ 53,881.00	-114	1.22%	1.19	78	4%	13%
2012	3142	\$ 53,057.00	-290	1.10%	1.05	90	5%	15%	
2013	3079	\$ 57,488.00	-63	1.09%	1.06	104	7%	15%	
28	1998	20	-	-	0.00%	0	2	-	-
	1999	20	-	-	0.00%	0	3	-	-16%
	2000	80	-	60	0.01%	0.02	2	5%	22%
	2001	83	\$ 28.00	3	0.01%	0.02	3	7%	-9%
	2002	130	-	47	0.02%	0.03	2	9%	-23%
	2003	40	-	-90	-0.01%	0.01	2	8%	53%
	2004	30	-	-10	-0.01%	0.01	2	-	-28%
	2005	20	-	-10	0.00%	0	2	9%	-18%
	2006	20	-	-	0.00%	0	1	-	34%
	2007	20	-	-	0.00%	0	2	9%	-24%
	2008	10	-	-10	0.00%	0	2	3%	9%
	2009	30	-	20	0.01%	0.01	1	-	-6%
	2010	20	-	-10	0.00%	0	3	14%	31%
	2011	10	-	-10	0.00%	0	3	3%	-10%
2012	10	-	-	0.00%	0	2	4%	13%	
2013	70	-	60	0.01%	0.01	3	-	18%	

Cluster Code	Year	Employment	Annual Wage	Job creation	National Employment Share	Location Quotient	Patent Count	Patent Count Growth	Establishments Growth rate
29	1998	12468	\$ 34,368.00	-	1,14%	1,33	6	-	-
	1999	12238	\$ 36,166.00	-230	1,10%	1,22	6	1%	10%
	2000	13147	\$ 35,815.00	909	1,10%	1,21	6	7%	-3%
	2001	13170	\$ 38,775.00	23	1,08%	1,16	7	4%	17%
	2002	12669	\$ 42,017.00	-501	1,11%	1,15	6	12%	-7%
	2003	13473	\$ 41,090.00	804	1,15%	1,16	7	3%	13%
	2004	19141	\$ 32,236.00	5,668	1,65%	1,66	6	6%	-23%
	2005	22227	\$ 30,868.00	3,086	1,84%	1,85	6	7%	-10%
	2006	23191	\$ 30,460.00	964	1,84%	1,85	5	3%	3%
	2007	22745	\$ 33,896.00	-446	1,77%	1,81	5	6%	-6%
	2008	21594	\$ 48,392.00	-1,151	1,63%	1,67	5	-1%	-8%
	2009	19453	\$ 51,578.00	-2,141	1,61%	1,64	4	-3%	-5%
	2010	18942	\$ 52,764.00	-511	1,64%	1,63	7	4%	52%
2011	19708	\$ 58,054.00	766	1,64%	1,6	6	0%	-5%	
2012	30215	\$ 57,173.00	10,507	2,44%	2,33	-	2%	-	
30	1998	6665	\$ 39,763.00	-	2,57%	2,99	57	-	-
	1999	6334	\$ 47,134.00	-331	2,44%	2,71	55	25%	-20%
	2000	7613	\$ 45,055.00	1,279	2,92%	3,2	58	3%	21%
	2001	6598	\$ 47,271.00	-1,015	2,52%	2,72	57	-26%	-12%
	2002	6084	\$ 45,943.00	-514	2,41%	2,48	53	-	23%
	2003	5971	\$ 52,808.00	-113	2,34%	2,37	55	20%	-12%
	2004	4118	\$ 57,628.00	-1,853	1,61%	1,63	53	20%	-14%
	2005	5859	\$ 54,900.00	1,741	2,28%	2,2	45	21%	21%
	2006	4236	\$ 62,956.00	-1,623	1,61%	1,62	53	34%	-4%
	2007	4137	\$ 70,658.00	-99	1,54%	1,57	50	5%	-18%
	2008	4737	\$ 67,727.00	600	1,70%	1,74	43	11%	7%
	2009	4472	\$ 68,142.00	-265	1,62%	1,66	46	-	-2%
	2010	4479	\$ 85,603.00	7	1,74%	1,73	70	1%	39%
	2011	5208	\$ 70,215.00	729	2,00%	1,95	77	3%	6%
2012	6287	\$ 75,897.00	1,079	2,35%	2,24	88	15%	17%	
2013	5702	\$ 77,599.00	-585	2,21%	2,14	93	4%	1%	
31	1998	20	-	-	0,04%	0,05	1	-	-
	1999	20	-	-	0,04%	0,05	1	-	0%
	2000	30	-	10	0,08%	0,09	1	20%	17%
	2001	30	-	-	0,08%	0,09	1	-	20%
	2002	30	-	-	0,10%	0,11	0	-	-35%
	2003	20	-	-10	0,07%	0,07	1	-50%	30%
	2004	20	-	-	0,07%	0,07	1	-	-2%
	2005	20	-	-	0,06%	0,07	0	-	-42%
	2006	20	-	-	0,06%	0,07	1	50%	43%
	2007	70	-	50	0,17%	0,17	0	-	-16%
	2008	70	-	-	0,17%	0,18	0	-	-3%
	2009	20	-	-50	0,05%	0,05	0	-	-11%
	2010	20	-	-	0,05%	0,05	1	-33%	41%
	2011	20	-	-	0,04%	0,05	1	-	3%
2012	20	-	-	0,04%	0,04	1	-	19%	
2013	20	-	-	0,04%	0,04	1	-	18%	
32	1998	2599	\$ 27,948.00	-	0,40%	0,47	24	-	-
	1999	2382	\$ 31,867.00	-217	0,38%	0,43	25	-1%	6%
	2000	2298	\$ 31,843.00	-84	0,38%	0,42	24	7%	-6%
	2001	2191	\$ 38,422.00	-107	0,37%	0,41	27	1%	16%
	2002	2226	\$ 31,794.00	35	0,44%	0,45	27	1%	-2%
	2003	2612	\$ 31,049.00	386	0,52%	0,53	28	10%	6%
	2004	2602	\$ 34,974.00	-10	0,53%	0,54	25	5%	-11%
	2005	2533	\$ 31,844.00	-69	0,50%	0,51	21	-1%	-18%
	2006	2428	\$ 39,113.00	-105	0,48%	0,49	19	-1%	-7%
	2007	2908	\$ 37,388.00	480	0,58%	0,6	19	5%	1%
	2008	3307	\$ 40,961.00	399	0,64%	0,66	15	10%	-25%
	2009	2819	\$ 41,078.00	-488	0,63%	0,64	14	5%	-2%
	2010	2726	\$ 45,225.00	-93	0,66%	0,66	23	5%	60%
	2011	2554	\$ 45,338.00	-172	0,47%	0,56	20	-2%	-13%
	2012	3425	\$ 46,166.00	871	0,71%	0,68	25	13%	28%
2013	3319	\$ 46,756.00	-106	0,68%	0,66	29	4%	16%	

Cluster Code	Year	Employment	Annual Wage	Job creation	National Employment Share	Location Quotient	Patent Count	Patent Count Growth	Establishments Growth rate
33	1998	158	\$ 43,54	-	0,59%	0,69	0	-	-
	1999	169	\$ 21,49	11	0,72%	0,81	0	38%	5%
	2000	190	\$ 23,36	21	0,68%	0,75	0	5%	-3%
	2001	193	\$ 26,58	3	0,71%	0,77	0	3%	-3%
	2002	107	\$ 35,82	-86	0,42%	0,44	0	5%	-12%
	2003	95	\$ 33,13	-12	0,36%	0,37	0	31%	6%
	2004	114	\$ 53,88	19	0,45%	0,46	0	14%	0%
	2005	236	\$ 32,06	122	1,06%	1,07	0	77%	-23%
	2006	201	\$ 31,62	-35	0,89%	0,9	0	6%	20%
	2007	334	\$ 37,36	133	1,51%	1,54	0	14%	-22%
	2008	300	\$ 59,11	-34	1,24%	1,27	0	17%	23%
	2009	314	\$ 61,71	14	1,33%	1,35	0	4%	0%
	2010	200	-	-114	0,85%	0,85	0	12%	30%
	2011	150	-	-50	0,66%	0,65	0	2%	5%
2012	250	-	100	1,04%	1,04	0	2%	14%	
2013	308	\$ 40,25	58	1,34%	1,3	0	7%	7%	
34	1998	732	\$ 49,11	-	0,71%	0,83	0	-	-
	1999	515	\$ 64,68	217	0,50%	0,56	0	3%	-8%
	2000	490	-	-25	0,48%	0,53	0	8%	34%
	2001	490	-	-	0,49%	0,53	0	-	97%
	2002	414	\$ 55,16	-76	0,43%	0,45	0	2%	-55%
	2003	347	\$ 61,61	-67	0,36%	0,37	0	9%	1%
	2004	351	\$ 55,57	4	0,35%	0,36	0	5%	40%
	2005	467	\$ 48,77	116	0,46%	0,47	0	13%	-38%
	2006	441	\$ 59,71	-26	0,42%	0,42	0	8%	12%
	2007	325	-	-116	0,29%	0,3	0	21%	-40%
	2008	401	\$ 59,90	76	0,42%	0,44	0	5%	76%
	2009	242	\$ 47,89	-159	0,28%	0,28	0	5%	-18%
	2010	271	\$ 58,34	29	0,33%	0,33	0	-	43%
	2011	325	-	54	0,40%	0,39	0	-	46%
2012	203	\$ 56,77	-122	0,26%	0,25	0	8%	-3%	
2013	200	-	-3	0,24%	0,24	0	14%	-26%	
35	1998	113	\$ 43.413,00	-	0,03%	0,03	6	-	-
	1999	127	\$ 28.824,00	14	0,03%	0,04	5	7%	3%
	2000	108	\$ 37.618,00	-19	0,03%	0,03	6	19%	5%
	2001	97	\$ 41.035,00	-11	0,02%	0,02	5	5%	1%
	2002	110	\$ 50.867,00	13	0,03%	0,03	6	23%	-7%
	2003	107	\$ 49.263,00	-3	0,03%	0,03	6	7%	-2%
	2004	156	\$ 36.333,00	49	0,04%	0,04	5	10%	13%
	2005	221	\$ 39.091,00	65	0,05%	0,05	6	-	-26%
	2006	296	\$ 38.694,00	75	0,06%	0,06	6	5%	10%
	2007	281	\$ 32.648,00	-15	0,05%	0,05	5	-	-11%
	2008	352	\$ 64.578,00	71	0,06%	0,06	5	6%	14%
	2009	244	\$ 65.521,00	-108	0,04%	0,04	5	-	16%
	2010	268	\$ 56.929,00	24	0,05%	0,05	7	-	15%
	2011	274	\$ 81.448,00	8	0,05%	0,04	7	3%	16%
2012	158	\$ 85.259,00	-118	0,02%	0,02	8	-	9%	
2013	235	\$ 82.694,00	77	0,03%	0,03	8	25%	11%	
36	1998	742	\$ 32.363,00	-	0,13%	0,15	9	-	-
	1999	653	\$ 33.548,00	-89	0,11%	0,13	10	7%	13%
	2000	926	\$ 35.596,00	273	0,16%	0,18	9	7%	-8%
	2001	795	\$ 38.725,00	-131	0,14%	0,16	11	15%	18%
	2002	903	\$ 40.171,00	108	0,18%	0,19	9	10%	-18%
	2003	943	\$ 45.427,00	40	0,19%	0,2	10	15%	5%
	2004	860	-	-83	0,18%	0,19	9	5%	-8%
	2005	835	\$ 25.675,00	-25	0,18%	0,19	7	7%	-20%
	2006	813	\$ 32.297,00	-22	0,18%	0,19	7	11%	6%
	2007	799	\$ 33.826,00	-14	0,18%	0,19	7	-	-2%
	2008	810	\$ 27.807,00	11	0,19%	0,2	6	4%	-23%
	2009	693	\$ 31.150,00	-117	0,18%	0,19	7	-	20%
	2010	678	\$ 35.773,00	-15	0,18%	0,18	10	4%	51%
	2011	811	\$ 31.463,00	133	0,22%	0,22	10	-	2%
2012	699	\$ 74.651,00	-112	0,19%	0,19	13	4%	24%	
2013	632	\$ 68.371,00	-67	0,17%	0,17	15	5%	14%	

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37	1998	2063	\$ 24,356.00	-	0.93%	1.09	1	-	-
	1999	2612	\$ 29,954.00	549	1.09%	1.21	1	4%	-12%
	2000	2895	\$ 29,203.00	283	1.15%	1.26	2	9%	101%
	2001	2711	\$ 29,361.00	-184	1.05%	1.14	1	7%	-34%
	2002	2725	\$ 30,964.00	14	1.01%	1.04	1	14%	-1%
	2003	2740	\$ 25,646.00	15	0.95%	0.97	1	4%	18%
	2004	2826	\$ 29,056.00	86	0.99%	1	1	2%	-23%
	2005	2902	\$ 31,016.00	76	0.97%	0.98	1	3%	1%
	2006	3394	\$ 28,068.00	492	1.11%	1.12	1	-1%	27%
	2007	3537	\$ 27,918.00	143	1.14%	1.16	2	10%	31%
	2008	3546	\$ 30,808.00	9	1.09%	1.12	1	1%	-33%
	2009	2971	\$ 30,625.00	-575	0.97%	0.99	1	-3%	3%
	2010	2611	\$ 29,578.00	-360	0.85%	0.85	3	-4%	149%
2011	2423	\$ 31,461.00	-188	0.79%	0.78	2	5%	-23%	
2012	3027	\$ 36,183.00	604	0.95%	0.91	3	1%	33%	
2013	2991	\$ 37,561.00	-36	0.91%	0.89	3	3%	-7%	
39	1998	6313	\$ 30.75	-	0.71%	0.84	6	-	-
	1999	6193	\$ 31.88	-120	0.71%	0.8	8	-2%	29%
	2000	6346	\$ 34.28	153	0.75%	0.82	7	-1%	-15%
	2001	6070	\$ 33.70	-276	0.74%	0.81	9	-4%	42%
	2002	5250	\$ 35.67	-820	0.71%	0.74	8	-1%	-10%
	2003	5628	\$ 31.29	378	0.77%	0.78	10	-1%	21%
	2004	5190	\$ 33.47	-438	0.74%	0.75	6	-3%	36%
	2005	5065	\$ 34.28	-125	0.74%	0.75	7	-3%	1%
	2006	4973	\$ 36.98	-92	0.74%	0.75	6	-2%	-14%
	2007	5113	\$ 35.85	140	0.78%	0.79	6	1%	0%
	2008	4729	\$ 37.84	-384	0.72%	0.75	4	-3%	-23%
	2009	4568	\$ 38.18	-161	0.79%	0.81	4	-9%	-6%
	2010	3822	\$ 41.11	-746	0.73%	0.73	8	-2%	86%
2011	3562	\$ 42.78	-260	0.70%	0.69	7	-4%	-3%	
2012	3529	\$ 44.67	-33	0.71%	0.68	7	-1%	-7%	
2013	3634	\$ 46.84	105	0.74%	0.72	9	0%	32%	
40	1998	6913	\$ 34,072.00	-	0.55%	0.64	110	-	-
	1999	6760	\$ 34,366.00	-153	0.55%	0.61	115	-5%	5%
	2000	7080	\$ 34,995.00	320	0.58%	0.64	111	2%	-3%
	2001	7082	\$ 35,320.00	2	0.60%	0.65	130	-1%	17%
	2002	6910	\$ 39,972.00	-172	0.66%	0.68	121	-3%	-7%
	2003	5559	\$ 41,499.00	-1,351	0.55%	0.55	135	1%	11%
	2004	7539	\$ 44,201.00	1,98	0.77%	0.77	113	-2%	-16%
	2005	7557	\$ 49,551.00	18	0.75%	0.76	104	-5%	-8%
	2006	7435	\$ 45,049.00	-127	0.72%	0.73	106	1%	3%
	2007	7350	\$ 47,533.00	-85	0.71%	0.72	102	-	-5%
	2008	7129	\$ 51,326.00	-221	0.68%	0.69	91	-3%	-10%
	2009	6946	\$ 48,339.00	-183	0.73%	0.85	74	-8%	-7%
	2010	7077	\$ 47,953.00	131	0.82%	0.82	121	-	41%
2011	7108	\$ 50,635.00	31	0.80%	0.78	115	4%	-4%	
2012	7053	\$ 50,447.00	-55	0.74%	0.7	149	3%	30%	
2013	8244	\$ 54,855.00	1,191	0.85%	0.82	184	-5%	23%	
41	1998	9678	\$ 38,784.00	-	3.28%	3.81	26	-	-
	1999	8072	\$ 36,232.00	-1,606	2.89%	3.2	26	-1%	6%
	2000	8716	\$ 38,048.00	644	3.13%	3.44	22	-4%	-16%
	2001	8972	\$ 42,272.00	256	3.43%	3.71	27	-2%	22%
	2002	7985	\$ 47,165.00	-987	3.33%	3.42	34	-5%	25%
	2003	7435	\$ 44,654.00	-550	2.75%	2.78	32	16%	-4%
	2004	6648	\$ 50,987.00	-787	2.52%	2.55	25	6%	-23%
	2005	6295	\$ 53,491.00	-353	2.50%	2.52	22	-2%	24%
	2006	7187	\$ 50,481.00	892	2.96%	2.98	28	-3%	24%
	2007	5701	\$ 52,353.00	-1,486	2.46%	2.5	25	-	-11%
	2008	5949	\$ 54,973.00	248	2.79%	2.86	24	5%	-5%
	2009	4892	\$ 57,299.00	-1,057	2.69%	2.74	26	-5%	9%
	2010	4591	\$ 63,790.00	-301	2.75%	2.73	33	-3%	28%
2011	4953	\$ 63,460.00	362	2.93%	2.87	37	-7%	13%	
2012	4770	\$ 68,904.00	-183	2.97%	2.83	48	28%	29%	
2013	4289	\$ 72,866.00	-481	2.78%	2.7	51	-23%	5%	



Cluster Code	Year	Employment	Annual Wage	Job creation	National Employment Share	Location Quotient	Patent Count	Patent Count Growth	Establishments Growth rate
42	1998	886	\$ 22.634,00	-	0,13%	0,16	5	-	-
	1999	1040	\$ 22.759,00	154	0,16%	0,18	5	2%	11%
	2000	1534	\$ 27.134,00	494	0,26%	0,29	5	5%	-16%
	2001	914	\$ 30.519,00	-620	0,17%	0,18	5	4%	12%
	2002	731	\$ 17.775,00	-183	0,15%	0,16	5	0%	-8%
	2003	747	\$ 21.779,00	16	0,16%	0,17	5	5%	-2%
	2004	416	\$ 24.530,00	-331	0,10%	0,11	4	5%	-11%
	2005	422	\$ 25.214,00	6	0,11%	0,12	4	1%	-7%
	2006	425	\$ 26.165,00	3	0,13%	0,13	4	2%	13%
	2007	550	\$ 26.359,00	125	0,18%	0,19	4	-	-15%
	2008	401	\$ 24.105,00	-149	0,15%	0,16	3	4%	-27%
	2009	368	\$ 21.811,00	-33	0,17%	0,17	2	6%	-7%
	2010	412	\$ 21.660,00	44	0,20%	0,21	4	6%	61%
	2011	357	\$ 22.385,00	-55	0,18%	0,18	5	5%	21%
2012	345	\$ 22.925,00	-12	0,18%	0,17	6	-	15%	
2013	388	\$ 25.408,00	43	0,20%	0,2	6	13%	12%	
43	1998	10	-	-	0%	0,04	1	-	-
	1999	10	-	0	0%	0,04	3	30%	41%
	2000	10	-	0	0%	0,04	1	-	282%
	2001	0	-	-10	0%	-	0	-10%	-80%
	2002	-	-	-	0%	-	0	-	-5%
	2003	10	-	10	0,04%	0,04	1	Infinity	11%
	2004	0	-	-10	0%	-	1	-10%	-25%
	2005	-	-	-	0%	-	0	-	-25%
	2006	-	-	-	0%	-	0	-	130%
	2007	-	-	-	0%	-	0	-	-13%
	2008	-	-	-	0%	-	0	-	-30%
	2009	-	-	-	0%	-	0	-	206%
	2010	-	-	-	0%	-	1	-	-12%
	2011	10	-	10	0,07%	0,06	0	Infinity	-65%
2012	0	-	-10	0%	-	1	-10%	8%	
2013	10	-	10	0,07%	0,07	2	Infinity	62%	
44	1998	407	\$ 37,63	-	0,24%	0,29	4	-	-
	1999	319	\$ 47,68	-88	0,18%	0,2	5	8%	13%
	2000	370	-	51	0,20%	0,22	3	22%	-33%
	2001	280	\$ 39,97	-90	0,17%	0,18	4	9%	21%
	2002	130	-	-150	0,08%	0,09	5	0%	39%
	2003	75	\$ 32,64	-55	0,04%	0,05	4	1%	-31%
	2004	63	\$ 34,83	-12	0,03%	0,04	4	3%	6%
	2005	70	-	7	0,04%	0,04	4	4%	-8%
	2006	112	\$ 36,78	42	0,06%	0,06	3	-	-15%
	2007	109	\$ 33,35	-3	0,06%	0,07	3	7%	9%
	2008	120	\$ 29,66	11	0,08%	0,09	3	29%	-1%
	2009	56	\$ 30,65	-64	0,05%	0,06	3	3%	-6%
	2010	70	-	14	0,07%	0,07	5	7%	44%
	2011	80	-	10	0,07%	0,08	5	-	2%
2012	30	-	-50	0,02%	0,03	6	0%	37%	
2013	30	-	-	0,02%	0,02	6	-	1%	
45	1998	5550	\$ 29.244,00	-	0,36%	0,42	1	-	-
	1999	5656	\$ 30.623,00	106	0,35%	0,39	1	7%	-12%
	2000	6014	\$ 32.418,00	358	0,35%	0,39	1	9%	9%
	2001	6138	\$ 32.625,00	124	0,36%	0,39	1	4%	7%
	2002	6132	\$ 32.073,00	-6	0,38%	0,4	1	5%	9%
	2003	6565	\$ 37.040,00	433	0,39%	0,4	1	2%	-16%
	2004	6240	\$ 38.861,00	-325	0,38%	0,39	1	5%	8%
	2005	6383	\$ 40.094,00	143	0,38%	0,39	1	2%	-19%
	2006	6037	\$ 40.622,00	-346	0,35%	0,36	1	2%	15%
	2007	6009	\$ 37.140,00	-28	0,36%	0,37	1	4%	-23%
	2008	6537	\$ 37.411,00	528	0,38%	0,4	1	10%	20%
	2009	6256	\$ 36.297,00	-281	0,39%	0,4	1	9%	-6%
	2010	6061	\$ 39.886,00	-195	0,40%	0,4	1	4%	34%
	2011	6127	\$ 41.621,00	66	0,39%	0,39	1	2%	8%
2012	7881	\$ 45.539,00	1,754	0,51%	0,49	1	4%	28%	
2013	8574	\$ 42.741,00	693	0,53%	0,52	1	9%	14%	

Cluster Code	Year	Employment	Annual Wage	Job creation	National Employment Share	Location Quotient	Patent Count	Patent Count Growth	Establishments Growth rate
46	1998	415	-	-	0,18%	0,22	73	-	-
	1999	240	\$ 28.520,00	-175	0,11%	0,12	78	30%	7%
	2000	304	\$ 49.485,00	64	0,14%	0,16	85	8%	9%
	2001	415	-	111	0,20%	0,22	84	-29%	-2%
	2002	465	-	50	0,24%	0,25	92	30%	10%
	2003	315	-	-150	0,17%	0,17	90	8%	-2%
	2004	265	-	-50	0,14%	0,15	66	-43%	-27%
	2005	265	-	-	0,15%	0,15	68	18%	3%
	2006	265	-	-	0,15%	0,15	72	-	7%
	2007	315	-	50	0,17%	0,17	75	1%	4%
	2008	385	-	40	0,19%	0,2	77	20%	4%
	2009	730	-	375	0,43%	0,45	69	8%	-11%
	2010	530	-	-200	0,32%	0,33	104	8%	52%
2011	530	-	-	0,31%	0,31	90	7%	-14%	
2012	540	-	10	0,31%	0,3	104	7%	16%	
2013	593	\$ 76.622,00	53	0,33%	0,33	117	25%	12%	
47	1998	944	\$ 36.845,00	-	0,15%	0,18	5	-	-
	1999	809	\$ 40.186,00	-135	0,13%	0,15	6	14%	15%
	2000	1213	\$ 31.540,00	404	0,20%	0,22	6	7%	-7%
	2001	997	\$ 41.475,00	-216	0,17%	0,19	7	1%	19%
	2002	1069	\$ 40.259,00	72	0,21%	0,22	6	8%	-9%
	2003	1160	-	91	0,24%	0,25	7	-	8%
	2004	968	\$ 51.716,00	-192	0,21%	0,22	6	-	-9%
	2005	983	\$ 50.291,00	15	0,21%	0,22	4	-2%	-39%
	2006	970	\$ 35.327,00	-13	0,21%	0,22	5	-5%	47%
	2007	870	\$ 46.552,00	-100	0,19%	0,2	6	17%	5%
	2008	691	\$ 60.713,00	-179	0,15%	0,16	4	-2%	-29%
	2009	550	-	-141	0,14%	0,15	5	19%	15%
	2010	645	\$ 39.218,00	95	0,17%	0,18	6	7%	34%
2011	714	\$ 37.041,00	69	0,18%	0,18	6	5%	-6%	
2012	710	-	-4	0,17%	0,17	7	7%	23%	
2013	478	\$ 22.875,00	-232	0,12%	0,12	9	-	18%	
48	1998	567	\$ 36.930,00	-	0,46%	0,53	0	-	-
	1999	536	\$ 36.461,00	-31	0,40%	0,44	0	8%	21%
	2000	636	\$ 35.131,00	100	0,47%	0,52	0	8%	9%
	2001	604	\$ 32.884,00	-32	0,43%	0,47	0	9%	-52%
	2002	1093	\$ 52.698,00	489	0,90%	0,93	0	18%	64%
	2003	1125	\$ 60.323,00	32	0,92%	0,93	0	8%	19%
	2004	524	\$ 33.946,00	-601	0,35%	0,35	0	-2%	11%
	2005	520	\$ 34.434,00	-4	0,33%	0,33	0	14%	-21%
	2006	455	\$ 41.720,00	-65	0,26%	0,26	0	-2%	23%
	2007	475	\$ 41.286,00	20	0,28%	0,29	0	8%	-4%
	2008	448	\$ 48.929,00	-27	0,23%	0,24	0	-	-24%
	2009	636	\$ 65.736,00	188	0,35%	0,36	0	1%	12%
	2010	669	\$ 72.677,00	33	0,41%	0,41	0	5%	63%
2011	690	\$ 51.612,00	21	0,43%	0,42	0	1%	5%	
2012	780	\$ 53.305,00	90	0,47%	0,45	1	15%	44%	
2013	794	\$ 48.942,00	14	0,41%	0,39	1	7%	21%	
49	1998	1025	\$ 29,70	-	0,25%	0,29	12	-	-
	1999	1108	\$ 27,50	83	0,27%	0,3	14	-5%	19%
	2000	1149	\$ 28,92	41	0,27%	0,31	12	-1%	-17%
	2001	1344	\$ 25,09	195	0,33%	0,37	12	-4%	7%
	2002	1197	\$ 28,15	-147	0,33%	0,35	15	11%	23%
	2003	1096	\$ 35,21	-101	0,32%	0,33	13	8%	-16%
	2004	1211	\$ 33,36	115	0,36%	0,37	12	6%	-7%
	2005	1271	\$ 33,92	60	0,40%	0,41	11	-4%	-9%
	2006	1487	\$ 39,92	216	0,48%	0,48	11	-	-1%
	2007	978	\$ 48,65	-509	0,33%	0,34	11	-4%	0%
	2008	1110	\$ 51,37	132	0,39%	0,4	8	-1%	-22%
	2009	679	\$ 47,72	-431	0,28%	0,29	10	-5%	19%
	2010	477	\$ 28,47	-202	0,21%	0,21	13	-10%	28%
2011	594	\$ 20,71	117	0,25%	0,25	16	-5%	29%	
2012	560	-	-34	0,24%	0,23	21	-8%	26%	
2013	560	-	-	0,23%	0,23	20	-8%	-4%	
50	1998	7030	\$ 33.370,00	-	2,44%	2,84	6	-	-
	1999	6269	\$ 36.938,00	-761	2,17%	2,41	4	-35%	-35%
	2000	6133	\$ 37.931,00	-136	2,07%	2,27	8	119%	119%
	2001	5398	\$ 41.950,00	-735	1,87%	2,03	6	-29%	-29%
	2002	5595	\$ 43.414,00	197	2,05%	2,17	8	35%	35%
	2003	6110	\$ 37.998,00	515	2,16%	2,18	5	-43%	-43%
	2004	6630	\$ 41.515,00	520	2,25%	2,27	8	79%	79%
	2005	7584	\$ 42.248,00	954	2,56%	2,58	9	5%	5%
	2006	7488	\$ 48.230,00	-96	2,48%	2,49	10	15%	15%
	2007	6890	\$ 49.387,00	-598	2,18%	2,22	6	-34%	-34%
	2008	9485	\$ 41.794,00	2,595	2,96%	3,04	7	3%	3%
	2009	9450	\$ 44.616,00	-35	3,24%	3,3	5	-18%	-18%
	2010	8844	\$ 46.099,00	-606	3,21%	3,18	6	12%	12%
2011	8495	\$ 46.736,00	-349	3,04%	2,97	5	-8%	-18%	
2012	11671	\$ 41.182,00	3,176	3,93%	3,74	7	42%	42%	
2013	11432	\$ 40.300,00	-239	3,81%	3,69	6	-8%	-16%	
	1998	768	\$ 26.165,00	-	0,15%	0,17	4	-	-
	1999	805	\$ 27.935,00	37	0,15%	0,17	4	3%	-4%
	2000	848	\$ 26.867,00	43	0,15%	0,17	3	5%	-18%
	2001	778	\$ 27.323,00	-70	0,15%	0,16	5	-5%	38%
	2002	728	\$ 33.129,00	-50	0,15%	0,15	4	-10%	-14%
	2003	846	\$ 32.861,00	118	0,17%	0,18	4	16%	-4%
2004	882	\$ 35.698,00	36	0,17%	0,18	4	3%	7%	
2005	1030	\$ 37.293,00	148	0,20%	0,2	3	-2%	-34%	

