



CLUSTERS3 PROJECT

Project: CLUSTERS3 Leveraging Cluster Policies for Successful Implementation of RIS3

Title: Looking into the context

Regional SWOT Analysis Report



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Explanatory notations

Cluster policy	In this document this term is used in a broad sense, including any policy/programme supporting collaboration across companies and other sector/activity specific institutions (such as research centres, university, state departments, etc.) through instruments such as cluster associations (or collaborative networks) or similar forms of collaboration among businesses in a cluster context.
Cluster policy instrument	In this document this term is used to refer to the activities developed within the framework of cluster policy. There are 3 predominant types of instruments: 1) cluster associations; 2) project based support; and 3) multitude of specific cooperation, network, and business-related services.
Agglomeration	In this document this term is used to refer to the accumulation of sector/industry resources and actors in a specific geographic area.
Cluster (natural)	In this document this term is used to refer to naturally-formed agglomerations of sector/industry resources and actors in a specific geographic area, creating critical mass and showing signs of cooperation and competition between these resources/actors.
Cluster actor	In this document this term is used to refer to all types of organizations related to a specific cluster; namely businesses (from SMEs to large corporations), research institutions, universities, government, business associations, etc.
Cluster associations (or collaborative network)	In this document this term is used to refer to formal and informal association and also other forms of cluster initiatives, collaborative networks, industrial sector groupings, etc. built-up of different cluster actors (see above). In the text the term cluster association is mostly used.
Cluster member	In this document this term refers to the cluster actors, which are formally connected/ belongs (as e.g. via formal membership) to a cluster associations.
Cluster manager	In this document this term is used to refer to a physical person in charge of managing/coordinating a cluster managing organization or cluster association.
RIS3 strategic areas	In this document this term refers to the priorities or areas of development that are identified and explored (in a multiple character) within regional/national research and innovation strategies for smart specialization (RIS3).
Umbrella (or framework) policy approach	In this document this term refers to territorial strategies or programmes, which address a broad spectrum of economic areas, e.g. from industry, via innovation to education, rather than only addressing one specific issue, such as e.g. clusters, trade relations or infrastructure development.

Executive summary



Introduction

Yet while clusters as an economic concept and policy instrument has been in place for more than two decades, this is not the case for regional smart specialization strategies, which were introduced by the European Commission in late 2013 as a pre-condition for European Structural and Investment Fund support and are seen as an “important concept for better and more targeted innovation policy” in Europe (European Commission, 2016, p. 13).

In this way RIS3 are not substituting cluster policies, but rather complementing them and directing them towards more targeted, inclusive and place-based research and innovation investment strategies. As such, regional policy-makers and institutions, as well as education and research centres, businesses and other socioeconomic actors, need to jointly understand and learn how to efficiently blend and implement the two concepts for the benefits of territorial development, growth and competitiveness.

Background

In the framework of the INTERREG project *CLUSTERS3 Leveraging Cluster Policies for Successful Implementation of RIS3*, 9 regional and national authorities have joined forces to learn, understand and share experiences in the design, implementation and monitoring of their cluster policies and smart specialization strategies. They represent considerable diversity of regional context and therefore provide an excellent basis for mutual learning (see Graph 1 in the Annex). This learning process will lead to the development of action plans and ultimately to the upgrading of cluster policies and to a better RIS3 implementation in these territories.

The project is structured in two phases. In the 1st phase the focus is on an exchange of knowledge on cluster policy and RIS3 by means of policy learning events, policy learning documents, identification of good practices and conducting peer reviews. In the 2nd phase action plans will be developed, leading to the application of learnings in real policy settings.

This policy brief sets out the main findings from the project’s first policy learning document, which provides a baseline analysis of the approaches to clusters, cluster policy and smart specialization of the 9 regions. This resulted in an analysis of the strengths, weaknesses, opportunities and threats (SWOT) of the partner regions in terms of clusters, cluster policies and smart specialization strategies.

A policy learning framework that would result in a SWOT analysis was developed through a participative approach, meaning that a proposed conceptual framework was initially discussed with partner regions to integrate their specific experiences and interests. The resulting SWOT framework is therefore tailored to the context and needs of the partner regions; its 5 sections provide a rich basis for policy learning and exchange:

- Exploring Territorial context and background to clusters
- Cluster Policy Background
- Cluster Organization Ecosystem
- Cluster Policy Monitoring and Evaluation
- Territorial Regional Smart Specialization Strategies blended with Cluster policy.

The study of the partner regions' clusters, cluster policy and RIS3 context is first explored in a **discourse part** of the policy learning document, with the main SWOT learnings and recommendations presented in a **reflection part** of the document. Moreover, the full policy learning document also includes theoretical notes, practical examples and links to online resources.

SWOT General picture

A review of the SWOT specifics of all partner regions in relation to their cluster policies and RIS3 produced some general observations that are reflected in the combined SWOT in Table 7 and are further explored below.

Strengths

Overall most of the partner regions showed a number of quite similar strengths. First of all, the partner regions seem to have successfully completed the exercise of defining their RIS3 strategic areas. Beyond that the partner regions also clearly know their key sectors and industries, which are being included in or coincide directly with their prioritized areas. Moreover, not only public (managing and implementing institutions) are aware of the thematic areas, but also the leading institutions and territorial actors. Thus one of the strengths is that businesses, research institutions, development agencies, etc. are aware of the strategic RIS3 areas and have a high interest in participation. Particularly on the private-sector side, cluster associations and companies seem to show high levels of engagement and implementation of both RIS3 as well as in the cluster policy (or clusters seen from a broader perspective).

Beyond the above, some partner regions have specific strengths. In the case of the Basque Country, for example, one of the key strengths is their long term experience and continuity of regional government's commitment to cluster and cluster policy implementation for the last 25 years, which has been progressively adjusted and modified providing rich experience for RIS3 implementation. Piedmont region sees its strengths in the development of feasible and strategic R&D investments. Hajdú-Bihar due to its geographic location and the historic specifics of Central and Eastern Europe is strong in the area of cross-border cooperation. Northern Ireland has developed a robust cluster evaluation and appraisal methodology, which informs decision making with regard to ongoing funding and programme design. Finally, Latvia from the perspective of state coordination has strengths in taking decisions and making changes to a wide range of policies.

Weaknesses

On contrary to the strengths identified, weaknesses are very specific for each of the partner regions, requiring territory-specific approaches to tackling them. For example Latvia identifies its main weaknesses in capacities of cluster actors and associations to self-finance and the absence of guidelines and dialogue space in some of the areas related to connecting RIS3 and clusters. The Highlands and Islands meanwhile sees their weaknesses in the wide dispersion of businesses and the absence of all components of the value chain locally, and Lubelskie stresses a weakness in the level of social capital (based on trust and cooperation) among different entities.

There are also a number of common weaknesses. Some of the central ones are the financial constraints or challenges associated with the funding of cluster policies as well as RIS3. Beyond that, the advantages of cooperation are not similarly acknowledged and perceived among all groups of

agents, and misunderstandings and different approaches to concepts such as clusters and innovation can result in vague policy prioritization.

Opportunities

Partner regions see their opportunities in line with the European call for stronger specialization within strategic priorities and clusters, as well as value chain(s) diversification. Due to the character of the partner regions all of them identify opportunities in emerging industries via facilitation of inter-sector / cross-cluster linkages. These issues are seen as a principal opportunity for their territories, which would also assure their successful escape from industrial lock-in and path dependency. In this line, the exploration of new types and kinds of clusters in their territories along with the identified RIS3 priorities are seen as an opportunity.

Several partner regions also identified opportunities related to enhancing the management, services offered and overall performance of cluster associations. While aware that formal cluster associations are only one of the instruments of cluster policies, they are increasingly recognized as a bridging institution between government (policy) and market (business) needs & reality. Strengthening the performance of cluster associations therefore could facilitate the natural cluster, and also the information / knowledge flows between slightly “different worlds”.

Another set of opportunities that the partner regions have seen is in strengthening the results of cooperation between companies and especially with research centres, as well as stronger exploration of the opportunities from international networks and platforms. Finally, the Basque Country and Latvia, in particular, have also addressed opportunities from improvement of evaluation methods and stronger policy mixes.

Threats

Most of the threats tend to reflect territories weaknesses, in particular those that have not been addressed over a longer period of time. In brief, among the most general threats across partner regions one can state a constant increase in external as well as internal competition, where the issue of keeping local strengths and scope while balancing with companies’ internationalization strategies is a concern. In addition to the above, the financial sustainability of cluster associations’ resources, especially the public side, is seen as a concern across the partners, and something that could grow into a threat, especially if firms and other institutions are unable to perceive the benefits and advantages of cooperation and collaboration.

Similarly to weaknesses, many of the threats were very place specific. Partner regions from outside of the EU15, for example, are facing threats rooted in a poor overall business and competitiveness environment, which is feared to affect the business absorption of the cluster concept. In Hajdú-Bihar for instance prime threats are centred on inefficient use of innovation capacities and lack of bridging with business needs. For the industrial regions of Piedmont and the Basque Country, on the other hand, there are threats in orienting cluster activities to the needs of the most active cluster members and re-enforcing path-dependency in mature industries. Finally, for Northern Ireland one of the key

threats for clusters lies in the lack of critical mass in terms of numbers of businesses operating in key sectors.

SWOT background

This section provides more detail on the background to the SWOT overview provided above. It sets out some general characteristics of the partner regions in terms of (i) territorial development and cluster policy practices, (ii) the cluster organisation ecosystem and (iii) RIS3 and clusters. This background is supported by a series of graphs and diagrams from the policy learning document which are included as Annexes.

Territorial development and cluster policy practices

Economic growth context

Most of the partner regions demonstrate a **positive evolution of growth** rates of GDP (Gross domestic product in Purchasing Power Standards) and GDP per capita during recent years (Graph 3). GDP per capita in 2014 remained below the EU28 average in several regions, however, and in many of the regions unemployment remained stubbornly high (Graph 4).

R&D context

Three research and development (R&D) themes are identified as particularly important across the partner regions in terms of the presence of industry/sector specific research centres (Graph 12):

- **Advanced manufacturing** (including a broad perspective of industries, e.g. from general approach to specific industry focus, such as automotive, mechatronics, aerospace, etc.)
- **Energy and related** (focused on traditional as well as renewable and alternative energy sources)
- **Health and biotechnology** (where the focus is on the direction of technological or medicine development for enhancing human health and products)
- **Engineering and Information and Communication Technologies (ICT)** (where engineering is related with physics in advancing so called “smart materials” and ICTs are a source of transformation along the latest Industry 4.0 trends).

This pattern is in line with overall EU trends, which show high business R&D investment into such areas as high-tech sectors, specifically in Healthcare, Pharmaceuticals and Technology Hardware. Moreover, a number of partner regions (namely the Basque Country, the Highlands and Islands and Piedmont) also have multisector technology centres, which could support cross-sector technological development.

Cluster concept

Although all partner regions have developed their own interpretations of the **cluster concept**, they share common conceptual building-blocks which enable a common language (Graph 13).

Cluster policy

Cluster policies themselves are quite different across partner regions, providing a rich basis for learning. From the public policy side support can come in the form of a dedicated cluster programme, or from a wide range of economic/structural programmes stimulating innovation or internationalization of the companies with the goal of promoting collaborative growth and competitiveness (Graph 21). Three supporting instruments for the cluster development that tend to be chosen across partner regions are: projects (in collaboration with various conditions and thematic areas); cluster associations (or collaborative networks, as well as other formal forms, such as sector/cluster managing organizations); and general activities related to collaboration and joint R&D promotion. However, much of the attention is focused on “cluster associations” (Graph 20). Indeed, all partner regions, regardless of having or not a specific cluster programme, apply mainly **two policy activities for cluster development**, which are channelled through cluster associations or collaborative networks.

- Financial support (public and private funding) for the **action plans of cluster associations**
- Financial support for the **projects developed in cooperation by members of cluster institutions** (associations).

Policy towards clusters tends to be focused in one government department, and in that sense the broadening of policy instruments, activities and programmes could be explored through stronger inter-departmental cooperation.

Funding

Partner regions have gathered rich experience in **resource accumulation** (different funding schemes and sources), especially from state and sub-state levels. Nevertheless, a number of partner regions rely on a narrow range of funding sources (Graph 23).

Cluster Organizational ecosystem

Cluster association (general)

Cluster associations are a very organized and suitable instrument for cluster policy coordination, monitoring and implementation. They are often a key instrument in the partner regions, especially those that have a dedicated cluster development programme. At the same time, as earlier mentioned, they shouldn't be the only instrument in the implementation of cluster policy (Graph 19).

Cluster manager

The position of **cluster manager** at cluster associations is taken seriously, and most of the associations' management were shown to have a background in sectors related to the cluster, usually in the private sector.

Governance

In terms of the **governance of cluster associations**, almost all cluster associations observed in the partner regions have established management structures, which typically includes a management board and a general assembly (Graph 28). Fewer have Advisory Boards, which even if an informal

structure can provide strategic guidance for the association and cluster in general. Moreover, the roles of Advisory Boards are potentially compatible for integrating clusters with diverse forms of RIS3 implementation.

Services and themes

Most of the partner region's cluster associations similarly provide services in four main areas: **information** (also including services for communication collection and sharing), **strategy** (would be also referring to market research and development), **collaboration** (networking and matchmaking) and **projects** (Graph 30). Following the Graph 31 in terms of thematic areas, where cluster associations work, along with strong dedication to technological and non-technological innovation, working on talent development and sustainability, attention to **internationalization** stands out slightly more.

Monitoring and evaluation

Most of the partner regions have developed methodologies for the **evaluation and monitoring** of their cluster policies, showing that they are interested in understanding how the policy is working. However, while the variety of evaluation & monitoring techniques creates richness and aids objectivity through the multiple sources of information, there are weaknesses in the de-centralized organization and non-harmonized approach across partner regions, and also in the strong focus on evaluation of results and activities, rather than social components and resources (with the exception of Northern Ireland which does evaluate, appraise and monitor these elements) (Graph 34).

RIS 3 and Cluster policies

RIS3 strategic areas

All partner regions have identified their **RIS3 strategic areas**. Cross-matching of these areas has resulted in the identification of common areas across a number of partner regions. Specifically, these areas are associated with advanced manufacturing systems and materials, energy, bio- and health sciences, ICT and food- & agriculture. These priorities moreover coincide with some key priority areas across the European Union, meaning opportunities for inter-regional and cross-border collaboration. There are, however, certain risks with the very general prioritization of RIS3 strategic areas. If this generalization is maintained at the project level then the strategy may not lead to the development of a territory-specific research and innovation base. However, it is often argued that more granular thematic specification will take place at the level of programme and project definition.

RIS3 implementation governance

A wide range of institutional structures and forms of participation in RIS3 implementation processes have been identified across the partner regions, from more public to more private, and from formal to less formal (Graph 40). Overall, the analysis of **RIS3 implementation** tends to show stronger public coordinated (balanced between formal & informal) implementation of RIS3. At the same time it doesn't mean the backseat of private sector and cluster associations. On contrast, in some of the partner regions (e.g. the Basque Country) after the areas were prioritised the regional government

proposed a distributed leadership and stepped back allowing stronger private sector implementation.

Funding

The **finance for RIS3 implementation** tends to come from the state, sub-state (regional) and EU funds, which is similar to cluster policy funding. This can provide a good basis for synergies between the two funding sources for mutual benefit (and learning). One of the distinctive weaknesses noticed is the quite low diversification of the **resource origin for RIS3**. Low diversification from one side could make the institutions in partner regions very competent in acquiring certain funding, but at the same time it may make them dependent and with dangers for a narrower, less rigorous and potentially less innovative RIS3 process (Graph 42).

Cluster associations in RIS3

Clusters and their formal/informal facilitating structures such as **cluster associations** constitute one of the most important institutional pillars in the RIS3 design and current implementation, and are acknowledged to also be important for RIS3 evaluation & monitoring. The cluster associations' role in RIS3 has been noticed in their participation, coordination, proposing initiatives, giving expert/strategic advice, evaluation & monitoring and bridging as well as streaming up/down knowledge between public and private territorial stakeholders (Graph 43). All partner regions have also undertaken a matching of cluster associations (or collaborative networks) with one or another RIS3 strategic area, which created a rich basis for exploration of the linkages and opportunities of their engagement.

Recommendations

Concluding from the findings and identified strengths and weaknesses of the partner regions a number of central recommendations have been proposed and in line with the six project topics are listed below for partner regions consideration in the process of bridging / leveraging clusters and cluster policies for successful implementation of RIS3:

Design and deployment of cluster policy

Cluster diagnosis / re-mapping

Cluster (as well as cluster association) mapping could serve as a good basis to understand the representativeness of cluster associations (or collaborative networks) with the natural structural conditions of the territory. In this way, renewed performance of cluster mapping may support policy makers in identifying new hidden or emerging territorial trends and strengths, as well as cluster organisations in reflecting their scope and scale;

Reinforcing industrial strengths

Building on the updated review of industrial/ business/ market structure and as well as giving attention to global business trends in perspective of the potential linkages and opportunities with KETs would support in re-identification and strengthening new industrial strengths. This exploration could give some initial ideas for the transformative process and formulation of the policy agenda;

Cluster concept definition

The vision of main cluster policy components can determine the format of cluster (and cluster associations) prioritization, as well as determine the potential resource pool. Therefore, it is important to build a clear definition of what is seen / would like to be perceived as clusters (cluster associations) in the territory and around this definition develop the associated policy instruments, which would then be followed by the strategy of sustainable communication of this vision to institutions in the territory assuring coherent vision;

Implement the policy through specific support instruments and programmes

Task based policy learning

Explore opportunities and learnings from the variety of instruments and organizational forms applied across partner regions for their cluster policies and RIS3 implementation, specifically via developed joint tasks e.g. joint external / internal projects, market / business analysis, study / stakeholder visits, which could also include cluster policy related departments at the managing and implementation authorities;

Openness to cluster policy and programme formulation

Some of the advantages in having a cluster specific programme include: (i) having a better overview and tracking of sector/cluster development/performance, (ii) ease of monitoring and evaluating progress, (iii) ease of reaching a bigger number of institutions from specific sectors, etc. At the same

time, such programme-based support can leave out the range of other programmes and funding resources available. In this context, having a cluster policy programme can build a baseline for cluster supporting activities, meanwhile the policy makers should be open to constant exploration of other programmes and instruments for their potential inclusion for cluster promotion;

Synergies and new sources in funding

Explore more synergies, new funding resources and experience across funding sources between clusters / cluster policies and RIS3, especially in areas of EU and regional funding; seek to balance between different funding sources. This explorative journey could stimulate more rigorous networking/ collaboration with new kinds of institutions; the example of new funding resources could be local/ international / European financial institutions loans or microcredits (extension of very small loans) or loans under specific conditions;

Development of cluster policy and alignment with RIS3

Open platforms and spaces

Following the developments in KETs, where innovation happens on the intersection of different technologies, skills and actors creating the spaces for open exploration and facilitation of these linkages should be central component of the alignment strategy between cluster policies and RIS3. The Cambridge Network is one example of an open innovation platform.

Local actors, especially businesses, engagement

As the mapping of RIS3 implementation in more partner regions showed rather public (balanced between formal & informal) driven implementation of the RIS3, a general recommendation is to enhance business-driven participation in institutions. In addition to this, opportunities to attract participation of finance institutions in RIS3 and cluster policy implementation is also suggested;

Joint forms of governance

Most of the new technologies, innovation and business opportunities are being born on the bridge of sciences and sectors without specific territorial restrictions. For example, clusters in the area of transportation and mobility (where transportation of goods and services relates (as well as goes beyond) such industries as automotive, energy and electricity and ICT) or RIS3 strategic priorities such as a clear and sustainable (or smart) energy; where the definition of industries to be included can vary from services and products related to energy production, consumption, storage and the energy types, etc. In similar line, the strategic areas that include a wide range of industries, from automotive, chemicals, mechatronics, etc. into advanced and/ or innovative manufacturing also produce rich grounds for developing new products and technology opportunities. As such, approaching and facilitating these processes isn't possible by sole engagement of one or two specific departments at provincial or municipal levels. Therefore, the prime recommendation is to explore more areas of cluster policy contribution to RIS3, via such approaches as multi-level governance and integrated policy mixes. The two concepts call policy makers to think about cluster and RIS3 domains' development in the broader terms.

Monitoring and evaluation of cluster performance and cluster programmes

Harmonized and centralized monitoring and evaluation

Due to the wide variety in different evaluation instruments and techniques, it could be recommended to harmonize the tools and approaches for evaluation and monitoring, therefore providing better basis for comparison across territories leading to richer learning. In this support, establishing/ naming one department / unit/ group for monitoring and evaluation could ensure comprehensiveness and long term vision of consistency of approach to evaluation evidence. As example can serve an established initiative of the Basque cluster policy implementing authority, which is aimed to engage cluster associations in creating and agreeing on common vision for evaluation;

Internationalization of cluster organizations

Cross-sector cluster cooperation within / between territories

Stimulate cooperation across the partner regions in the strategic RIS3 areas or cluster policy priorities, which could lead to new joint projects, experience exchange at the level of territorial stakeholders; establishing new product and innovation ideas streams, etc.. Specific sector, areas within these could be advanced manufacturing, energy, health and bio-related sciences, ICT technologies, food- and agro-industries as well as a number of more sectoral and cross-sector initiatives;

International cooperation in common RIS3

Identified strategic RIS3 areas (associated with advanced manufacturing systems and materials, energy, bio- and health sciences, ICT and food- & agriculture) build great opportunity for rich knowledge and policy exchange and potential collaboration across partner regions stakeholders and institutions, which should be explored during the project;

Building the capacity of cluster organizations

Cluster associations as a potential rather the only tool

The importance of cluster associations (or collaborative networks) should be addressed and acknowledged, however, it should also be highlighted that this is not the only tool for the implementation of the cluster policies; moreover it is worth acknowledging that support of the activities in collaboration between institutions could be via cluster associations or directly to the joint groups of actors with clear objectives and strategic vision;

Survey among cluster associations and sharing good practices

A specific survey within the project could be developed for the cluster associations (or collaborative networks), which would cover specific topics related to their performance, management and governance. Especially as thematic areas such as cluster management and capacity building are amongst the topics partner region stakeholders are most interested in. In addition, it would stimulate

and strengthen already started initiatives and process of learning by benchmarking, sharing experience in the learning session and identification of good practices within/across partner regions.

Membership fees

Membership fee is a common instrument for the cluster associations (especially formal cluster organizations) to diversify their financial resources, however, some of the members do not realize immediate advantages from the membership and therefore face some concern in paying it; The awareness or communication of the benefits from introducing membership fees (e.g. increase the level of cluster actors participation, engagement, motivation and dedication) could be more clearly highlighted and shared across the private sector participants;

Main section



INTRODUCTION

Setting the context

Clusters as an economic concept and policy instrument has been in place worldwide already for a more than two decades. Lately in light of more targeted and coherent development of countries and especially regions within the European Union, the design of smart specialization strategies (RIS3) for regions was set as a pre-condition for EU related funding, e.g. via such programmes as Horizon 2020 or COSME. By 2016 the RIS3 identification and development stages have been completed, and is followed by RIS3 implementation. The current stage has a broad definition and understanding among EU regions, and local stakeholders find themselves on a ‘journey’ of entrepreneurial discovery in this RIS3 implementation path.

Meanwhile, while RIS3 is a new policy instrument, cluster policy is not and with experience of over 20 years could surely provide a rich basis for RIS3 learning (Aranguren & Wilson, 2013). Moreover, clusters and the cluster concept are actively used within many regions and are also placed at the core of the RIS3 agenda (European Commission, 2013). This requires policy makers and regional actors to pay attention and learn ways to integrate and/or bring these two concepts together.

In the framework of the Interreg project CLUSTERS3 “Leveraging Cluster Policies for Successful Implementation of RIS3” one of the objectives of the project’s partners is to learn from the ways each partner region designs, implements and monitors its cluster policies and RIS3. Resulting from this learning will be action plans to undertake specific changes upgrading their cluster policies and enhancing RIS3 implementation. The partner regions are the Basque Country (Spain), Northern Ireland (United Kingdom), the Highlands & Islands (United Kingdom), Piedmont (Italy), Hajdu-Bihar (Hungary), Lubelskie (Poland) and Latvia (Graph 46). These partner regions represent well the diversity of regional context and therefore build an excellent basis for mutual learning.

Objectives

In the process of the project’s learning and policy upgrade a number of different instruments and/or activities are being conducted by institutions and stakeholders representing partner regions; e.g. development of policy learning documents, conducting peer-reviews and on-site visits, etc. In this context, this document services as one of the learning documents supporting and facilitating the policy upgrade. The specific objective of this document is to set out the baseline from where the partner regions stand in terms of their cluster policies and RIS3 strategies. From this baseline, a set of common and specific challenges and opportunities are identified.

Methodology

Serving the purpose of a baseline study, this policy learning document analyses and synergies between clusters, cluster policy and smart specialization approaches of the 7 partner regions, resulting in an identification of their strengths, weaknesses, opportunities and threats (SWOT). An essential component in conducting this comparative analysis was the design of a coherent and

inclusive policy learning framework, which served for collecting and processing the data across the 7 partner regions.

A policy learning framework that would result in a SWOT analysis was developed through a participative approach, meaning that a proposed conceptual framework was initially discussed with partner regions to integrate their specific experiences and interests. Joining the results from a literature review, six CLUSTERS3 project defined topics and from regions' feedback, a policy learning framework was developed setting a rich basis for the policy learning experience within the project. The developed framework and methodology specifics are presented in Methodology section (p. 115) of the document.

Format of presented information

Following the developed methodology framework along with the objectives and questions set, the document presents partner regions' cluster and RIS3 in two parts: (I) **Discourse** and (II) **Reflection**.

In the **(I) Discourse part** an overall review of the partner regions and their cluster policies in the framework of smart specialization strategies is conducted. It is structured in five sections exploring Territorial context and background to clusters, Cluster Policy Background, Cluster Organization Ecosystem, Cluster Policy Monitoring and Evaluation and Territorial Regional Smart Specialization Strategies blended with Cluster policy. This part is concluded with a SWOT analysis summary of the regions of cluster policy within RIS3 context.

In the **(II) Reflection part** the learnings from comparison and summary of the partner regions knowledge/information towards strengthening cluster policies within RIS3 strategies are introduced. These learnings are presented in three sections: Territorial development and cluster policy practices, cluster organizational ecosystem and RIS3 and clusters. This part is concluded with summary of areas of action/opportunities.

I. DISCOURSE PART: REVIEW OF THE PARTNER REGIONS AND THEIR CLUSTER POLICIES IN THE FRAMEWORK OF SMART SPECIALIZATION STRATEGIES.

This part of the policy learning document aims to give an overview of the partner regions situations, understanding and approaches in five areas:

- Exploring Territorial context and background to clusters
- Cluster Policy Background
- Cluster Organization Ecosystem
- Cluster Policy Monitoring and Evaluation
- Territorial Regional Smart Specialization Strategies blended with Cluster policy.

The review is then summarized in a joint SWOT analysis of cluster policies within RIS3 context in the 7 partner regions.



1. Territorial context and background to clusters

1.1. Setting the territorial background

Smart specialization strategies, clusters and associated policies are embedded in their territorial contexts. Therefore, we have conducted an initial and general exploration of the 7 partner regions.

Theoretical note

Why territory specific context matters

“Each location has its unique set of economic opportunities and challenges. Policies need to be aligned with these locations, and they need to be delivered in the ways that are consistent with the realities of the locations.” (European Commission, 2016)

The information presented here gives a brief overview of main economic and structural indicators of each territory, facilitating a broad idea of where the partner regions stand with regards to key reference points (national average, European Union 28 average, where possible, and each other). This should give an objective inter-regional, national and EU standpoint of the partner regions. The review of the partner regions is based on indicators grouped in 4 main **categories**:¹

- 1) **Geographic context**: indicators related to demographic and physical setting of the partner region;
- 2) **Economic context**: indicators associated with main economic trends, such as Gross Domestic Product (GDP) total and per inhabitant;
- 3) **Labour market**: indicators such as unemployment (total and in specific sectors);
- 4) **Sector context**: indicators associated with the production and employment trends of the partner regions.

Graph 1 provides an overview of the main areas/features of the partner regions territorial context based on these 4 categories, which are explored in more detail in the following pages.

¹ Only the directly related graphs have been included in the text. More detailed information is presented in the Annexes.

Graph 1 Territorial context of partner regions, general overview

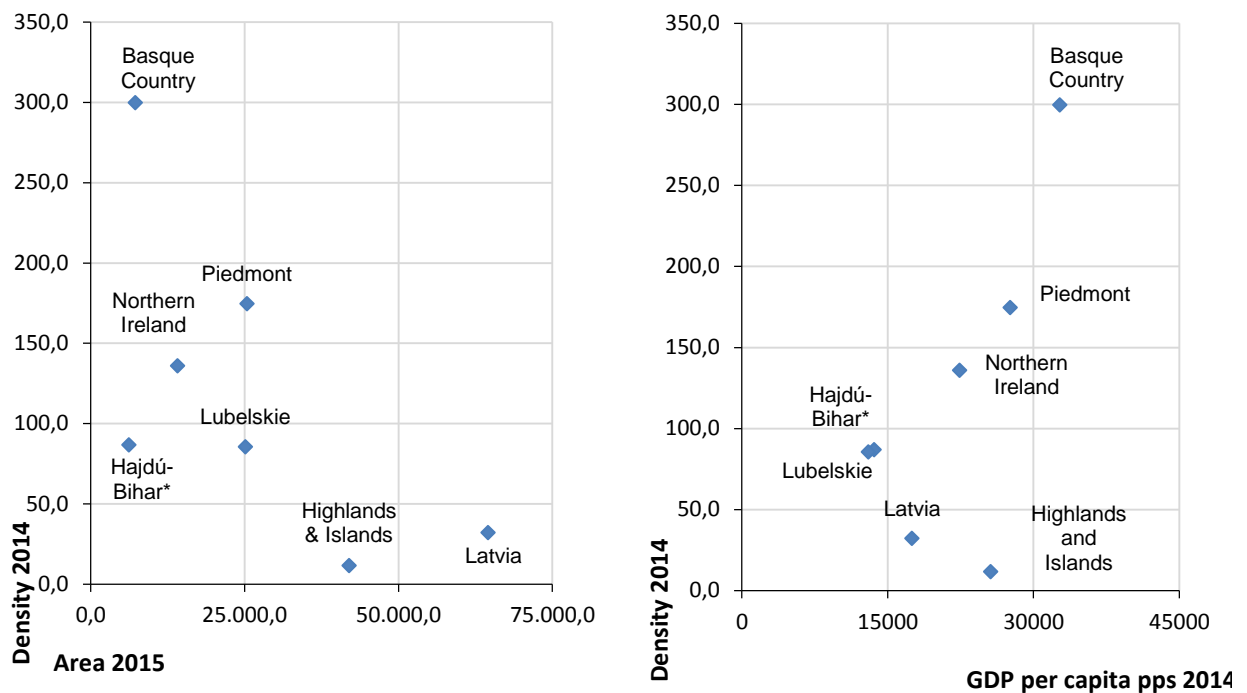
		max	above/increa	mid/neutral	below/declin	min	Basque Country	Hajdú-Bihar	Highlands & Islands	Latvia	Lubelskie	Northern Ireland	Piedmont	
Geo context	Density** <i>Persons per km2, 2014</i>						299,6	86,7	11,6	32,2	85,4	135,8	174,5	
	Area** <i>km2</i>						7 228	6 209	41 974	64 573	25 122	14 130	25 387	
Economic context	GDP per cap pps <i>GDP per cap ppt 2014</i>						32 700	13 618	25 600	17 500	13 000	22 400	27 600	
	<i>as of EU base 2014; GDP per cap pps 2014 (27 500)</i>						above	below	below	below	below	below	above	
	GDP growth pps <i>GDP per cap ppt growth aver 2011-14 (%)</i>						0,3	2,6	3	5,5	4	1,8	-0,1	
	<i>as of EU base GDP per cap pps av 2011-14 (2,2%)</i>						below	above	above	above	above	below	below	
Labour market	Unemployment* <i>Unemployment 2015 (%)</i>						14,8	9,4	4,1	9,9	9,3	6,1	10,2	
	<i>as of EU 28 unemplymnet 2015 (9,4%)</i>						above	same	below	above	below	below	above	
	High tech sectors <i>High tech sectors (manuf.& services) empl av 2011-15 (%); EU28-3,9%</i>						3,7 (below EU)	3,5 (*Észak-Alföld) (below EU)	2,2 (below EU)	3,1 (below EU)	1,5 (below EU)	3,1 (below EU)	3,7 (below EU)	
Sector context	Agriculture, forestry & fishing** <i>agro Share v GVA, 2014(%)</i>						0,74	11,4	3,21	3,19	5,73	1,19	2,02	
		<i>agro Share of empl, 2014 (%)</i>						1,48	15,28	4,37	7,44	25,76	3,55	2,11
	Industry	<i>industry Share of GVA, 2014 (%)</i>						26,70%	22,48%	14,25%	16,80%	15,15%	18,80%	22,28%
		<i>industry Share of empl, 2014 (%)</i>						20,07%	15,16%	14,25%	16,59%	15,15%	12,37%	21,29%
		<i>industry trend evolution of GVA 2011-15</i>						decline	down/ up	increase	decline	increase	increase	decline
		<i>industry trend evolution of empl 2011-15</i>						decline	decline	increase	down/ up (higher '14)	decline	up/down	decline

Note: colour coding reflects comparison among partner regions and if applicable trends with their national or EU28 values: max – maximum value (dark blue), increase/ above (blue), decline/ below trends (grey), min – min value (dark grey) (*due to the character of the indicator “unemployment” - the reverse character of color-coding is applied; **no colour coding applied)

1.1.1. Geographic context

Graph 2 plots the density of each of the territories against their size and their per capita GDP. The Basque Country is the densest territory among the partner regions by some distance (almost 300 inhabitants per km²), and also has the smallest territorial scope (7,228 km²). At the other end of the scale Latvia and the Highlands and Islands are the least densely populated, and also the largest territories. Population density can have both advantages (higher density can lead to a bigger variety of skills and human capital, which can drive economic growth) and disadvantages (high density could lead to problems related to resource scarcity). GDP per capita is highest in the Highlands and Islands (€29,900 in 2014), closely followed by the Basque Country, Piedmont and Northern Ireland, with a significant gap to the other three territories. This reflects the traditional division between the group of regions from EU15-countries and non-EU15 countries.²

Graph 2 Area, density and GDP per capita



Source: data Eurostat; Gross domestic product (GDP) per capita at current market prices in Euro per inhabitant (data availability); (*) – reported from national statistics office

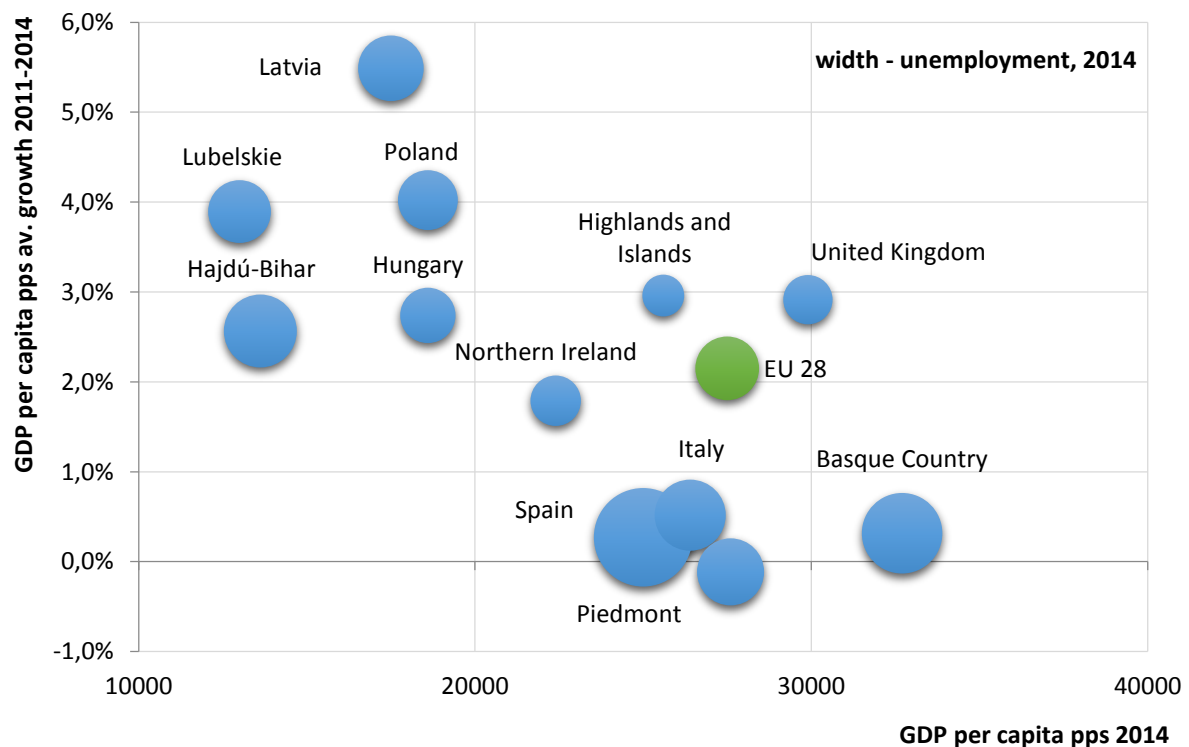
1.1.2. Economic context

Graph 3 includes information on both GDP per capita in 2014 (horizontal axis) and GDP per capita growth from 2011-2014 (vertical axis), along with information on unemployment (width of the

² EU15 stands for the number of member countries in the European Union prior to the accession of ten candidate countries on 1 May 2004.

bubbles). Data is included both for the regions themselves and for the corresponding countries. Thus we can see that while the Highlands and Islands and Northern Ireland are strong performers both in level and growth in per capita GDP, they lag behind the UK as a whole. On the other hand, the Basque Country and Piedmont have higher levels of GDP than Spain and Italy, but have exhibited similarly low levels of growth between 2011 and 2014. Lubelskie and Hajdú-Bihar both lag behind their national averages (Poland and Hungary) in level of GDP per capita, but have exhibited similar, moderate rates of growth. Finally, the star performer in terms of growth in GDP per capita over the 2011-2014 periods is Latvia. Further details in terms of evolution of GDP per capita and its growth rate per partner region are presented in Annexes.

Graph 3 GDP per capita growth, average and unemployment 2011-14 and 2014



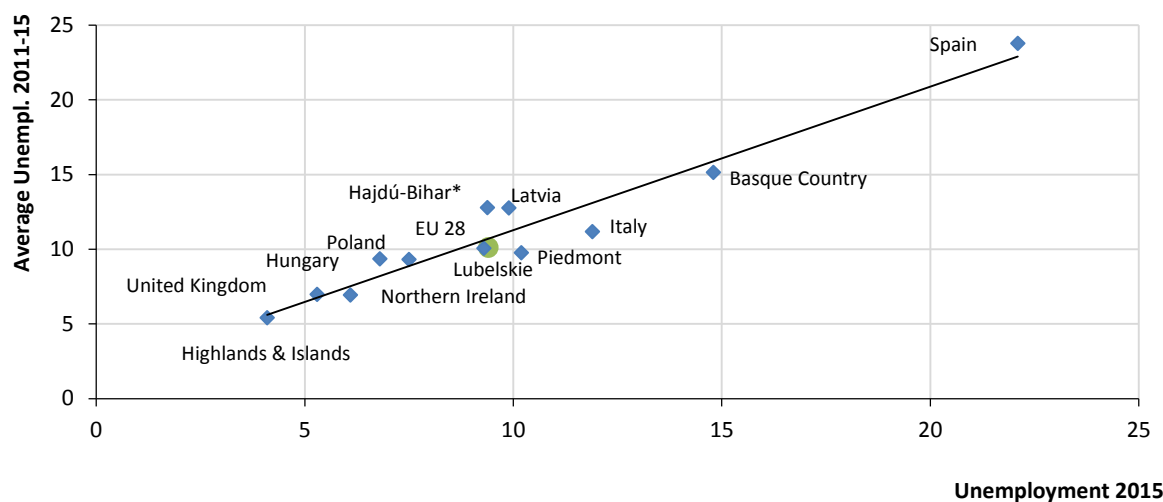
Source: data Eurostat; Gross domestic product (GDP) per capita and growth at current market prices in PPS per inhabitant (data availability); Unemployment rate (15 years and over) %

1.1.3. Labour market

Among the partner regions the Basque Country has the highest unemployment in 2015 (15.14%) as well as the highest average unemployment between 2011 and 2015 (Graph 4), while the lowest is found in the two UK regions (Highlands and Islands and Northern Ireland). Graph 5 illustrates the relationship between average unemployment rates 2001-2015 and the EU28 average. Here there is a

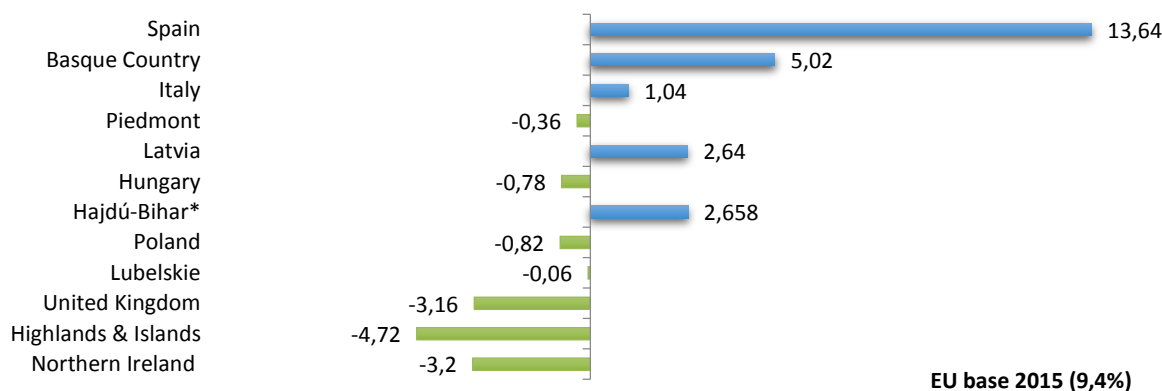
split between the Basque Country, Latvia and Hajdu-Bihar (above the EU28 average), Piedmont and Lubelskie (slightly below the EU28 average) and the Highlands and Islands and Northern Ireland (significantly below the EU28 average).

Graph 4 Unemployment rate 2015 and average, 2011 - 2015



Note: data Eurostat; Unemployment rate (15 years and over) %

Graph 5 Unemployment average 2011-15 as of EU28 in %



Note: data Eurostat

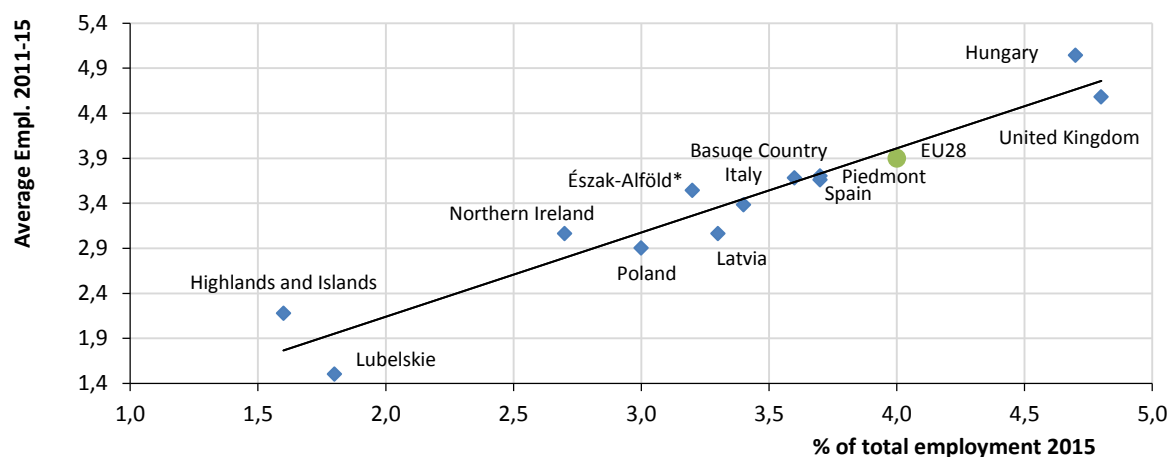
Having high shares of employment - and skills - in high technology sectors is important for addressing the latest technology and cross-sector trends associated within 4th industrial revolution and digitalization.³ It is widely considered that employment in high technology sectors is especially relevant

³ EU position, relevance, main characteristics of high technology sectors could be found following the link: http://ec.europa.eu/eurostat/statistics-explained/index.php/High-tech_statistics_-_employment

in terms of creating high-complexity products and high-wage jobs, and that their dynamism helps to improve performance in other sectors and increase innovativeness of products and services.⁴ All this brings us to map the situation in the partner regions.

While the Highlands and Islands has the lowest overall unemployment rate, Graph 6 illustrates that it also has low shares of employment in high technology sectors, both as of 2015 (1.6%) and on average employment between 2011 and 2015 (2.2%). Although Lubelskie has slightly higher shares in these sectors in 2015, the average rate for 2011-15 is 1.5%, which is lower than for Poland (2.9%) or other partner regions, such as Northern Ireland (3.1%) or Piedmont (3.7%), and much lower than the EU28 average (3.9%). In spite being still below some of the partner regions, Latvia seems to show also a good trend in the employment in the high tech sectors with 3.3% in 2015 and 3.1% for average 2011-15. It is also interesting to note that all regions (with exception of Piedmont) have lower levels of employment in high-technology sectors than for their country as a whole. All in all, all partner regions in terms of average employment (2011-2015) as well as its share as of total in 2015 were much lower than the EU28, which suggests that this is a potential area for policy attention.

Graph 6 Employment High-technology sectors (high-technology manufacturing and knowledge-intensive high-technology services)



Note: data Eurostat; (*) for Hajdú-Bihar the data of Észak-Alföld is taken due to availability

1.1.4. Sector context

Reviewing the key economic sectors of the partner regions based on variables such as share of Gross Value Added⁵ (Graph 7) and employment (Graph 8), the Basque Country and Piedmont stand out in

⁴ “In the global race for competitiveness, it is essential to create, exploit and commercialize new technologies. High-tech sectors and enterprises are key drivers of economic growth and productivity, and generally provide high value-added and well-paid employment” (Eurostat, 2017).

⁵ The value of output produced minus the value of intermediate consumption; it is a measure of the contribution to GDP made by an individual producer, industry or sector (OECD, 2017).

terms of their high share of GVA and employment in industry. At the same time, both are showing declining trends (Annexes) in terms of share over the period 2011–2015.

Looking at the sectoral distribution is central for understanding the allocation and trends in economic and competitive strengths of the economy. The industrial (and within it manufacturing) profile is often seen as the “backbone of the economy”.⁶ Manufacturing, in particular, is central for innovation, productivity and trade due to the potential for upgrading and incorporating new technologies and techniques for producing new products, or for producing existing products in leaner processes (reducing time and costs from idea to market).

Over recent decades the shares of industry and manufacturing have also shown a tremendous decline in production and employment across a wide range of European countries and regions. This decline has been noted especially in the old industrial regions, where the first and second tier producers have re-allocated the parts of their production value chains to emerging markets to take advantage of cheaper labour and production costs. However, there is an ongoing re-strengthening of the attention afforded to manufacturing and industry, especially in advanced economies.⁷ This is related to two global industry trends:⁸ on one side, increasing costs in low-cost manufacturing countries; and on the other side, growing manufacturing opportunities from digitalization and new technologies (e.g. 3D printing).⁹ In the light of strengthening the industrial competitiveness of European economies due to radical changes in the nature of industry and manufacturing, the growing contribution of Key Enabling Technologies (KETs) is crucial.

This declining trend in industry share is evident in most of the partner regions over the last five years (see Annexes), although there has been an increasing share. Within industry the manufacturing trend across the partner regions shows a higher decline in terms of share of employment than GVA, which is likely to be related to previous job-cuts in manufacturing due to re-location of production and/or automatization of factories. This trend has potential to being reversed due to global trends in industrial manufacturing with new technologies in developed economies.¹⁰

⁶ More detail on EU policy related to industrial development can be found under DG Growth – Industry: https://ec.europa.eu/growth/industry_en.

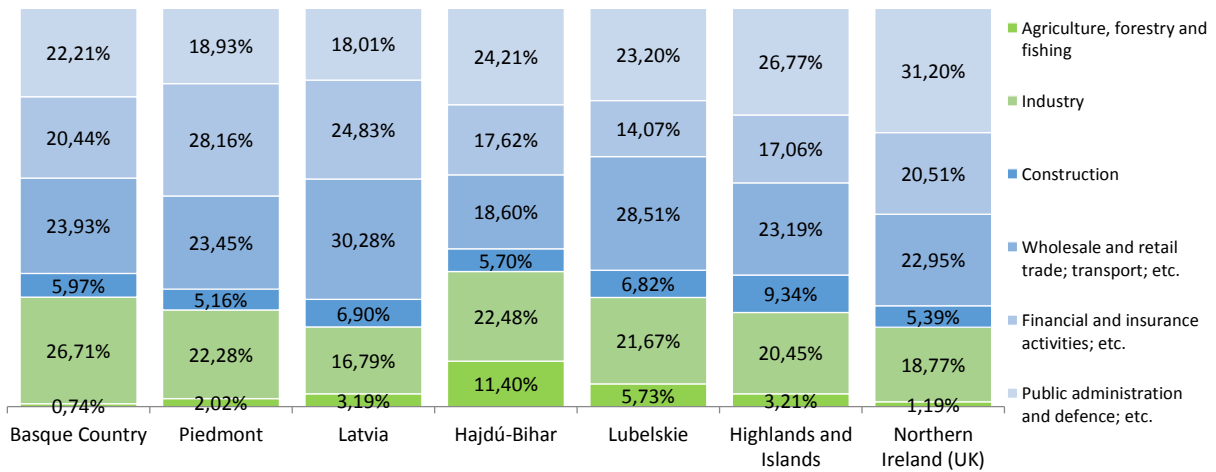
⁷ McKinsey (2012): Manufacturing the future: The next era of global growth and innovation, <http://www.mckinsey.com/business-functions/operations/our-insights/the-future-of-manufacturing>

⁸ Strategy& (2015): 2016 Industrial Manufacturing Trends, <http://www.strategyand.pwc.com/trends/2016-manufacturing-trends>.

⁹ One of the examples of the new type of production factories in Europe is Adidas “Speedfactory” in Germany, with leaner processes that are almost fully automatized and digitalized (The Economist, January 14, 2017, <http://www.economist.com/news/business/21714394-making-trainers-robots-and-3d-printers-adidass-high-tech-factory-brings-production-back>).

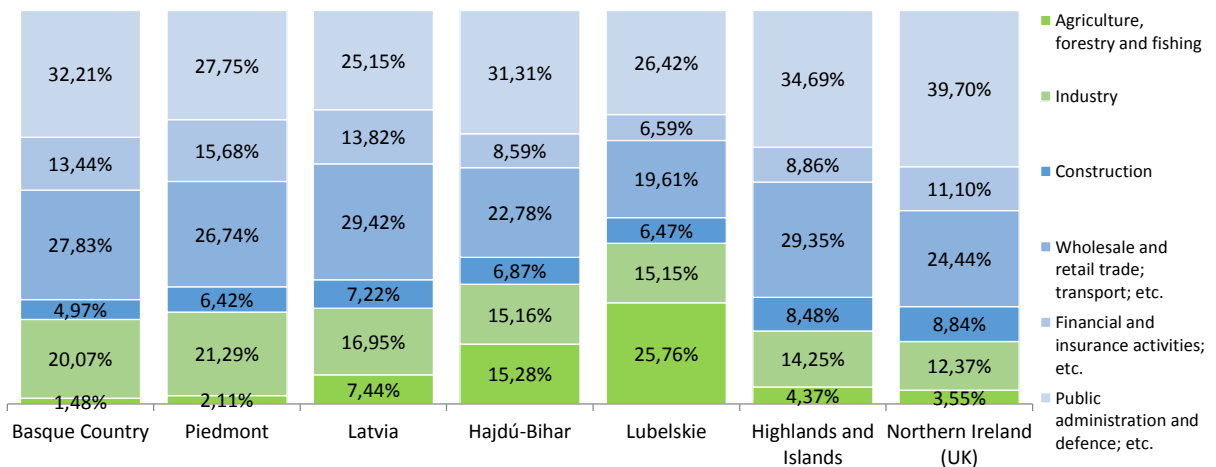
¹⁰ PIIIE (2016): “Eastern Europe’s Lethargic Economies” <https://piie.com/blogs/realtime-economic-issues-watch/eastern-europes-lethargic-economies>.

Graph 7 Share of GVA main sectors, 2014



Note: data Eurostat; GVA based on market prices; Full description for Wholesale and retail trade; transport; accommodation and food service activities; information and communication; Financial and insurance activities; real estate activities; professional, scientific and technical activities; administrative and support service activities; Public administration and defence; compulsory social security; education; human health and social work activities; arts, entertainment and recreation, repair of household goods and other services

Graph 8 Share of employment main sectors, 2014

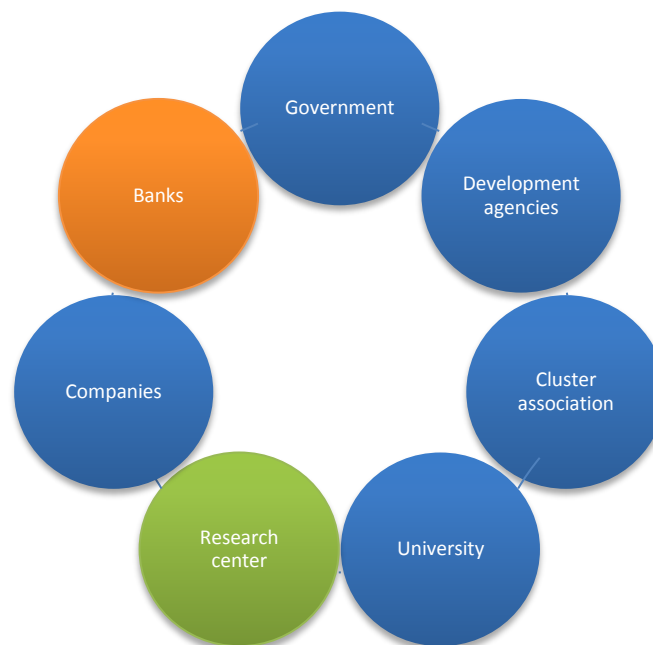


Note: data Eurostat; Full description for Wholesale and retail trade; transport; accommodation and food service activities; information and communication; Financial and insurance activities; real estate activities; professional, scientific and technical activities; administrative and support service activities; Public administration and defence; compulsory social security; education; human health and social work activities; arts, entertainment and recreation, repair of household goods and other services

1.2. Triple-helix infrastructure

Regional development and cluster policy implementation are strongly dependent on the type of actors involved. Here the review of territorial context is extended with analysis of the triple-helix¹¹ infrastructure (traditionally made-up of three areas: industry, academia and government). Here, for practical reasons, the triple helix institutions have been further split into sub-institutional categories: 1) Government (including public administration), 2) Development Agencies, 3) Cluster Associations (or collaborative networks), 4) Research institutions, 5) Universities, 6) Companies and 7) Banks. In brief, based on the provided evidence from the partner regions, the contribution of these institutions to regional development and clusters in the partner regions are as illustrated below, with some examples provided in the box.

Graph 9 Institutional contribution



Notes: Institutional contribution, Blue – regularly contribute, green – sometimes, orange - rarely

Examples	Contribution of institutions:
	Government
	<i>“The Department of Economic Development & Competitiveness is in charge of designing and deploying Cluster Strategy in collaboration with and through SPRI Development Agency.” Basque Country</i>
	Development agency

¹¹ Term to capture the interrelated roles of the public sector, private enterprise and universities (Etzkowitz and Leydesdorff, 1997) in (Andersson, Serger, Sörvik, & Hansson, 2004).

“Invest NI is a Non Departmental Public Body (NDPB) under the auspices of Department for Economy. As such it has responsibility for the implementation of the region's economic strategy.” Northern Ireland

Cluster associations

“Have the responsibility to management and coordination of different clusters; definition of recommendations on future cluster policy, networking and co-operation issues” Hajdú-Bihar

Universities

“Some clusters do have strong collaboration with corresponding research institutions like for example cluster “CLEANTECH LATVIA” are cooperating with Riga Technical University. They work together on daily bases to develop the clean-tech solutions, but this kind of cooperation is not common in all cases.” Latvia

Research centers

“Provide relevant advanced technologies to business, research/innovation projects.” Lubelskie

Companies

“Businesses are involved in collaboration and innovation often in conjunction with or instigated by the other main actors/ institutions” Highlands & Islands

Banks

“Banks covering the HIE area provide credit policy support along with some ad-hoc support under sectors where relevant.” Highlands & Islands

The traditional challenge of bridging firms and research institutions still persists in the partner regions, with evidence that research centers contribute “on an individual basis” and that “on some occasions the clusters can inform the work of research centers, and on other occasions the flow of information/expertise can be reversed”. A very limited contribution was also highlighted for banks and finance-related institutions, with survey responses indicating that they “do not participate” or are “not relevant”.

1.2.1. Policy authorities

The character of public institutions involved in industrial and cluster policy are another important component of location specific characteristics shaping policy design, implementation and development. Taking into account the diversity of political administrative systems and therefore the potential differences with regard to their managing and implementation authorities, and after looking at the given settings, strong diversity is confirmed among partner regions. The below Graph 10 gives a brief overview of the **managing and implementing public authorities** in the partner regions and also addresses their engagement in the cluster policy and related matters.

Managing authorities

In most of the partner regions the managing public authority has a department which deals not only with cluster issues, but also with issue such as economic development, industry, trade and innovation. Meanwhile, areas such as employment and infrastructure are often the domain of other departments or even another managing public authority (e.g. Department of Environment and Regional Planning in the Basque Country, or Ministry of Transport in Latvia).

In the partner regions with more centralized governments the competences for cluster development are often within the national managing authorities. This is, for example, the case with Poland, where the Ministry of Economics is the managing authority. A similar situation is found with regards the management of cluster policies in sub-regional levels (NUTS3). In this case, the managing responsibilities are held at the regional or even national level (e.g. Highlands and Islands to Scottish Government, and Hajdú-Bihar to Hungarian).

Implementation authorities

Further to managing public authorities in most of the partner regions the implementation of cluster policy is delegated to an implementation agency, which tends to be in charge of a broader spectrum of policy specific matters. These implementation authorities or agencies either cover the whole spectrum of cluster, business and industry related matters, or only specific ones (Graph 10).

Example	Lubelskie, Poland
	<p>This partner region has two agencies involved in cluster policy implementation: PARP – Polish Agency for Enterprise Development and NCBiR – National Center for Research and Development. These two together with National Science Center are also engaged in “innovation” policy related implementation. Meanwhile, in terms of “economic” policy implementation mainly PARP is involved.</p>

Budget for cluster and related policies

A review of the budgets dedicated to cluster policies is extremely difficult to undertake due to the diversity and multitude of cluster policies (Graph 10). In the case of support via a cluster managing organization the budget structure is slightly clearer to estimate. As example, in the case of the Basque Country, the explicit budget for the cluster association as an actor of/ and within cluster facilitation is 2,5 mln EUR (Cluster Supporting Programme), meanwhile the further financial support may come from specific calls for Technology R&D and Innovation projects (150 mln EUR) or from Internationalisation project calls (20 mln EUR). In other cases, such as project based funding the financial framework is vaguer. This is the case in Hungary, for example, where the targeting of finance is based on thematic priorities – such as SMEs and competitiveness, research, or technology development and innovation – rather than specific programmes.

1.2.2. Business structure

Regional economies are built around their business structures/firm demographics. Traditionally the business landscape is seen via three types of companies: 1) micro companies (<10), 2) small and medium companies (10-250) and 3) large companies (>250).¹² The distribution of these types of companies in each of the partner regions is presented in Graph 11. In all of the partner regions the majority of companies are **micro companies**. Indeed, the only significant difference in the shares is noticed in Northern Ireland and Highlands and Islands, where small and medium companies have a slightly higher share than in other partner regions.

A deep review of the business infrastructure is beyond the scope of this document, but it is stressed that business mapping exercises per partner region in general and in specific sectors would / could serve as a rich basis to understand the territorial business and structural context. This would facilitate good information for building sector and business specific cluster, innovation and industrial policies. Indeed, most of the partner regions know well their leading **medium and large companies**, reflecting the necessity to put the knowledge and engagement of these firms in the “driving seat” for strengthening and facilitating collaboration with the small and medium companies towards successful regional and especially cluster development.

¹² For company business typology see [Eurostat](#) explanation note

Graph 10 Policy authorities and dedicated budget for cluster support

P. Region	Clusters	Economic dev.	Industry	Trade	Innovation	Employment	Infrastructure	Other	Budget (clusters, 2015)
Basque Country	Dept. Economic Development & Competitiveness (DDEC), Basque Government					Dept. of Empl. & Social Affairs	Dept. of Environ. & Regional Planning		2,5 mln EUR
	SPRI S.A.					other	other	other	
Highlands & Islands	Scottish Government (**the division is different)								HIE - appx: 11,3 mln EUR ERDF - appx: 5,6 mln EUR *1
	HIE								
Northern Ireland	Department for the Economy					DfE	United Regulators; Ofcom	other	appx: 189,2 mln EUR*2
	Invest NI								
Piedmont	Competitiveness regional system Dept.		Competitiveness regional system Dept.		Competitiveness regional system Dept.				114,5 mln EUR
	Finpiemonte								
Lubelskie	MoE				MoE & Ministry of Science & Higher Education		Ministry of Infrastructure & Lubelskie Voivodeship		3,7 bln EUR
	PARP; NCBIR	PARP	Industry Development Agency	Polish Information and Foreign Investment Agency	PARP; NCBIR; National Science Ceter				PARP - approx. 350 mln EUR; NCBIR - approx. 2 bln EUR
Hajdú-Bihar	Managing Authority for Economic Development Programmes, Deputy State-Secretariat of Economic Development Programmes, National MoE						M. of Human Resources; M. of National Development		2,67 billion EUR *3
	International & Cluster Dept. of National MoE	n/a	n/a	National Research, Development and Innovation Office	n/a	n/a	n/a	n/a	
Latvia	MoE					Ministry of Welfare	Ministry of Transport		ERDF - 6,2 mln EUR
	State Education Development Agency	LIAA			Innovation portal of Latvia	National Employment Agency	Ministry of Transport		

Notes: related to cluster policy: Managing authority Implementing authority

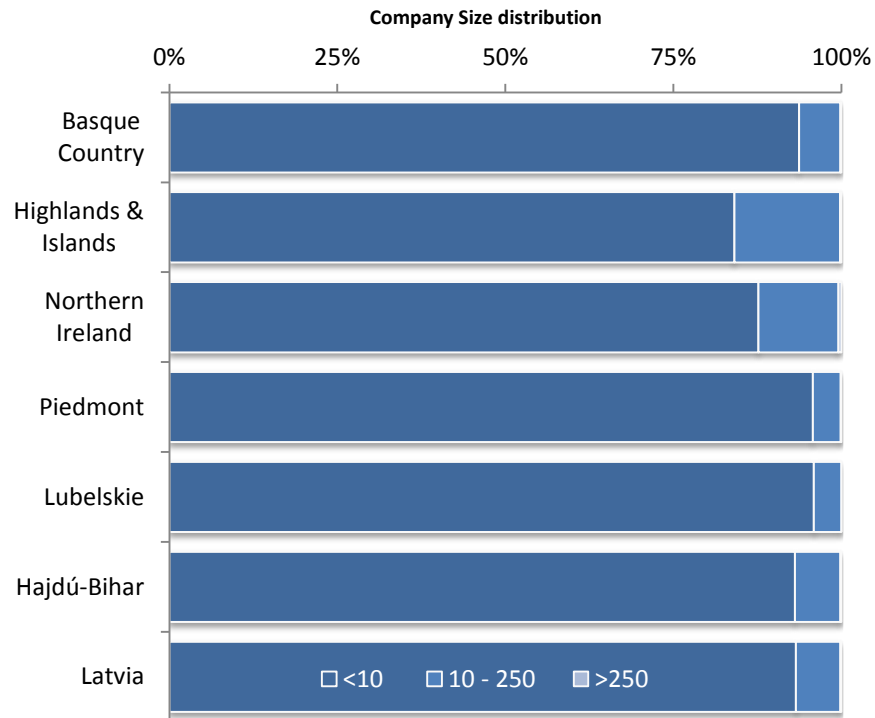
Note: in Northern Ireland operational budget for cluster support is delegated from the Department for the Economy to Invest NI

*1 This budget covers HIE's goals/areas of responsibility which are: to support businesses in Internationalisation, Inward investment, Inclusive growth, and Innovation.

*2 not only clusters

*3 covering different priorities

Graph 11 Companies



Medium	Large
Basque Country	
ABB, DAEWOO, DANONA, Faes, Gamesa, Goizper, Inauxa, Panda, Precicast, Salto Systems	Batz, Bridgestone, Cikautxo, CAF, DANOBAT, IBERDROLA, IDOM, Ingeteam, Mercedes-Benz, Orona
Highlands & Islands	
Reids of Caithness, NomadiX Media	CapGemini, Norbord, Lifescan, Baxter's, Global Energy Group,
Northern Ireland	
Old Bushmills Distillery, Hilton Foods (NI)	Moy Park, UTV Media, Kainos Software, Dunbia-
Piedmont	
Blu engineering - APR - Enginsoft - Ellena Spa	FCA - Alenia - Bracco imaging – Ferrero
Lubelskie	
Petrodom Venna, ZOMAR, BURY TRADE, LEMONEX, ZL Naleczow Zdroj	PGE, Azoty Pulawy, Bogdanka, Black Red White, PZL Swidnik, URSUS, Ł-Meat, Wierzejki
Hajdú-Bihar	
CGC Hungary Ltd; Evonik Agroferm Ltd.; KEVIÉP Construction and Trade Ltd.	TEVA Pharmaceutical Works Ltd. (TPW); KITE Agricultural Ltd.; TIGÁZ Gas Supplier Ltd.
Latvia	
SIA "MGS FACTORY"; SIA "MS-IDI"; SIA "Greynut"	SIA "Mikrotīkls"; AS "Grindeks"; AS "Latvijas Finieris"

Notes: share of companies (enterprise) as per no. of employees (2015) (company with less than 10 empl., between 10 and 250 empl., with more than 250 empl.); data for 2013 for Piedmont, 2014 Hajdú-Bihar and Latvia; Source: based on survey data

1.2.3. Science and research infrastructure

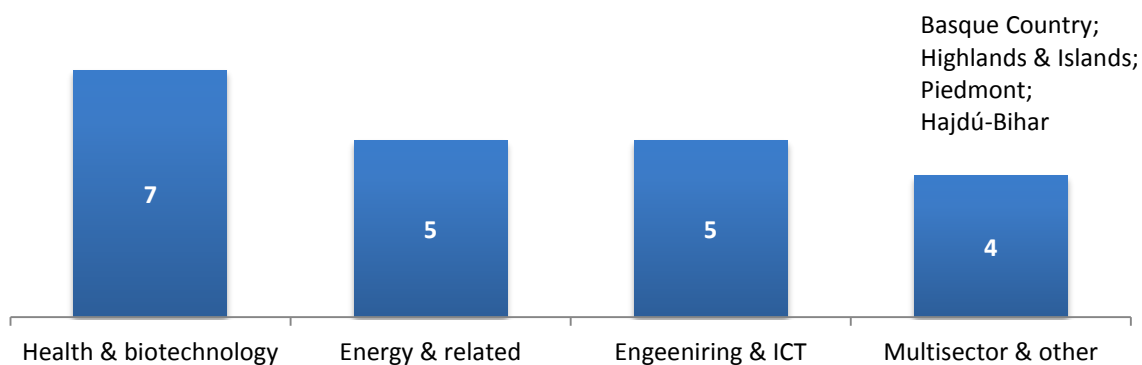
Based on three examples from each partner region of their main **science and research centers** (also research centers) related to cluster development, it has been observed that most of the reference centers are **industry or sector specific institutions**. Only four regions – Basque Country, Highlands & Islands, Piedmont and Hajdú-Bihar – mentioned centers with **multisector specialization** (Graph 12).

With regards to the industry/sector specific research centers, three main research and development themes stand out (Graph 12 and Table 1):

- **Advanced manufacturing** (including a broad perspective of industries, e.g. from general approach to specific industry focus, such as automotive, mechatronics, aerospace, etc.)
- **Energy and related** (focused on traditional as well as renewable and alternative energy sources)
- **Health and biotechnology** (where the focus is on the direction of technological or medicine development for enhancing human health and products)
- **Engineering and ICT** (where engineering is related with physics in advancing so called “smart materials” and ICTs are a source of transformation along the latest Industry 4.0 trends).

This pattern is in line with overall EU trends, which show high business R&D investment into such areas as high-tech sectors, specifically in Healthcare, Pharmaceuticals and Technology Hardware. In most of the partner regions the main referred science and research centers were also in line with the main RIS3 priority areas, which are also very similar across regions.

Graph 12 Thematic specifics of science & research infrastructure across partner regions



Note: number stands for the no. of partner regions having research center in the respected field (based on 3 leading examples)

Table 1 Top 3 science and research centers related to cluster development

Region	Health & biotechnology	Energy & related	Engineering & ICT	Multisector & other
Basque Country	Cooperative Research Centres (CIC) Biogune, Nanogune, Energigune, Tourisgune (biotechnology)		BERCs (Basic Excellence Research Centres) in Biomolecular, Physics, Maths (physics)	TECNALIA (multisector); IK4(multisector)
Highland & Islands	Centre for Health Science, Inverness (health science & biotechnology)	European Marine Energy Centre, Orkney (sea energy)		Scottish Association of Marine Science, Oban (maritime)
Northern Ireland	Connected Health Innovation Centre (CHIC/ health technology)	Centre for Advanced Sustainable Energy (CASE,/ renewable energy)	Northern Ireland Advanced Composites and Engineering Centre (NIACE/ advanced Materials/Engineering)	
Piedmont	Molecular Biotechnologi Center (biotechnology)	ENEA (energy and sustainable development)	CNR-IEIT - Institute of Electronics, Computer and Telecommunication Engineering (electronics)	National Research Council (CNR) (as a multi-disciplinary research center); University of Turin; Politecnico of Turin
Lubelskie	Maria Curie-Skłodowska University (biotechnology); Medical University of Lublin (medical technology)	Institute of Soil Science and Plant Cultivation (renewal energy)		
Hajdú-Bihar	Chemical Works of Gedeon Richter Plc.	Hungarian Academy of Sciences Institute for Nuclear Research (broad areas of modern physics; atomic and subatomic physics, material sciences, reaching to environmental and biomedical sciences)		University of Debrecen

Region	Health & biotechnology	Energy & related	Engineering & ICT	Multisector & other
Latvia	Latvian Institute of Organic Synthesis (biomedicine & smart energy)		University of Latvia Institute of Solid State Physics (smart materials); Institute of Electronics and Computer Science (ICT)	

1.3. Clusters

1.3.1. Defining the cluster concept

Theoretical note

Clusters and other types of industrial agglomerations

The most common definition of cluster is often attributed to Michael Porter, who sees clusters as “geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (for example, universities, agencies, and trade associations) in particular fields that compete but also cooperate” (2008, p. 197). He further claims that clusters are “broader than industries” and able to “capture important linkages, complementarities, and spill-overs of technology, skills, information, marketing, and customer needs that cut across firms and industries” (ibid., p. 205). Therefore, he (ibid.) sees three main advantages that stem from companies’ location in clusters: productivity, innovation and new business formation.

For all that, Michael Porter was not the first to discover the advantages of the industrial agglomerations. The first reference to agglomerations and industrial districts is traditionally attributed to Alfred Marshall (1882), who described it as a sensed “industrial atmosphere” in “industrial districts” of British cities. A renewed interest was then sparked in the 1980s in the context of experiences in the Emilia Romagna - region that is often referred as the Third Italy (Piore and Sabel 1984; Becattini 1991; Asheim 2001; Paniccia 2002; Isbasoiu 2006). Since then different streams and theoretical concepts explaining such spatial concentration have been developed. For example, in California Allen Scott (1998) highlighted the rise of new industrial spaces, while others have preferred to talk about industrial complex, socio-territorial industrial system, innovative milieu, local production systems, local high-tech milieus, local and regional innovation systems, or learning regions (Asheim 2001; Asheim and Gertler 2005; Cooke and Morgan 1998; Keeble and Wilkinson 2000). At the same time, although the above referred concepts show some differences due to the blurred boundaries and the absence of a non-unified theory between them, they all have similar ground - **externalities** of kinds similar to those first observed by Marshall (Martin and Sunley 2003; Sugden et al. 2006; Bruch-Krumbein and Hochmuth 2000).

The **applied definition** of clusters is often central to understanding which territorial actors are being perceived as clusters and to determining policy approaches chosen to support the defined cluster forms. After reviewing the cluster definitions given by partner regions (listed in Example Box) the lists of existing cluster definitions, which one can find in the works of Rosenfeld (1997), Martin & Sunley (2003), Isbasoiu (2006), Sedita & Lazzeretti (2012), Konstantynova & Wilson (2014) and many more can only be expanded further.

Example

Cluster definitions applied by partner regions:

© *“The main agents strengthening cooperation between actors in the innovation system and especially among SMEs, facilitating their integration into global value chains”*

© *“Groupings of independent undertakings – innovative start-ups, small medium and large undertakings as well as well as research organization – operating in a particular sector or geographic reference”*

© *“Specific form of co-operation between institutions and organizations - mainly enterprises - concentrated geographically and operating in the same or related sectors”*

© *“Network of businesses, research, education and other related agencies, which operate in a specific economic sector or inter-related industries, use related technologies and similar profile labor resources, consist of legally independent businesses, that are competing, and at the same time realizes the mutual cooperation”*

In case of the absent of the official cluster definition, the approximation was given and reads as follows:

© *“Businesses within defined growth sectors are directly supported. Sectoral support is based through a range of interventions, e.g. collaboration across companies via a number of specialist networking programmes”*

© *“The terms 'cluster', 'collaborative network' and 'ecosystem' are variously use to define groups of organizations (business, academia and public sector), who have agreed to work together to exploit synergies for commercial gain”*

© *General reference to Porter's definition as well as "companies and other organizations organized in economic networks" or "a network of entities (producers, suppliers, researchers, service providers) that work in the same sector or combine the same sectors"*

At the same time, referring to the **classical definition of industrial clusters derived from Porter (1998)** (see Theoretical Box) and linking it with the definitions given by partner regions, some specific similarities and differences can be noted. In terms of similarities, the definitions highlight the importance of aspects such as:

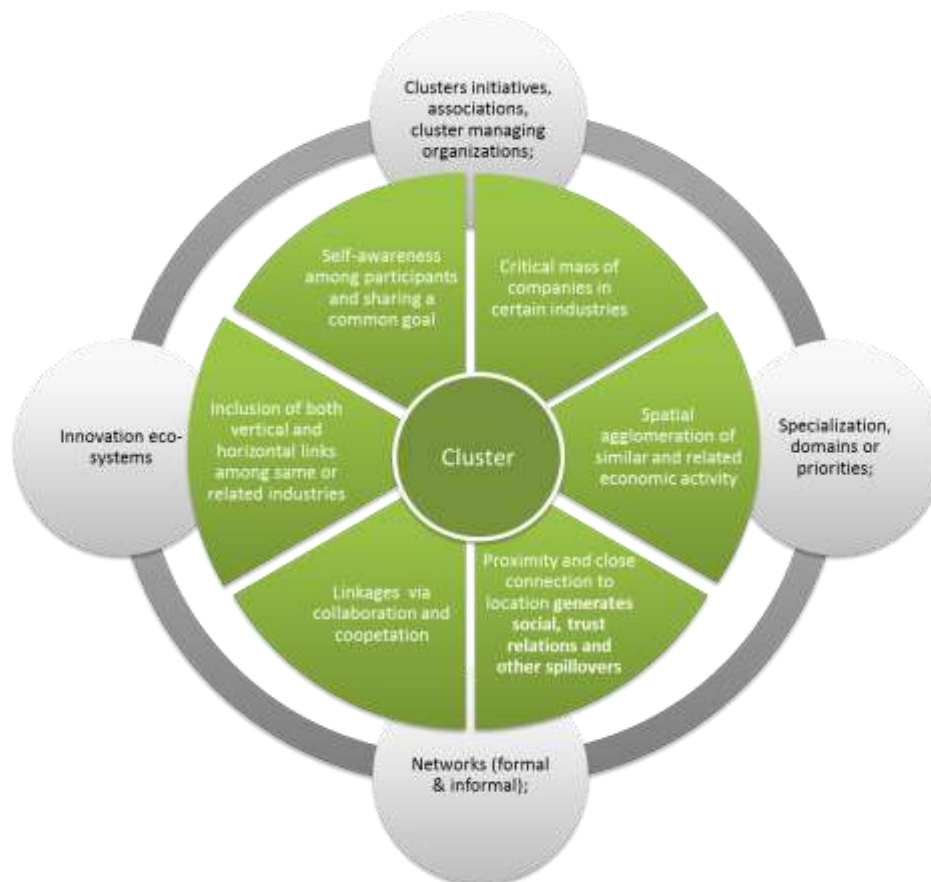
- **Cooperation and collaboration;**
- **Institutional inclusion** comprised of business, public sector and research/education, etc.;
- **Industrial or sectoral interconnections** associated with similar as well as with related sectors, which could produce positive innovation spill-overs.

With regards to differences, it is interesting that such an essential component as “geographical closeness” has barely been used in the given cluster definitions by partner regions. This could be because geographical closeness is so strongly incorporated in the minds of policy-makers and territorial actors that it doesn’t need to be made explicit, or alternatively because it is seen as less relevant in the context of processes of globalization and internationalization. Yet it is acknowledged, by the Basque Country for example, that “geographic closeness seems to be an important factor for facilitating regular personal meetings and exchanges among cluster actors and cluster associations’ members, for developing close relationships and for building trust as an important ingredient for collaboration.”

Another stand out difference from Porter in the definitions of the partner regions is the utilization of such wording as “**networks**” and “**ecosystems**”. In literature on industrial agglomerations, such notions as networks do not center their focus on geographic proximity, rather on knowledge relations and connectivity across industries. Indeed, within the network concept the type of communication and relationship among actors is often seen as more formalized and with less importance of geography (Rosenfeld, 1997), but the opposite could be stated about the concept of ecosystem.

This is where it is important to remember some of the core building blocks related to the definition and understanding of the cluster concept. Combining common features of the cluster concept proposed by Konstantynova & Wilson (2014) with similar main characteristics of successful clusters established by European Commission (2016), **6 prime building blocks** for defining clusters should be kept in focus. These 6 cluster building blocks (marked green in Graph 13) form the core characteristics of the cluster concept, namely the presence of: 1) Critical mass of companies in certain industries; 2) Spatial agglomeration of similar and related economic activity; 3) Proximity and close connection to location generates social, trust relations and other spill-overs; 4) Linkages via local collaboration and cooperation; 5) Self-awareness among participants and sharing a common goal and 6) Inclusion of both vertical and horizontal links among same or related industries.

Graph 13 Central characteristics of cluster concept definition



Source: Based on European Commission (2016) and Konstanyanova & Wilson (2014) Note: green marked/ in circle pies – building blocks of cluster definition; grey marked/ outer circles – concepts, which should be distinguished from cluster definition, but could be related to cluster growth

Clusters should also be clearly distinguished from other very commonly used terms (which although have strong linkages to clusters are not one-and-the-same) such as:

- 1) cluster initiatives, associations or cluster managing authorities (these are formal or informal institutions, which are often used as policy instrument to develop clusters);
- 2) specialization, domains or priorities (which are agglomerations, showing territorial industrial/sectoral potential or existing strength, but don't yet show clear evidence of cooperative dynamics, self-definition or common strategic vision);
- 3) networks (formal & informal) (see earlier paragraph);
- 4) innovation eco-systems (stands for a system with/without cooperation with large and diverse array of participants and resources that contribute to and are necessary for ongoing innovation in an economy).

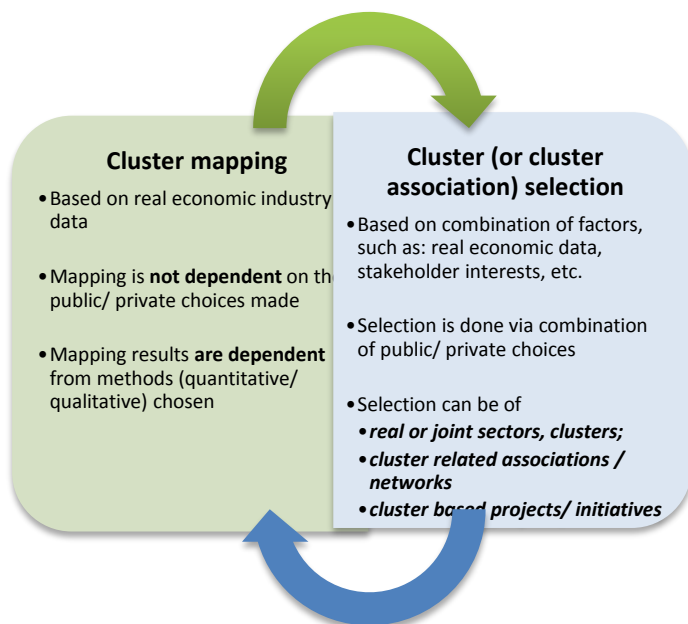
In conclusion, an important cluster characteristic is stressed for policy makers: clusters are natural phenomena, which form due to externalities. This should not be mixed with initiatives and/or associations, which already constitute a policy instrument for cluster facilitation and support.

1.3.2. Cluster identification and mapping

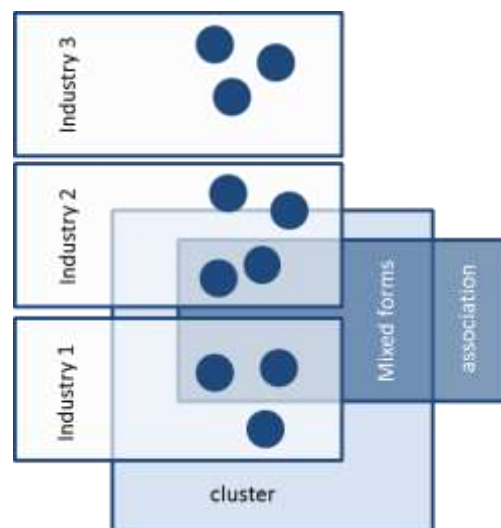
Having a clear and shared understanding of the cluster concept within the territory sets a clear spectrum for identification/mapping of clusters via certain data sources, data collection and methods. In the partner regions, where the identification and definition of clusters took place, the most common qualitative cluster identification/mapping procedures were meetings with stakeholders, and the most common quantitative approaches were mapping based on available/defined indicators (on sub-national or national level). These approaches were followed by the partner regions specific procedures for the selection of clusters/sectors (or directly associations) to be supported.

There is indeed an important distinction between cluster mapping and the selection of clusters (or cluster associations) to support. The first should seek to understand what is already there and to reflect real economic opportunities and challenges. It is done to build the basis for understanding whether support might be needed to strengthen what is there, and if so what type of support, which is ultimately a policy decision (see Graph 14). In some cases, clusters (or cluster associations) can be supported without a previous exercise of cluster mapping. This is often done, when local actors seem to be well aware of their territorial economic and industrial strengths.

Graph 14 Main characteristics and difference between cluster mapping and cluster (cluster association) selection



Graph 15 From industry to cluster association (or collaborative network)



A mapping of clusters has been done by 3 out of 7 partner regions (namely by the Basque Country, Piedmont and Lubelskie). It is worth noting the regions which conducted cluster mapping are also those in which a specific cluster programme is in place. The exception is Lubelskie, which has done the mapping, but doesn't have a cluster programme, and Northern Ireland, that in reverse has the programme, but no recent mapping exercise has been mentioned.

Tip

European Cluster Observatory,

<http://ec.europa.eu/growth/smes/cluster/observatory/>

The Cluster Observatory is an online, free and user-friendly platform that provides a single access point for statistical information, analysis and mapping of clusters and cluster policy in Europe that is foremost aimed at European, national, regional and local policy-makers as well as cluster managers and representatives of SME intermediaries. The Cluster Observatory also produces reports on clusters and regional competitiveness conditions, such as the bi-annual European Cluster Panorama, a European cluster trends report, a regional eco-innovation scoreboard, and a cluster policy stress test.

OPPORTUNITIES AND CHALLENGES

Building on insights from the above 4 categories of territorial context, summarized in Graph 2, it is possible to identify areas in which the partner regions are well positioned (a clear positive distinction with respect to other partner regions and EU28) or not so well-positioned (cases of negative/declining trends or low performance with respect to other partner regions and EU28).

In terms of partner regions' national and EU28 comparisons there is no clear unifying trend. Each partner region distinguishes itself in its own way. Based on GDP per capita (2014) most partner regions (with exception of the Basque Country and Piedmont) were below their national and EU28, but GDP per capita growth for the period 2011-2014 is shown to be higher than EU28 across most partner regions. This is however, from a perspective of endogenous economic growth theory, a common trend for regional convergence (meaning that the territories with lower GDP per capita rates tend to have higher growth rates in contrast to the territories with higher GDP per capita rates).

Looking beyond GDP, in terms of unemployment (2014) three partner regions – Highlands & Islands, Northern Ireland and Lubelskie – have below EU28 unemployment rates, while only the Highlands & Islands also has unemployment below its national level. It is also worth highlighting that in all partner regions the share of employment in high-tech sectors is below the EU28. Industry (and manufacturing) share in value added and employment is also declining in most partner regions, with the exception of Northern Ireland and Highlands & Islands (starting from low levels). One way of addressing these declining trends (and boosting employment in high-tech sectors) is through the modernization of production and technological upgrading, for example by incorporating new technologies related to ICT (industry 4.0) and other KETs.

In this regard two issues with regards science & research infrastructure have been noticed. First, almost all partner regions have research **centers in the area of 'health and bio-related sciences'**, and second, only four partner regions seem to have research **centers with multiple sector coverage**. At the same time it is clear that global challenges are centered on such topics as energy saving, human health and medical related issues, as well as upgrading of materials and ICT technologies, and there are particular opportunities from cross-fertilization of technologies.

In terms of the context for working with clusters, all partner regions tend to use their territory specific definition of **cluster**, which although being slightly different, at the same time in one or another way aligns with the traditional one of Porter (1998). Thus definitions tend to emphasize the distinction between clusters and an overall business or sectoral focus, and the existence of positive externalities arising is clusters around labour market pooling, greater variety of specialized international goods and services, tacit knowledge spill-overs, an atmosphere of rivalry, but also of trust and cooperation, etc.. At the same time, it has been noticed that in the conceptualization of the cluster definition the reference to geographic proximity is seldom made, while it is very common to encounter the word "network", which might be interpreted to be more formal and less dependent on strict geographic proximity (in a district sense). Beyond this, a certain duplication of the wording "clusters" exists, where

natural industrial agglomerations and clusters are being used often in a similar way to cluster associations.

One of the central roles that tend to be associated with clusters is the generation of spill-overs both within and beyond the cluster. Moreover, cluster associations often serve as a bridge between business and policy-makers. It is important to bear in mind, however, that (natural) clusters can be developed and supported not only via specifically targeted ‘cluster programs’, but also via other co-related stimulus, such as innovation or macroeconomic policies, programmes and plans. Indeed, while in most of the partner regions cluster development is addressed together with other related economic issues (e.g. innovation, trade, industry promotion) under the leadership of one or a number of different institutions, there is still space for other themes to be considered in terms of clusters. Specifically, the two areas of employment and infrastructure stand out as having potentially strong synergies with cluster development, but often treated completely separately.

In relation to financial resources for cluster policy a broader budget structure (financial resources as linked to broader economic themes with minimum specification of the targeted audience) allows the managing and implementing authorities to adjust and stream the financial resources in a more flexible way (leading to consideration of different cluster life-cycles, for example). Meanwhile, the drawbacks of a broader budget structure are more dispersed distribution of the finance and its potential misallocation. Furthermore, most regions (except the Highlands & Islands and Hajdú-Bihar), were referring to national/regional own resources when referring to funding. This suggests a potential opportunity to acquire additional financial resources via grants/tenders schemes on European (e.g. ERDF – European Regional Development Funds) & international (e.g. EIB – European Investment Bank) levels.

Finally, another challenge and at the same time opportunity arises with regards to the use of cluster mapping tools in order to fully exploit available data and knowledge on natural industrial agglomeration/clusters strengths. A more frequent and nuanced use of cluster mapping could help to better define the borders of larger cluster realities and to capture the potential emergence of new industrial value chains and the new entrepreneurial opportunities arising from co-location.

2. Cluster Policy Background

2.1. Cluster policy overview

2.1.1. Defining cluster policy

Understanding cluster policy is very complex matter due to a wide range of existing definitions, forms and types of these policies.

Theoretical note

Cluster policies

Since the beginning of the 1990s, as the cluster concept became a popular lens for understanding regional and national competitiveness, so interest in policies for their identification and support have grown.

Cluster policy herewith is considered as a set of instruments towards the identification of and support for clusters. Cluster policy is most commonly developed in the ambit of regional policy, but can also exist as part of industrial, educational, or entrepreneurship policies, for example. Dependent on the region, different types of clusters can be identified and therefore different programmes, tools and methods can be applied to support their development (Andersson 2004; Europe INNOVA 2008).

The most common cluster policy definitions are extremely broad in their scope. At the same time Benner (2012) is convinced that no matter what is seen or understood as cluster policy, it is of greater importance to realize the difference between it and any other existing policy. This distinction lies in the main targets of the cluster policy, which are not exclusively tailored towards the development of one specific industry but rather towards the whole value chain in which it is constituent. The main rationale for cluster policy intervention is based on allocation¹³ and redistribution¹⁴ arguments and in the latest decades are also supported by evolutionary theory related to lock-ins and path dependency challenges (Tödtling & Tripl, 2005).

One of the possible instruments applied for the development of clusters is the establishment of a cluster managing organization, which can be coordinated privately or publically, locally or nationally (World Bank 2009). They are a kind of mediator and enhancer in the clustering processes. Each cluster initiative is built up and acts in a unique way, and the scale or organizational structure of this association can vary widely, dependent on the number, type of participants and the cluster activities. At the same time the majority of these institutions have very similar tasks, which primarily focus on strengthening cooperation and common vision among actors working in the related industrial fields.

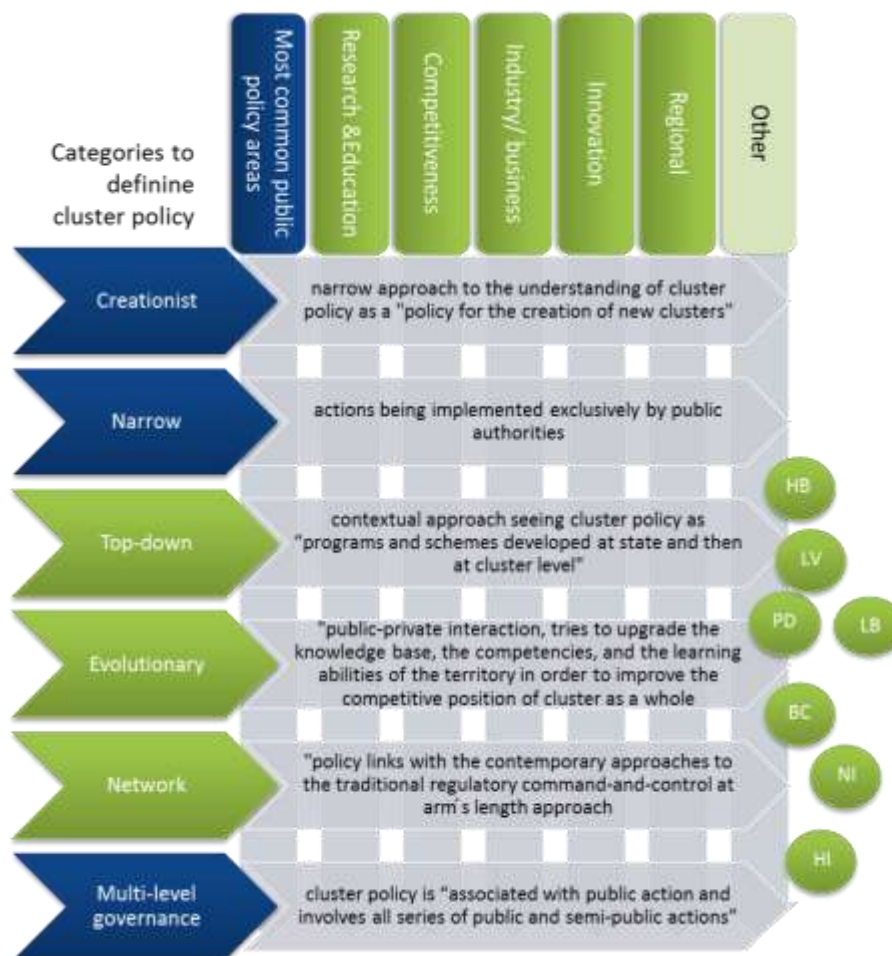
Having reviewed descriptions and characteristics applied across the partner regions towards the identification and strengthening of clusters, it is clear that approaches to defining cluster policy differ.

¹³ Primarily building on microeconomic concepts of market failure, namely when specific conditions restrict the ability of normal market processes to lead to optimal outcomes from an overall welfare perspective

¹⁴ Rests on the concept of social justice rather than market inefficiency and can be partially attributed to the political and legislative roles and responsibilities of the State.

Taking as a reference the (horizontal) cluster policy categories defined by Borrás (2008) (Graph 16), it can be suggested that in most partner regions the cluster policy vision falls into three main categories: **top-down, evolutionary and network** (marked green in Graph 16). Further, as often cluster policies are forming part of a larger public policy scenario, the connection to other types of policy has been also made. The most common links to other public policies areas in partner regions are to **innovation, industry/business, competitiveness, research and education, as well as regional** (marked green in Graph 16).

Graph 16 Categories defining the scopes of cluster policies



Source: Based on Borrás (2008) and Benner (2012). Note: green marked parts - the closest reflect the approaches to define cluster policy applied by partner regions; BC - Basque Country, HB -Hajdú-Bihar, HI - Highlands and Islands of Scotland, LV – Latvia, LB – Lubelskie, NI - Northern Ireland, PD -Piedmont

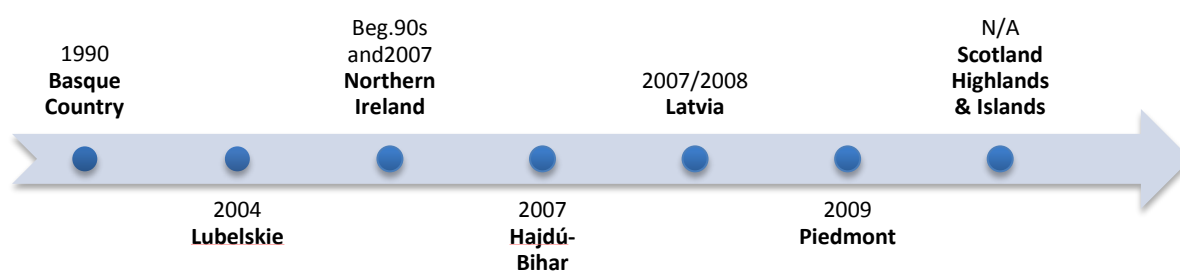
Building on the above, to analyse cluster policies developed and applied by partner regions, cluster policy is interpreted in this document in a broad sense. It is taken to include any policy/programme

supporting collaboration across companies and other sector/activity specific institutions (such as research centres, university, state departments, etc.) through instruments such as cluster associations (or collaborative networks) or similar forms of collaboration among businesses in a cluster context.

2.1.2. Cluster policy main characteristics

While all partner regions in one or another form have some policy/programme supporting cooperation/networking across companies and sector specific institutions, 4 out of 7 partner regions (Basque Country, Piedmont, Northern Ireland and Latvia) have a dedicated cluster policy programme. In most of these regions the launch of cluster policy activities as a part of a dedicated cluster policy programme took place before the financial crisis of 2007. Moreover, in 2 of the 7 partner regions some cluster-related initiatives can be tracked to the beginning of 1990s, although it is only in the Basque Country that a dedicated cluster policy has been permanently present since then.

Graph 17 Evolution of cluster policy activities initiation across partner regions



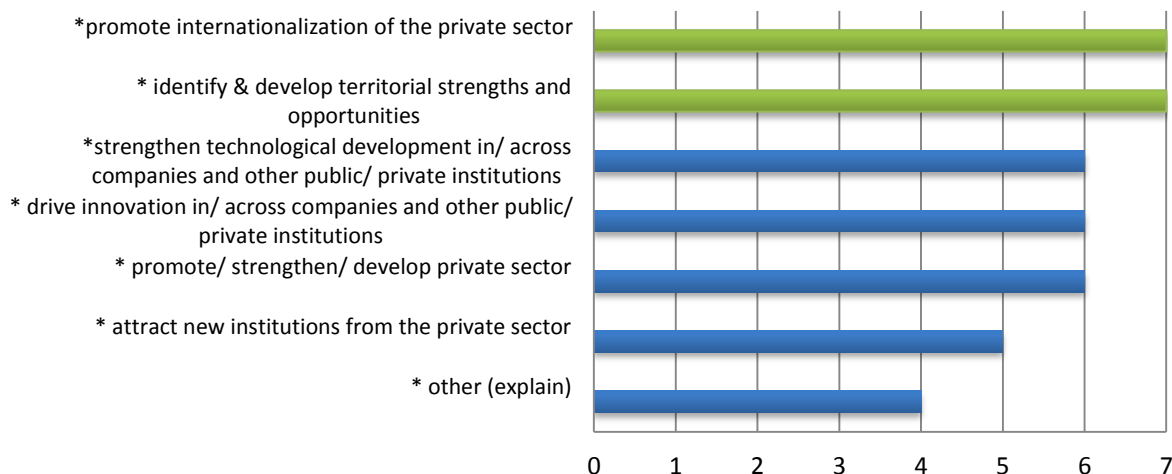
As to the **rationales** behind initiation of cluster related activities, one can clearly identify the willingness to strengthen the **productivity, competitiveness and/or growth of companies**. Beyond that, the following specific rationales were mentioned.

- Address market failures;
- Address low spending on R&D among SMEs;
- Increase low propensity in collaborative projects between enterprises, universities and research centers;
- Help SMEs be more competitive and grow;
- Promote overall territorial competitiveness and economic development;

The rationale to launch a cluster policy is often related with its **objectives**, which then aim to respond to the rationales behind the decision to launch a cluster policy. As can be seen in Graph 18 there are two cluster policy objectives that are present in all partner regions. These are the promotion of **internationalization** of the private sector, and the **identification & development of territorial strengths and opportunities**. Strengthening technological development, as well as driving innovation in/across companies and promoting/strengthening public institutions, is also a common objective across the partner regions.

Graph 18 Objectives of the cluster policy

What are the main objectives of the cluster policy?



Note: horizontal line – no. of partner regions

2.2. Cluster policy instruments

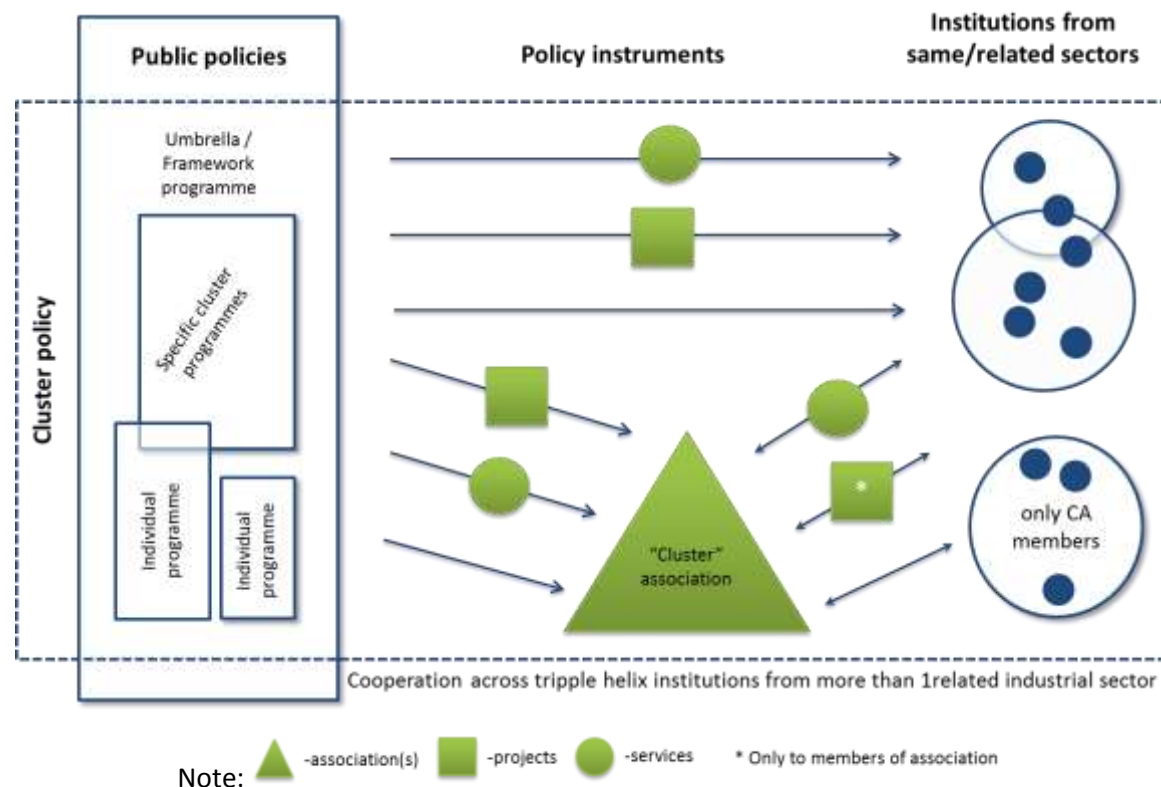
After exploring the general categories for defining the cluster policy across partner regions, the focus here is on the content of those policies. For this, it is important to understand that even if there is no dedicated cluster programme for cluster support, the broad concept of cluster policy allows exploring the hidden policy instruments or activities, which directly and often indirectly are being organized for the support of clusters.

Theoretical note

Cluster policy instruments

It is essential to realize (following the concept of Borrás mentioned earlier) that cluster policy can be comprised either of a specific cluster programme or of one (or multiple) components within umbrella or framework programmes that address a broad spectrum of economic areas (e.g. from industry, via innovation to education). The can therefore be co-funded from individual activities within selected public policies (e.g. innovation, research & development, etc.); a range of specific policy instruments which stimulate different aspects of cluster development. Nevertheless, there are 3 predominant types of instruments: 1) support for associations; 2) project based support; and 3) a multitude of specific cooperation, network, and business-related services. Instruments such as project support and services can be implemented within a framework of specifically established or financially supported cluster institutions (“cluster association” is the most common name), or not. These policy instruments can be funded from diverse departments at multiple levels of public administration. The main objective of these policy instruments is strengthening cooperation and support to a broad spectrum of industries/clusters, rather than only one.

Graph 19 Cluster policy framework

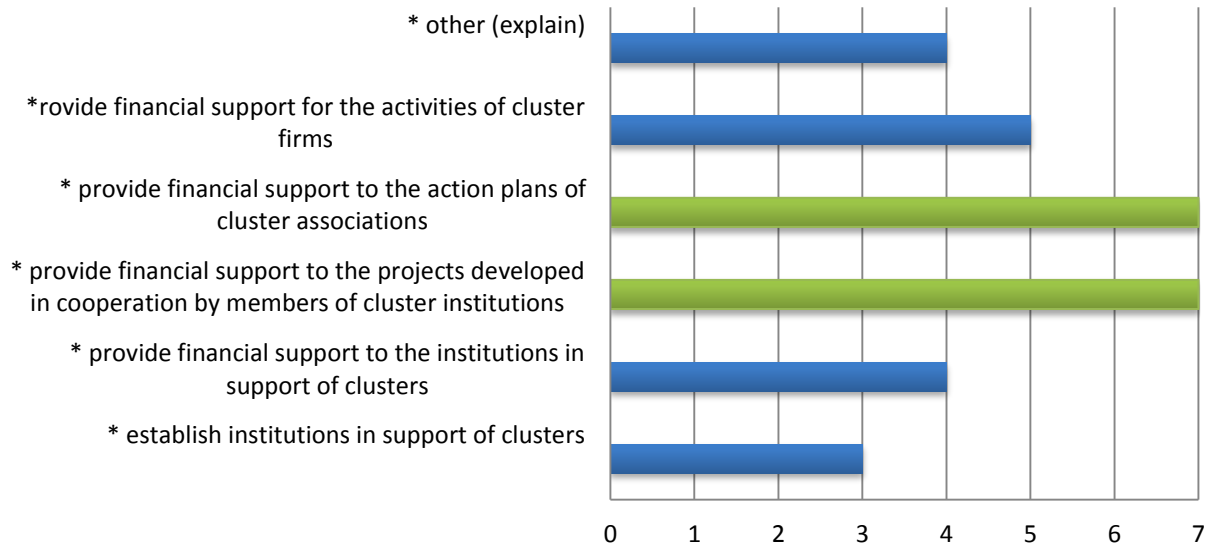


Source: Extended based on Konstantynova & Wilson (2014)

Following the above and reflecting on the responses provided by partner regions (Graph 20) it can be noted that all partner regions, regardless of whether they have a specific cluster programme, apply mainly two policy **instruments/activities for cluster development**, namely **financial support** (public and private funding) **to: 1) the action plans of cluster associations; and 2) the projects developed in cooperation by members of cluster institutions (associations)**. At the same time, it is important to stress that the non-financial support is also strongly present in the number of partner regions. E.g. the Basque Country also offers cluster associations a range of non-financial initiatives such as information on industrial trends and economic outlook (OCI) or live platform to exchange knowledge and experience.

Graph 20 Main instruments/ activities of the cluster policy

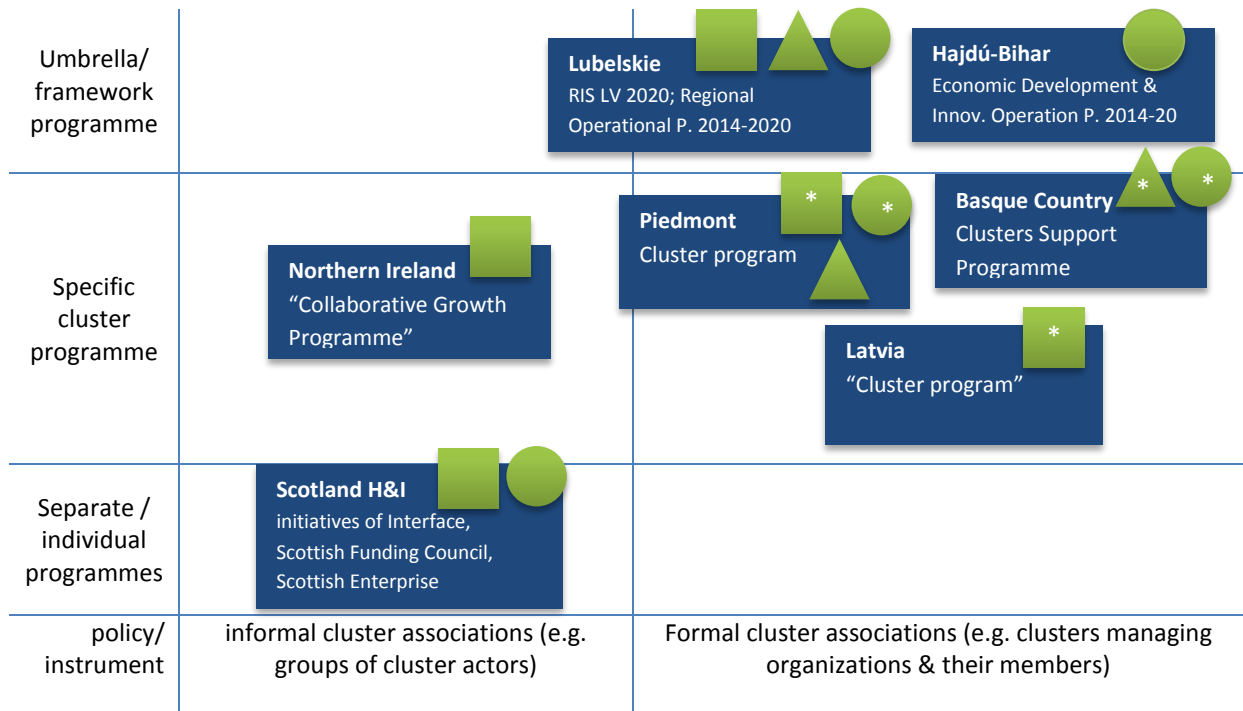
What are the main instruments/activities of the cluster policy?



Note: horizontal line – no. of partner regions

Further to that, based on the cluster policy framework set out in Graph 19, the partner regions have been placed in a matrix in Graph 21 according to the description of their activities/instruments undertaken towards supporting clusters.

Graph 21 Matrix of partner regions based on defined cluster policy framework related categories



Notes: Indicates public support to/ via

 -association(s)
  -projects
  -services
 * Only to members of association

Based on the matrix in Graph 21 the following conclusions can be drawn. First of all, most of the partner regions that have a specific cluster programme also have formal cluster associations (cluster managing organizations) charged with developing sector/cluster based activities (e.g. Piedmont, the Basque Country, Latvia). Secondly, where these formal cluster associations are present, they become focal points for communication with cluster actors, whereby most cluster policy instruments, such as projects or other services, are implemented or traced via engagement with these cluster associations. Thirdly, with or without cluster associations, the most common policy instrument for the development of clusters is the support of projects in cooperation. Finally, addressing clusters or setting cluster support instruments from the perspective of an umbrella/framework or various individual/separate programmes gives more flexibility in terms of engaging natural clusters rather than only the members of associations.

To give a more detailed perspective on the cluster policy instruments applied by partner regions, a number of selected instruments are listed in the example box below.

Example

Cluster policy instruments (selected)

Dispersed approach via informal cluster organizations - Highlands & Islands:

Promotes the following sectors and thematic priorities:

1 - Businesses in the defined sectors: 1. Food and Drink, 2. Creative Industries, 3. Tourism, 4. Life-Sciences, 5. Finance and business, 6. Energy. Business Programmes are supported directly by HIE through a mix of funding and business support including workshops, webinars, and one-on-one advice from consultants;

2 - Innovation is being supported through projects between businesses and academia by Interface in form of Innovation vouchers, which cover the (limited) cost of the academic partner's time where the business puts the same amount in cost or kind (their time) into the project;

3 - Projects where the main element is **collaboration** are supported via government organizations such as the Scottish Funding Council (SFC), Skills Development Scotland (SDS), Local government authorities and Scottish Enterprise (SE);

Other support is included in the **Scotland Can Do strategy** which can be defined as Scotland's innovation strategy, along with industry groups such as the Creative Industries Networks, Scotland Food & Drink, Tourism network groups (Note: this is part of an umbrella policy approach).

Programme approach - Basque Country:

The Basque Country Clusters Support Programme is a part of the Economic Development and Competitiveness Policy. Initiated in 1990-92 it is deemed to be the oldest of its kind in the world. Based on a yearly call of around €3,5 million (including €1 million call for collaborative internationalisation), cluster associations are awarded a grant based on their Action Plan for the year as well as some objective criteria such as n° of member companies (and specifically SMEs) and sustainability of their funding. Some other Support measures include "training" and knowledge & experiences sharing sessions organized by DDEC-SPRI for all cluster managers and staff.

Umbrella approach - Lubelskie:

RIS3 2020 strategy consists of a number of priorities, where the promotion of clusters is being incorporated. Particularly cluster are incorporated within Priority 1: Increasing the ability of business entities to create and absorb knowledge and implement innovations, particularly in areas of regional smart specialization; and Measure 1.4: stimulation and development of network cooperation between business entities. This applies to supporting the formation of both trade associations (e.g. cooperatives and groups of agriculture producers) and cross-industry structures, especially clusters and platforms for cooperation involving the scientific and research sector. The following tools are expected to be used under this measure: 1) Partnership, Networks and Clusters pilot programme, 2) an integrated project

encouraging networking/cluster initiatives, especially those oriented to the development of interregional, supra-regional and international cooperation, 3) autonomous instruments supporting the development of already existing network and cluster structures, 4) autonomous instruments dedicated to the professionalization of network/clusters integrators (personnel/organizations involved in networks/clusters management), 5) autonomous instruments used to establish common research agendas (sectoral programmes) for specific regional smart specialization areas, covering key R&D projects, relevant to the development of the companies located in those areas.

Regional Operational Programme for Lubelskie Voivodeship 2014-2020: Two priorities of the ROP LV 2014-2020 are essential for the RIS LV 2020 implementation: 1. Research and Innovation, and 3. Competitiveness of Enterprises. For priority 1 the allocation of funding amounts to PLN 100,4 million (approx. €23 million; 4,5% of the total allocation) and for priority 3 it amounts to PLN 291,6 million (approx. €70 million; 13,07%). The specific objectives are strongly linked to cooperation between science and business sectors in order to: (1a) increase R&D commercialization activity, (1b) increase enterprise's R&D activity, (3a) support SMEs' development, (3b) increase of the share of international trade for SMEs, (3c) increase the use of innovation by SMEs.

Finally, there are a **few national programmes** co-financed with EU funds that are dedicated to R&D support and SME competitiveness: Smart Growth OP, Eastern Poland OP as well as programmes on EU level (i.e. H2020, COSME).

2.3. Selection of priority clusters and cluster associations for policy support

Within the cluster policies, regardless of the policy approach and instruments planned, one of the initially important steps (briefly mentioned in Graph 14) is the selection of clusters for policy support.

Depending on the chosen approach to define clusters and policy instruments for the cluster support, the object of selection within cluster policy will vary. Indeed, the selection of the cluster policy object is central to the policy intervention as it defines the object of policy support (see initial reference to cluster mapping and cluster and cluster associations selection in Graph 14). Typically the following main policy objects can be observed: clusters; clusters associations (or collaborative networks) in which one could further distinguish cluster managing organizations; cluster projects (or projects in cooperation); and/or cluster association's activities.

The object of cluster policy selection varies per partner region and is related to the definition chosen for clusters and the nature of the cluster policy design. Typically, two main objects of cluster policy are subject to selection

(1) Selection of cluster associations: Association's performance, as per key defined indicators, membership, action plans, etc.. Clearly, in the partner regions with formalized cluster associations (Basque Country, Piedmont, Hajdú-Bihar) the selection process is strongly related to the association.

Example

Hajdú-Bihar, selection of cluster association:

The identification/decision on selected clusters is based on the experience of former periods on one hand; and on the other hand, several modifications are planned during the evaluation of clusters. Rather than economic data assessment, cooperation within the cluster and activities of cluster members are the main basis for analysis. Strong emphasis is also put on the examination of the cluster management performance as well as cluster management services, and assessing internationalization is highlighted.

(2) Selection of projects: Joint projects in cooperation among different institutions based on:

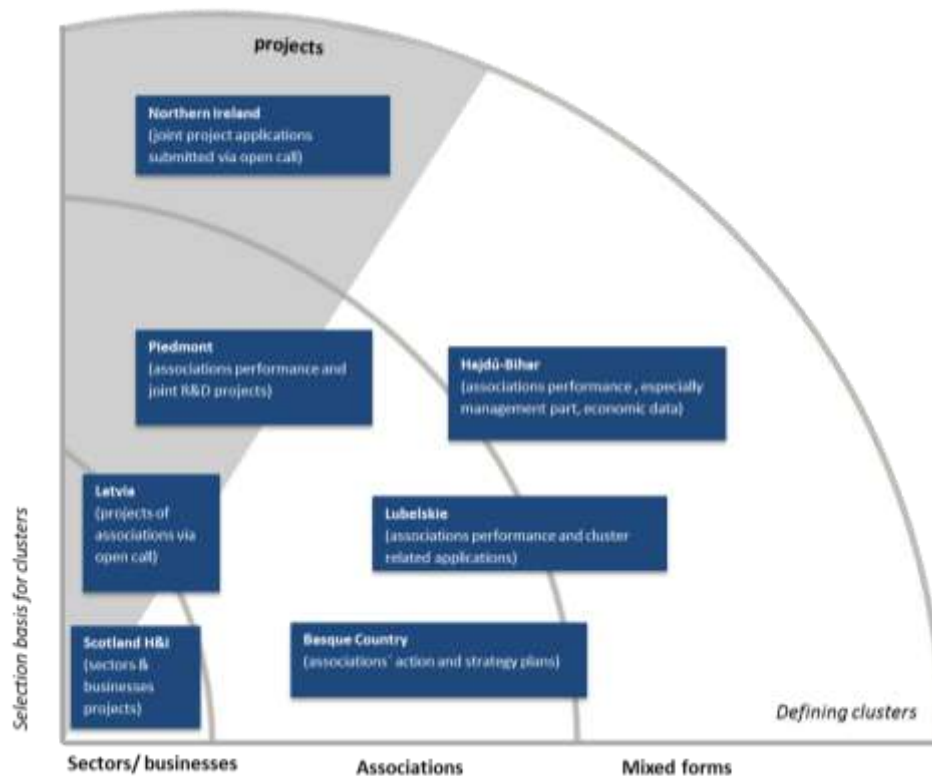
- a) **priority sectors** (Scotland Highlands and Islands, Northern Ireland, Lubelskie)
- b) **cluster associations** (Piedmont, Basque Country)
- c) **both associations and priority sectors** (Latvia)

Example

Latvia, selection of projects submitted by associations in priority sectors:

The cluster program takes form of an open call during which clusters submit their project proposals. According to the criteria and priorities stipulated by Ministry of economics most relevant projects are selected. Priorities are based on "Latvian goods and services export promotion and attraction of foreign investment guidelines 2013-2019", which is one of the national policy planning documents. The call closes in spring and until October/November the Ministry of Economics in cooperation with Central Finance and Contracting Agency are evaluating submitted projects. Applicants are associations or foundations with the following conditions: 1) registered in the Enterprise Register of the Republic of Latvia in the Register of Associations and Foundations; 2) represents not less than 20 not interlinked small (micro), small and medium-sized merchants – cluster members – and ensure that in a year after approval 30 merchants will be represented; 3) total net turnover on average during the last three years is not less than 10 million per year; 4) total export volume of the average of the last three years is not less than 2 million euro per year (exception in tourism sector) and 5) at least two research/knowledge organisations are involved. As a result 14 clusters tend to be supported of which two are cross-sectoral clusters. In the previous planning period the cluster program was carried out in time period from year 2012 until 2015, with 11 cluster associations financed.

Graph 22 Selection of cluster policy objects



Most of the joint projects (based on one of the 3 above forms) receiving public funding tend to be submitted via **open calls** (year round or with specific time-frame, e.g. every half a year, once in 2 years). These calls indicate and evaluate applications with respect to specific technical conditions, which have to be met. The selection is made based on set conditions, within which the most common requirements are:

- Fit in partner region's prioritized sectors or cluster association;
- Alignment with national/sub-national economic priorities;
- Assessment based on application's viability, strategic fit, economic efficiency and other objectives;

Example

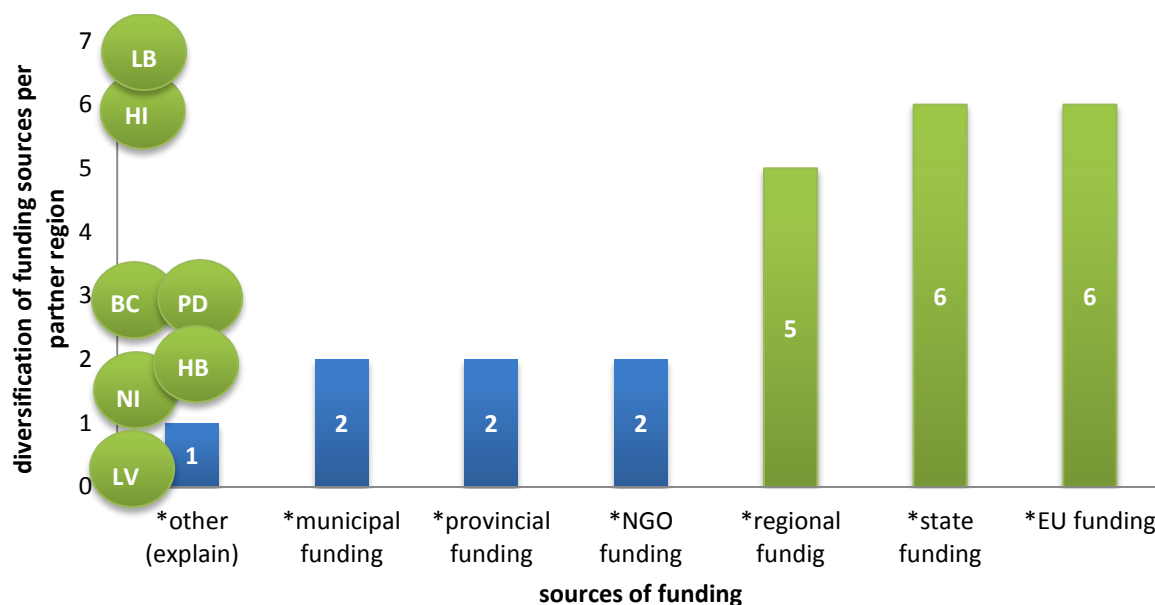
Northern Ireland, selection of projects submitted by networks in priority sectors:

Applications to the Programme must be business-led and can be made year-round via an ongoing open call or, alternatively, through subject/sector specific calls which are held once/twice per year and are aligned to MATRIX thematic areas. All applications made to the Programme are subject to strict appraisal in line with Invest NI's Intervention Principles which include

an assessment of the project's viability, strategic fit, economic efficiency, additionality and mobility - as well as its ability to deliver against a series of agreed SMART objectives.

The funding for the cluster policy instruments is mostly generated from state, regional and EU funding resources, which is similar also for the funding within RIS3 priorities (Graph 23 and Graph 42).

Graph 23 Sources of cluster policy funding



OPPORTUNITIES AND CHALLENGES

Cluster policies vary strongly from place to place, and the policies of the partner regions provide no exception to this general rule. Taking a broad definition of cluster policies, which can range from individual programmes supporting collaboration and interaction between business and research centers, via dedicated cluster programs to a more general umbrella approach to cluster coordination, all of the partner regions some form of cluster policy. Meanwhile, three cluster policy instruments tend to be chosen across partner regions in support of cluster development: projects (in collaboration with various conditions and thematic areas); cluster associations (or collaborative networks, as well as other formal forms of sector/ cluster organizations); and general activities related to collaboration and joint R&D promotion. Following from the above some central challenges and opportunities arise.

Although the establishment of formal **cluster associations** may seem a very structured and suitable mechanism for cluster policy coordination, monitoring and implementation, it carries with itself certain risks, specifically as most of the services are being addressed to members of these associations rather than natural industrial agglomerations; and therefore, leaving a number of cluster actors

behind. There are also risks of inertia and slowness of associations to adapt their activities and membership as the boundaries between economic activities and technologies shift. Meanwhile, the clear benefits from establishment of clusters associations (which could be both public, e.g. Lower Austria, to private driven, e.g. Upper Austria) are in their capacities to engage and facilitate private sector towards cooperation and be a bridging link between companies and government.

With regards the existence of dedicated cluster programmes, advantages include: a better overview and tracking of sectors, cluster development and performance; ease in monitoring and evaluating progress; ease in reaching a large number of institutions from specific sectors/clusters, etc.. At the same time, such programme specific support can lead to neglecting a range of other programmes and funding resources, where there may be considerable synergies. In this regard addressing clusters or setting cluster support instruments from the perspective of an umbrella framework has advantages, and this approach also gives flexibility in engaging natural clusters rather than only members of associations. Here, however, support for clusters can also result in being limited and not reaching the necessary scale, scope or priority targeting. A key challenge for cluster policy, therefore, is in negotiating the trade-offs between the different approaches and developing the most appropriate approach for each regional context while being aware of the risks of the chosen path.

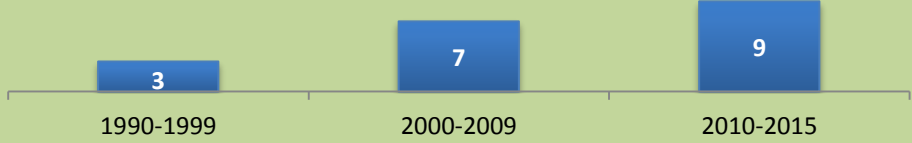
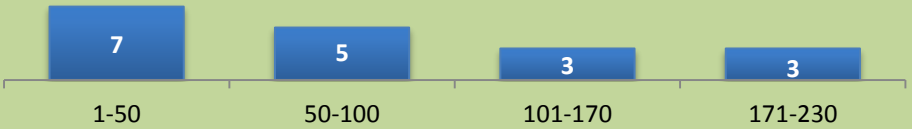
Beyond the character of cluster policy itself, two other issues are also closely related: funding sources and of the selection/prioritization of the object of cluster policy support. A challenge with regards funding sources is to move beyond the regional or national level (which is often dominantly the case for the partner regions, as Graph 23), to explore such windows as NGO and/or international (European Investment Bank, etc.) sources, and to exploit synergies between different funding possibilities. In terms of the object of selection for cluster policy support, this is determined by the chosen approach to cluster policy. In most of the partner regions, the object of cluster policy is already determined, therefore, but there remain open questions (related also to the mapping of natural clusters) in terms of how best to select and articulate support between different potential objects (cluster firms, cluster organizations, cluster projects).

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3. Cluster Organization Ecosystem

3.1. Background to cluster associations

The analysis and review of the cluster organization ecosystem is based on examples of cluster organizations provided by each partner region. These examples are summarized below:

Number of associations	19 cluster associations (or collaborative networks), initially 3 examples per 1 partner region										
Sectors covered (* the total number for all sectors will be higher as some associations cover multiple sectors)	<ul style="list-style-type: none"> • Manufacturing <ul style="list-style-type: none"> ○ Advanced materials ○ Machinery and equipment ○ Motor vehicles, trailers, etc. ○ Other transport: airspace, shipbuilding, etc. ○ Electronic components ○ Electric equipment ○ Wood products ○ Food & drinks • Information and communication • Professional, scientific and technical activities • Human health and social work activities • Other personal service activities 										
Years of establishment	1992 – earliest 2014 – latest 2009 – median Overall distribution:  <table border="1"> <thead> <tr> <th>Year Range</th> <th>Number of Associations</th> </tr> </thead> <tbody> <tr> <td>1990-1999</td> <td>3</td> </tr> <tr> <td>2000-2009</td> <td>7</td> </tr> <tr> <td>2010-2015</td> <td>9</td> </tr> </tbody> </table>	Year Range	Number of Associations	1990-1999	3	2000-2009	7	2010-2015	9		
Year Range	Number of Associations										
1990-1999	3										
2000-2009	7										
2010-2015	9										
Size (2015) # members	5 – smallest 230 – biggest 85 – average Overall distribution:  <table border="1"> <thead> <tr> <th>Size Range</th> <th>Number of Associations</th> </tr> </thead> <tbody> <tr> <td>1-50</td> <td>7</td> </tr> <tr> <td>50-100</td> <td>5</td> </tr> <tr> <td>101-170</td> <td>3</td> </tr> <tr> <td>171-230</td> <td>3</td> </tr> </tbody> </table>	Size Range	Number of Associations	1-50	7	50-100	5	101-170	3	171-230	3
Size Range	Number of Associations										
1-50	7										
50-100	5										
101-170	3										
171-230	3										

The background of the selected cluster associations shows that they are mostly related to the manufacturing sector, where the focus ranges from production of food and drinks to heavy manufacturing, such as vehicles, maritime and aerospace. Most of the cluster associations selected for the survey have been established recently, in the period between 2010 and 2015. This further confirms the aforementioned reflection on the later launching of cluster related policy instruments among the partner regions. On average the presented cluster associations have around 85 members, with 5 being the lowest and 230 the highest. Most of the associations fall in a range 1 – 100 members and have less than 50 members. In relation to sectors, manufacturing-related associations can be found in all the member size categories and this is similar for ICT-related associations.

3.2. Organization structure

3.2.1. Recent evolution in member size

Overall the number of members from 2013 to 2015 **doubled** across almost all cluster associations. However, this growth is not necessarily representative as the data available is limited to these examples. As for sectors, and again taking in account the limitations of the data, the **highest increases** in members have been in **ICT and bio- and health related cluster associations**.

3.2.2. Structure of members

Analysing the membership structure of cluster associations was a challenging process due to lack of inclusive information from the partner regions. As such 2 partner regions had to be excluded, limiting the number of observations to only 13 cluster associations. Nevertheless, the membership structure is very common across the sample that could be considered, with the biggest share being companies (between 85% and 95%), followed by research centers and universities (ranging from 5% to 13%) and then public institutions (from 1% to 3% and in some cases 11% of total members) and other (e.g. banks, chambers of commerce, think tanks, NGOs).

Graph 24 Average share of members per categories across observed cluster associations



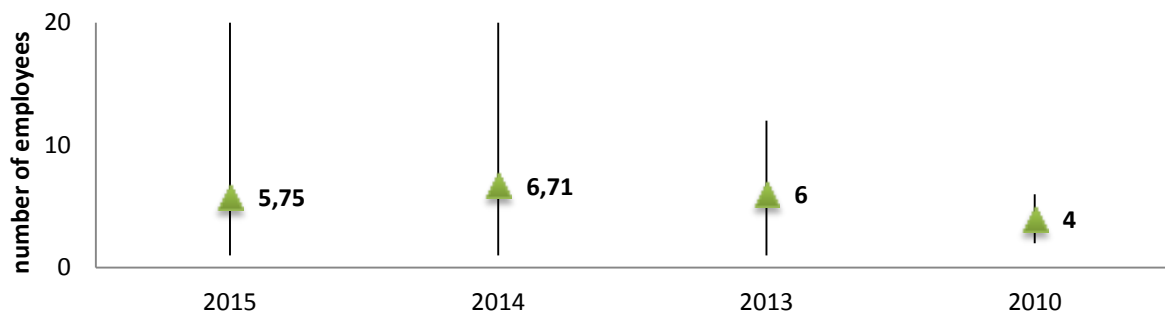
■ companies ■ research centers and universities ■ public institutions ■ other (if applicable): municipalities

It is very difficult to drive any partner region specific conclusions on their membership distribution due to the robustness of the data. Nevertheless, a higher share of companies in the partner regions of Highlands and Islands, Northern Ireland, the Basque Country and Piedmont could be noted.

3.2.3. Number of employees

The management of cluster associations tends to be in the range of 1-20 employees, with average 4-6. Over the years, from 2010 to 2015 the number of employees per association has increased.

Graph 25 Range in number of employees working in cluster associations across partner regions (max, average, min)



In 2015 in the Basque Country, Piedmont and Latvia tended to be more number of employees per association as to such partners as Lubelskie and Northern Ireland. Meanwhile, it should be noted that the higher numbers of employees one are to be found in a more formal character of cluster policy implementation and cluster associations. However, due to the low number of observations this information also can't be generalized.

3.2.4. Budget

Overall, in most of the partner regions the funding is **both public and private**, with the private share of around 50% or more of total budget. However, as the characters of both cluster policy and of legal organizational forms of cluster association vary across partner regions, so does their budget. Therefore, here the results will be presented in terms of examples.

Example

Budget of Cluster Associations

Basque Country: The funding of cluster associations comes from both public and private sources. Public funding constitutes between 21% and 41%, with on average 20% of regional public funding and around 5% of national funding.

Northern Ireland: the funding is 100% public sector. SME-led Networks carrying out Scoping Studies can avail of up to £25k funding per project, while implementation projects can receive up to £170k per project. The INI funding comes from the NI Block Grant from the UK central government at Westminster.

Scotland H&I: The funding for cluster support comes from two sources, the ERDF 40% and 60% from HIE.

Piedmont: The associations' budgets are composed of 50% ERDF + 50% private funding (membership fees and services).

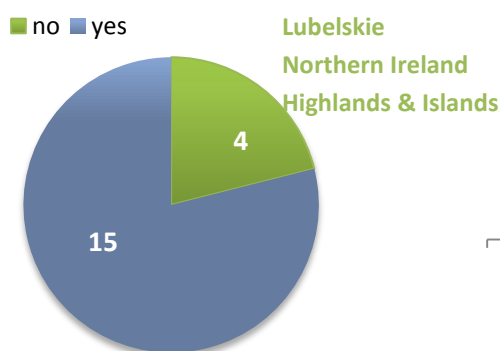
Lubelskie: Based on the example of Lublin Medicine (Cluster of Medical and Pro-health Services), which is a municipal level cluster association, around PLN 200000 (45,242 EUR) comes from public municipal sources and around PLN 30000 (EUR 6,786.5) from private funding.

Latvia: Associations build their budget dominantly from the public, especially ERDF funding, which could reach up to 85% of the total.

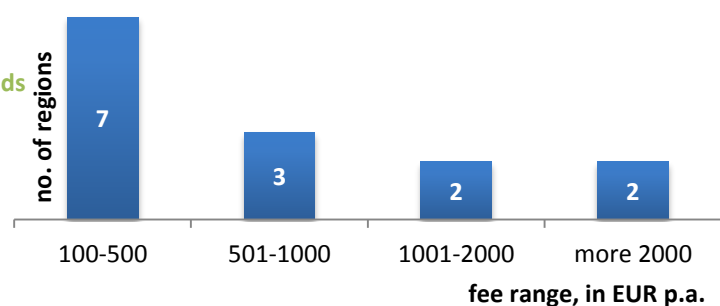
3.2.5. Membership Fee

The membership fee is a common income resource for a broad number of cluster associations across partner regions. The exceptions (as per data available) are the three regions (Lubelskie, Northern Ireland and Highlands and Islands) with less formal institutional cluster characteristics (Graph 26).

Graph 26 Presence of membership fee



Graph 27 Membership fee distribution across partner regions



The character of the fee varies across partner regions and also within the partner regions' associations. Nevertheless, certain similarities and distinctions appear. The most common **similarities** are:

- Fee tends to be non-fixed and depends on the size (measured as of the number of employees, turnover or character) of the member institutions/ company;
- Fees tend to be higher in the regions with higher GDP per capita income (& vice versa);
- Fees usually are annually paid (but also per month: Hajdú-Bihar)

Overall, the fee ranges from **€100 to €10500** per year (Graph 27), with the average fee of around **€1800**. Meanwhile, in most associations the fee is below €500, which doesn't provide a significant financial barrier for institutions to participate.

3.3. Governance and management

The institutional form of cluster associations varies from more to less formalized. In the case of the partner regions the characteristics identified are presented in Graph 28 and Table 2.

Almost 90% (17 out of 19) of cluster associations responded that they have an **established management structure** to operate/coordinate/develop the cluster association (cluster). Out of these 17 associations more than 80% have a **General Assembly and Board of Management** (13 and 15 respectively) as structures within the associations in charge of cluster development. Distinctively, only in 3 of the cases mentioned the existence of an **Advisory Board**.

Graph 28 Organizational structure of cluster associations across partner regions

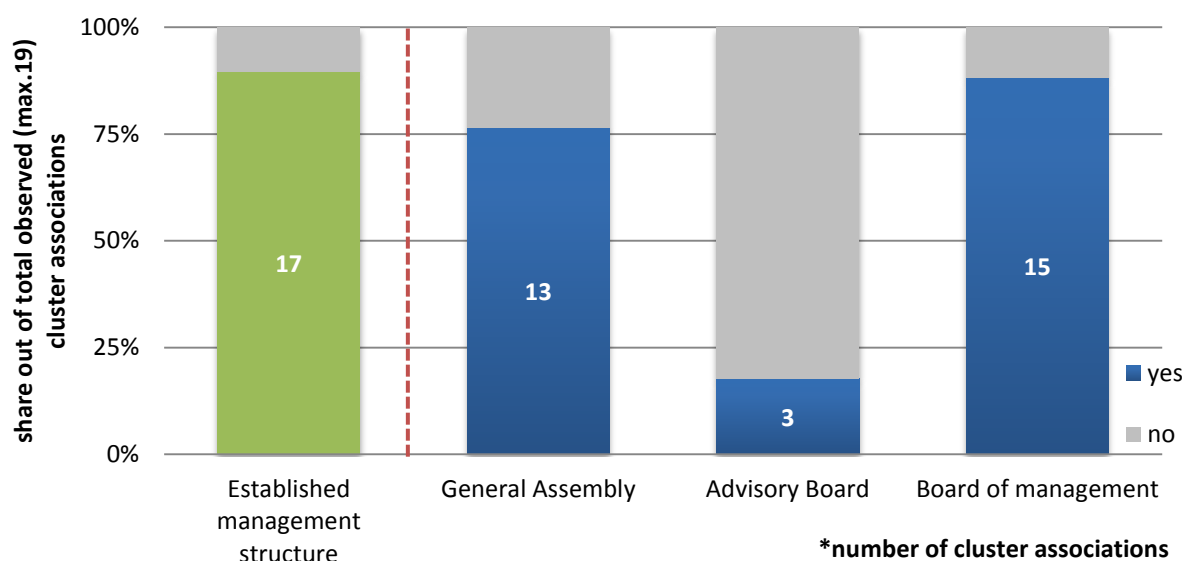


Table 2 Organizational characteristics and partner regions' cluster associations

Established management structure ("no")	General Assembly ("no")	Advisory Board ("yes")	Board of management ("no")
Highlands & Islands	Highlands & Islands; Northern Ireland;	Northern Ireland Piedmont; Lubelskie	Highland & Islands

Example

Advisory Board: Lublin Medicine - Cluster of Medical and Pro-health Services

The Advisory Board consists of 6 public institutions and 4 private institutions. As examples, they are representatives of the City Hall, Universities, Science and Technology Park, companies, hospitals. It has period of office of 2 years and meets 2 times a year.

Where there is a **General Assembly** the members of the cluster associations gather on average almost twice a year (6 times per year in one of the associations in Latvia and once annually in a wide number of partner regions, e.g. from the Basque Country, via Hajdú-Bihar and Northern Ireland).

The **Board of management** of cluster associations has an average the period of office of 2.5 years (max 3 years in Hajdú-Bihar and min 1 in Piedmont), with an average 5 meetings per year (max 12 in some of the Latvian associations and min 1 one of the Piedmont associations). The structure of the Board varies across the partner regions, although the aim is generally to establish a triple helix balance with significant share of representation from the private sector. The average number of members in the Board is around 8 and ranges from 4 to almost 20 members. This disparity has naturally to do with the sector and scale difference of the cluster associations (or collaborative networks).

Example

Board of Management

Basque Country AFM Advanced Manufacturing Technologies Cluster: The Board of management consists of 16 Companies, 1 Public Agency (SPRI), 2 Cluster Managers representing also Tech Center (INVEMA) and Training School (IMH). It has period of charge 3 years and meet 6 times a year.

Webpage: www.afm.es

Latvia Vidzeme High Added Value and Healthy Food Cluster: The Board of management consists of 5 members (with one Chairman of the Board, from private sector): 3 CEO's of member companies, 1 representative from R&D institution, 1 representative from regional public

Webpage: <http://www.clustercollaboration.eu>

Highlands & Island Scottish Craft Distillers Association: Initially set up by Interface Food&Drink and Heriot Watt, others such as SAOS brought in with some two driven industry partners. Facilitated and organised early stage by public sector but an Industry Board very quickly voted in.

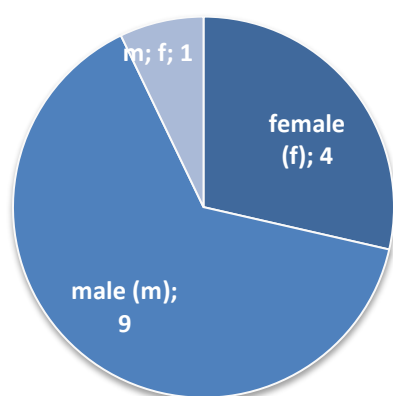
Webpage: <http://scottishcraftdistillers.org>

3.4. Manager of cluster associations

The review of cluster associations has shown that in most (not in all as there is different forms of cluster associations) of the partner regions' associations there is a cluster manager.

The professional background of cluster managers varies from more practical business-related to academic. However, a more general trends also appears, specifically most of the cluster managers have either business consultancy experience or earned sector experience, which is due to their earlier engagement, e.g. in sales or marketing within companies in the sector.

Graph 29 Gender distribution in cluster management



Male & Female Managers:

- J - Information & communication sector
- Northern Ireland

Female (f) Managers:

- C - Manufacturing
- J - Information & communication
- Q - Human health and social work activities
- S - Other personal service activities
- Basque Country
- Latvia
- Lubelskie
- Hajdú-Bihar

Male Managers:

- C – Manufacturing (8 associations)
- J - Information & communication
- Basque Country
- Latvia
- Lubelskie
- Hajdú-Bihar
- Northern Ireland
- Scotland H&I

Due to available data the basis for analysis here has been reduced to 14 cluster associations. Out of these 14 (Graph 29), in 64% the managers are **male** with an average age of around 45 and having been in their position on average 5 years. **Female** cluster managers are on average younger (42) and have been in their position almost the same as men, 5.5 years. Further to this in regard to sectors, women are more dispersed than men. While male managers mostly tend to be found in manufacturing related sectors, women managers along with manufacturing tend to also appear in cluster associations associated with such sectors as human health and social work activities. However, again due to scarcity of data this information is not generalizable across partner regions.

Tip

The European Secretariat for Cluster Analysis (ESCA), <http://www.cluster-analysis.org/>

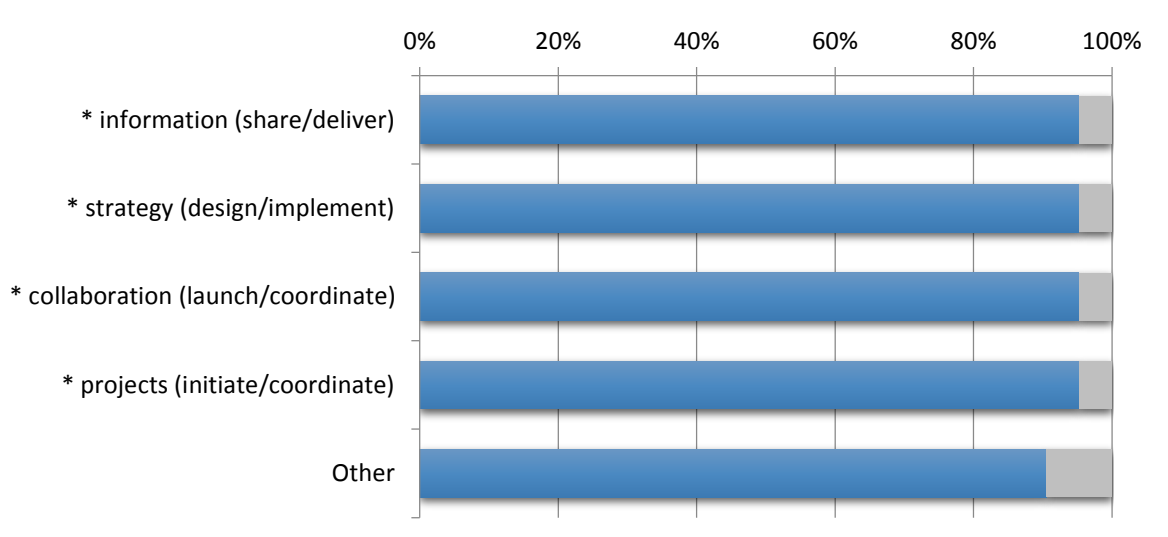
ESCA is a network of cluster experts from more than 30 countries. It offers services in two areas:

- 1) ESCA promotes cluster management excellence through benchmarking and quality labelling of clusters and cluster management organizations. ESCA has been mandated by the European Cluster Excellence Initiative (ECEI) to organise the assessment process.
- 2) ESCA supports cluster policy makers and programme owners with advice on cluster programme development.

3.5. Organization Services and Tasks

Within a matrix of **services** (information/visibility, strategy, collaboration, projects) and their **thematic focuses** (internationalization, technological innovation, non-technological innovation, HR), most of the partner regions' cluster associations are similarly centered across 4 service areas: **information** (also including services for communication collection and sharing); **strategy** (would be also referring to competitive intelligence); **collaboration** (same as networking and matchmaking); and **projects** (Graph 30).

Graph 30 Services offered by cluster organizations (collaborative networks)

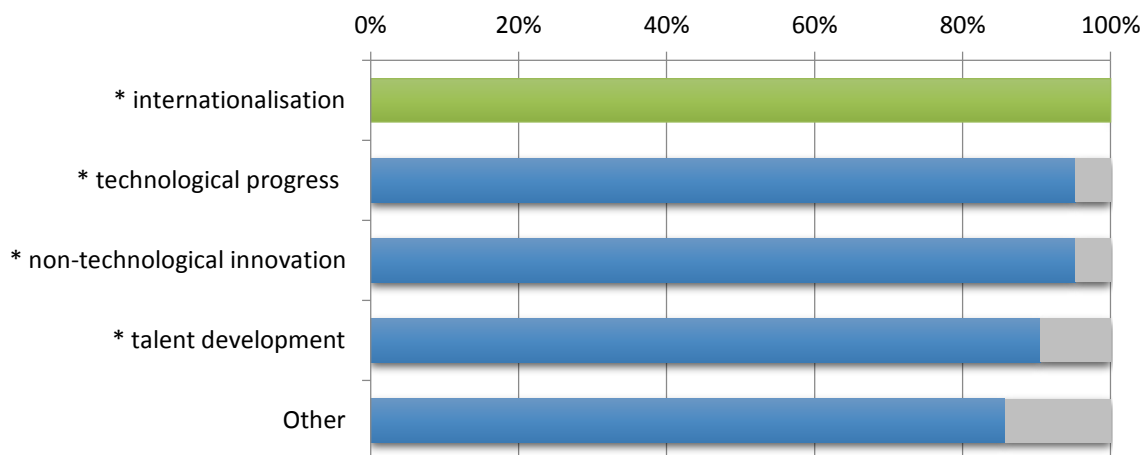


Technology-related services (services associated with advancement in product or service innovation, also including strengthening R&D capacities and packaging development) has been slightly less addressed, and referred to by 90% of responses. Beyond the above mentioned services, the selected cluster associations also mentioned the following services:

- training;
- accreditation;
- representation;
- commercialization/funding, fundraising;
- production testing;
- lobbying;
- showroom;
- specific support to new enterprises

In reference to the thematic areas in which these services are being organized, it should be noted that **internationalization** is a thematic area addressed in all the questioned cluster associations (Graph 31).

Graph 31 Thematic areas of services across cluster associations



Further internationalization 95% also addressed such themes as **technological progress and non-technological innovation**. As to the themes addressed by 'other', the following have been mentioned: **marketing, research, education and training, quality management and/ or legal regulations**, which can be associated with services that could be introduced across the above mentioned themes.

A general conclusion from the above is that there are some groups of services and themes where it is difficult to make a clear division. At the same time, it is important to stress that in the both categories, services and themes, other areas such as **training, education, marketing and quality management** have been mentioned a lot. This indicates the importance of these services and themes for a broad number of cluster associations.

OPPORTUNITIES AND CHALLENGES

The review of cluster associations (or collaborative networks) based on the three examples selected by partner regions allows some conclusions to be drawn, but with great care, as the limited data doesn't allow for generalizations. This is especially so with regards some characteristics (e.g. cluster manager), where the number of observed cluster associations was further reduced. Indeed, given expressed interest in the theme of cluster organization ecosystems across partner regions, one potential recommendation is the desirability of conducting a **big scale survey specifically designed for cluster associations** (or collaborative networks). This survey could then cover broader thematic as well as data scope of cluster associations and provide partner regions with deeper insights into operationalization of cluster activities within/by cluster associations. The survey could also include more detail information on the character and specifics of cluster management.

Looking into the initial details of the cluster organization governance and management one can clearly see big variety of forms both across partner regions and within partner region; heterogeneity rules. This diversity has to do with the already mentioned differences in partner regions' legislation structures, operational level of **cluster associations**, character of cluster policy and definition of cluster concept. Due to the small number of studied cluster association the relation between or across certain associations' related variables can't be easily stated. Some obvious relationships stand out, however, such as more formal policy frameworks and associations and larger memberships being associated with a higher number of employees in the cluster associations.

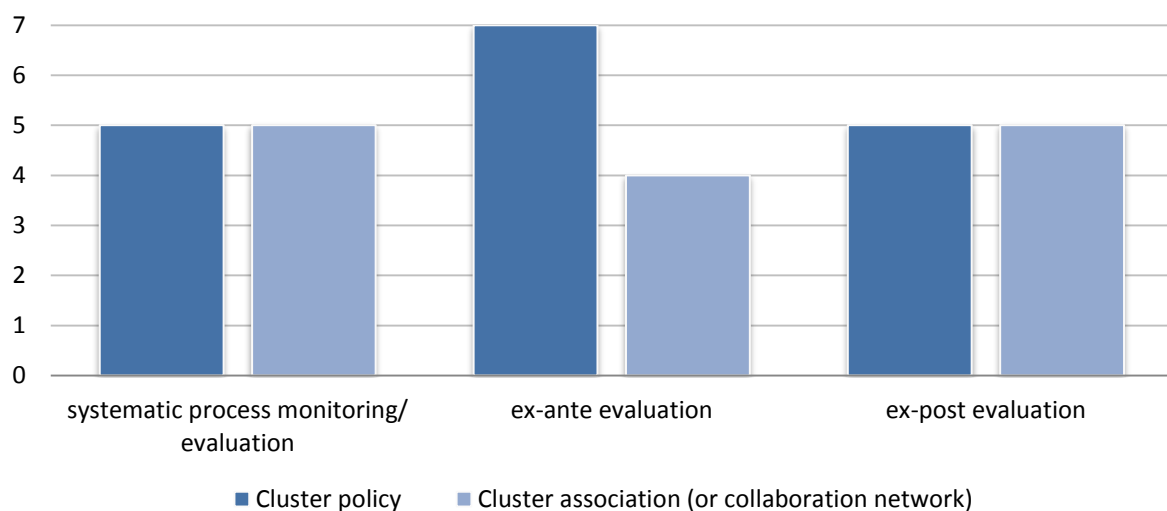
On the **operational side**, the review of these examples shows that the position of cluster manager is taken seriously. Most of the associations' management have a strong sectoral background, which is usually of private-sector origin. Similarly, the governance of cluster associations is taken seriously and built around the usual structures of Management Board and General Assembly. Advisory Boards are rare, however, and given their potential to provide strategic guidance and an external view, this presents an opportunity. Moreover, Advisory Boards are potentially compatible with other processes integrating clusters with RIS3.

Finally, on the **financial side** of the cluster associations typically have both public and private sector backing, with membership fees a common source of private revenue. While the public share of funding does not reach 50%, the fees are low in most but not in all cases and there could be potential space for membership fee increases, especially in the established cluster associations. This will depend, however, on being able to effectively demonstrate and communicate their benefits to members.

4. Cluster Policy Monitoring and Evaluation

A review of the partner regions demonstrates that cluster policy evaluation and monitoring is generally taken seriously, with a range of approaches evident. Only **2 out of 7 partner regions** mentioned that there was **no** process of systematic monitoring/evaluation for cluster policy or cluster associations (or collaborative networks), and all regions engage in some form of ex-ante evaluation of the cluster policy (Graph 32).

Graph 32 Partner regions responses on monitoring/ evaluation



Moreover, the responses of the partner regions indicate, both for cluster policy as well as for cluster associations (or collaborative networks), that information is collected in a range of common formats: e.g. surveys (quite a general format of written questions with closed-answer questions), questionnaires (more personalized to the recipient with open questions and flexibility in responses), and in-person interviews or informal conversations (Graph 33). Regions also apply their own specific instruments, of which the most common is the review or monitoring of the progress of the association or policy as per submitted applications to a certain call. This gives clear information on how certain entities have advanced.

Within the common format of data collection, high use is made of personal interviews and questionnaires when it comes to evaluating the cluster policy, indicating a preference for less formal methods when it comes to policy. Evaluation/monitoring of cluster associations, however, generally uses the common methods less intensively, and other tailored methods more.

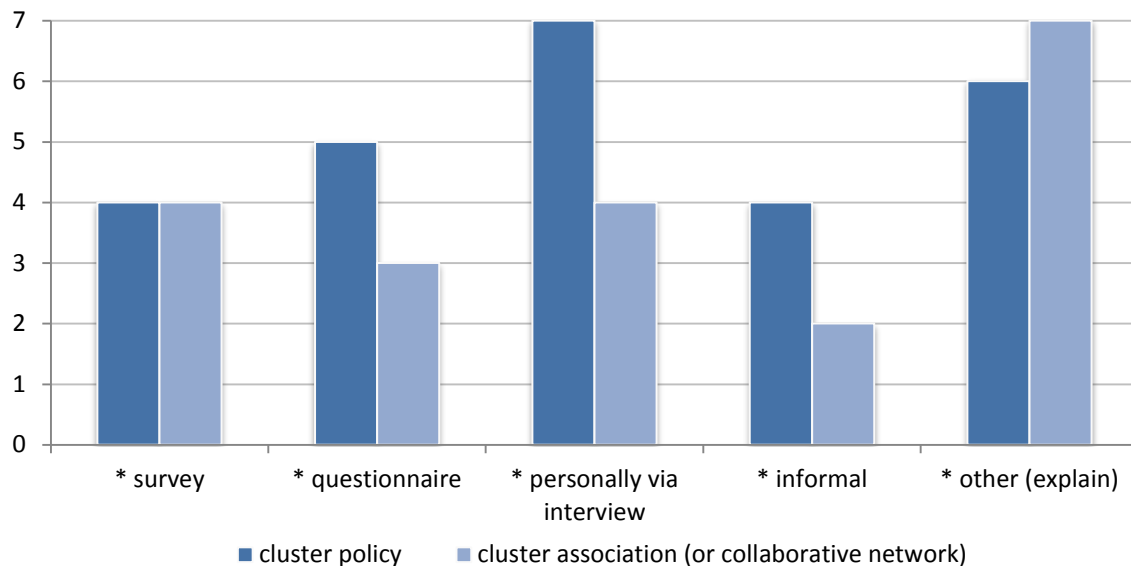
Tip

TCI Evaluation Working Group, <http://www.tci-network.org/evaluation>

The TCI Cluster Evaluation working group seeks to capture some of this learning, develop overall frameworks and share different techniques to show the value of collaboration and return on investment. Those, who are interested in the participation in the working group, can contact working group organizers for more information.

One of the recent publications is: Institute of Design Innovation, Glasgow School of Art; TCI Network: Designing cluster evaluation. How design can support creative collaboration, <https://issuu.com/tcinetwork/docs/clusterevaluationbooklet>

Graph 33 Partner regions responses on format of collecting information for the evaluation



Other

Cluster policy	Cluster association (or collaborative network)
<ul style="list-style-type: none"> • Reviewing institutions', companies public information (e.g. financial accounts, annual reports) • Data analysis, statistics • Monitoring/ review submitted reports/ application for programme/ project calls; 	

Conducting evaluation/monitoring of cluster policies and/or associations is a complex issue, and requires certain coordination or management from one or another authority. A question on who does monitoring/evaluation in the partner regions was therefore included. In most of the partner regions, the monitoring and evaluation of cluster policies and cluster associations is done both internally and externally (with the exception of Latvia, where mainly internal monitoring of implementing activities or post-programme evaluation per project objectives is done). Having external and internal monitoring/evaluation is in general a good approach towards balancing the objectiveness of results with the capacity for ongoing self-reflection.

Cluster policy monitoring and evaluation is done by either managing or implementing authorities, in collaboration or separately. For example, in case of the Basque Country it is SPRI, in the Highlands & Islands it is individual project managers within Highlands and Islands Enterprise, and in Northern Ireland the Collaborative Growth Programme team within Invest in Northern Ireland monitor individual projects funded under the Programme, while overall Programme evaluation and appraisal is carried out by an independent body. Almost the same trend is noted for the monitoring/evaluation of the cluster associations (or collaborative networks). Cluster associations (or collaborative networks) either engage in evaluation themselves or are externally evaluated by a project manager or special monitoring group in the managing or implementing partner region authority.

In general, monitoring/evaluation tends to be externalised in cases when the programme approval amount exceeds a certain level (e.g. Highlands and Islands). In Northern Ireland, the external Programme evaluator and appraiser is selected via public tender (which is based on INI “Green Book” methodology), and in Latvia the cluster program is evaluated by the Central Finance and Contracting Agency (CFCA), by the Ministry of Economics and – as for all EU programmes – by the Ministry of finance which is the managing authority for the Structural Funds. In some of the cases (e.g. the Basque Country), rather than external consultants, the partner region draws on evaluation input from a special independent research institution that is able to intervene in the evaluation from time to time with specific expert advice.

The methodology for monitoring/evaluation is different in each partner region, and Graph 34 and Table 3 attempt to provide a summary of the main features by region. To do so the “perfect cluster” framework developed by the TCI Network Cluster Evaluation Group is adapted to detect what elements are being captured in the evaluation/monitoring of each region.¹⁵ Within that, the most common measurement features are:

- performance of sectors (via various indicators);
- association's activity, its dynamism and strengths;
- (key) lessons learned;
- strategic fit and alignment with programmes;

¹⁵ See <http://www.tci-network.org/evaluation>.

- invested funding resources and generated new ones;
- individual projects assessment;
- activity related instruments (number of workshops, personnel trained);
- results achieved (e.g. number of jobs created/protected; sales)

Yet components such as **resources** (what money and physical assets are being used?) and especially **social capital** (What are the characteristics of people being involved?) appear to be the least considered in the monitoring/evaluation processes of partner regions.

Graph 34 Main characteristics of monitoring/ evaluation methodology, overall

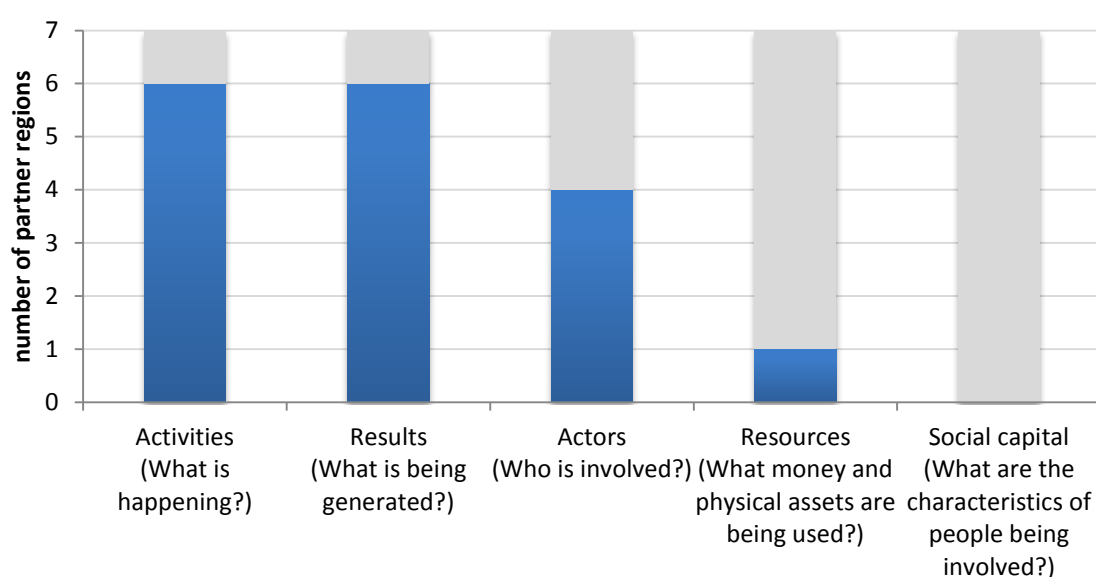


Table 3 Main characteristics of monitoring/ evaluation methodology, per partner region

Description	Activities (What is happening?)	Actors (Who is involved?)	Resources (What money and physical assets are being used?)	Social Capital/ Human Elements (What are the characteristics of people being involved?)	Results (What is being generated?)
Basque Country	●				●

Policy “ It considers both the performance of sectors (Clusters) and the dynamism and strength of Cluster Associations; It measures performance, and has conducted surveys and 360º assessment”; Association “It pays attention to both the economic weight of the cluster (number of companies, employment, turnover) and to sustainability of the cluster organisation; It measures the association’s activity and maturity through indicators”

Description	Activities	Actors	Resources	Social Capital/ Human Elements	Results
	<i>What is happening?</i>	<i>Who is involved?</i>	<i>What money and physical assets are being used?</i>	<i>What are the characteristics of people being involved?</i>	<i>What is being generated?</i>
Highlands & Islands					
<p><i>Policy “Depending on the requirements for a specific programme, monitoring of projects by HIE staff may include the following: monitoring of performance measurements; risk management; lesson learned log; update reports; benefits tracking.” “Ex-ante economic impact assessment will typically consider the following: Outline the strategic fit and alignment with HIE's priorities; The likely level of demand for the support on offer through the programme; Assess additionality of HIE funding; Any displacement issues that may arise regionally or nationally; Where possible, estimate net quantifiable impacts (for employment, earnings, turnover and GVA) that can be attributed to the programme. The terms of reference for post-ante evaluations of large business support programmes will vary depending on the programme, but may include consideration of the following:•Assessment of the benefits arising from the delivery of the programme; Cost effectiveness/value for money; Identify any lessons learned from the programme; Assess demand amongst beneficiaries for future development support”</i></p>					
Northern Ireland					
<p><i>Policy “In terms of the overall Programme the CfG team report internally against Invest NI Balance Scoreboard KPIs in respect of number of Clusters/Networks approved; number of Facilitators trained; number of scoping workshops held etc.; when assessing individual projects funded under the Programme INI will consider elements such as number of jobs created/protected; sales (export or otherwise) generated; knowledge transfer; number of staff upskilled etc.; overall, the Programme is subject to full independent economic evaluation and appraisal, while Networks/projects funded under the Programme are required to report to provide formal progress reports to Invest NI on a quarterly basis; these are assessed against KPIs contained in each project’s Letter of Offer”</i></p>					
Piedmont					
<p><i>Association “Ex-ante evaluation (to identify the CMO); in time evaluation (CMO performance and results achievement)”</i></p>					
Hajdú-Bihar					
<p><i>Policy “Situation analysis, review of former activities, results and development approaches, review of international cluster experiences” Association “Cluster Accreditation scheme: to select and classify clusters having real and high innovation potential and able to achieve significant performance; applies specific selection criteria; the scheme is recognised by the EC as good practice”</i></p>					
Latvia					
<p><i>Following results are expected: Export volume until year 2023 December 31. should be 6 068 440; Supported SME's until year 2018 December 31. should be 180 of which 60 are grant recipients; Supported SME's until year 2023 December 31. should be 360 of which 120 are grant recipients; Certified expenditure until year 2018 December 31. should be 1 201 009 EUR.</i></p>					

Unsurprisingly the actual indicators used measurement also varies widely across the regions. The word cloud method¹⁶ (Graph 35) has been applied to obtain an overall sense of the types of indicators used. The word count reflects the importance of quantitative indicators ('number' is the most common word), and also highlights the objects of evaluation, namely 'programme', 'clusters' and 'entities'. Beyond that, the attempts to measure cooperation are also stressed, and funding and membership are also used as indicators of cluster policy and cluster association progress. An overall impression is that evaluation indicators seem to be applied for different objectives; to measure progress but from multiple perspectives that include the character of members, their interaction between each other, clusters relation/impact with programmes objectives, etc.

Graph 35 Indicators applied across partner regions

No. of times the word has been used (only >1)



5	number
4	cooperation
4	clusters
3	programme
3	entities
3	cluster
3	level
2	international
2	membership
2	operating
2	support
2	funding
2	assess
2	demand
2	value

Different methodologies and indicators for evaluation/monitoring have different benefits and drawbacks, which implies that each partner region is facing different challenges in their evaluation/monitoring processes. As a source of comparative learning, presents some specific benefits from each region's perspective on the methodology being applied in that region. Related to these experiences one of the central and most common challenges identified is the need in the definition of

¹⁶ Word clouds or tag clouds are graphical representations of word frequency that give greater prominence to words that appear more frequently in a source text. The larger the word in the visual the more common the word was in the document(s). The higher frequency of the word usage tends to underline its importance for the respondents or in the analyzed document. Thus, this method is recommended to be complemented by qualitative analysis of the data. In this document, the analysis was done based on the responses provided by partner regions to a question on them methodology/main indicators applied to monitor & evaluate (if applicable).

the evaluation process to specify impact and measurement criteria that fit into the specific territorial context as well as the broader global context.

There are other common challenges in cluster evaluation, as can be seen in the experience of the TCI Network Cluster Evaluation group. Over 4 years of workshops involving cluster policy practitioners and academic researchers from around the world has led to agreement on a series of common ‘principles’ (see theory box). The 1st principle – to do evaluation for learning and change, rather than only for audit – stands out as particularly important in the context of the partner regions experiences.

Theoretical note

Principles to guide evaluation

(Source: TCI Evaluation Group)

1. Evaluation for change - Evaluation is about learning – not just audit
2. Different audiences need different outputs
3. Evaluation needs to reflect real world context
4. Capture evidence against
 - > **Why (regional competitiveness);**
 - > **What (projects and programs);**
 - > **How (collaborative dynamics)**
5. Timing of evaluation - reflect the maturity
6. Social capital and trust are fundamental so find ways to evidence softer issues
7. Causality is challenging so gather basket of evidence

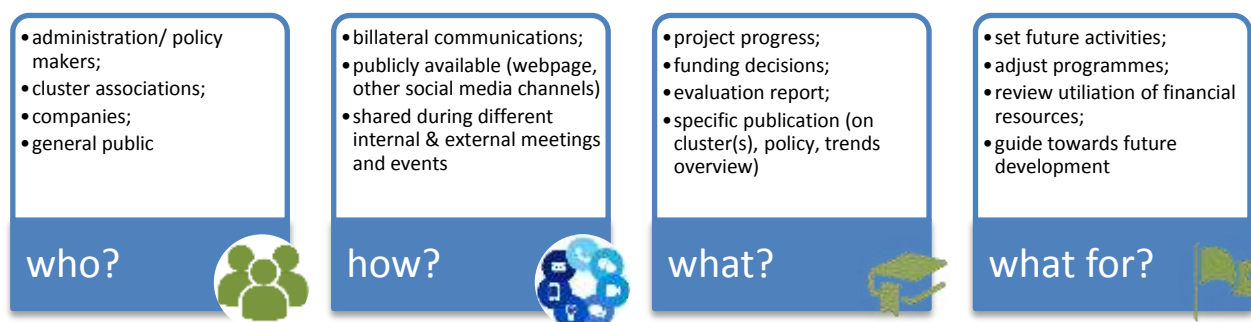
Table 4 Partner region specific benefits from application of their evaluation methodology

Partner region	Key benefit of methodologies applied by partner regions
Basque Country	<ul style="list-style-type: none"> • Evolutional perspective on each cluster and associations; • Knowledge on concrete cluster activities; • Better funding allocation
Highland and Islands	<ul style="list-style-type: none"> • Better planning of the projects funds and its allocation; • Rich information on project implementation; • Identify concrete project outputs; • Information for designing future program

Partner region	Key benefit of methodologies applied by partner regions
Northern Ireland	<ul style="list-style-type: none"> • Consistency across the organization in terms of the allocation of public funds; • Identification of problems faced by clusters and therefore evidence base to make adjustments to the Programme and/or seek future funding
Piedmont	<ul style="list-style-type: none"> • Knowledge on the activities and their implementation
Lubelskie	<ul style="list-style-type: none"> • Alignment with the mission and vision of the territorial RIS3 assuring coherent vision across the local stakeholders working towards reaching programme objectives
Hajdú-Bihar	<ul style="list-style-type: none"> • Rich basis to learn and improve/ adjust/ refine forthcoming programmes; • Accreditation entitles clusters to apply and increased opportunities in receiving EU funding
Latvia	<ul style="list-style-type: none"> • Information on current and future programme implementation

The means and formats of sharing information about the monitoring/evaluation also vary in detail from region to region, but they follow certain common features (Graph 36).

Graph 36 Dissemination of clusters and cluster policy related information



OPPORTUNITIES AND CHALLENGES

In summary, most of the partner regions have taken means and developed methodologies for the evaluation and monitoring of cluster policies, indicating that they are both interested in and sensitive to the need for learning and change. Cluster evaluation is a difficult and complex issue, however, and this initial review has provoked partner regions to explore their successes and challenges in terms of evaluation/monitoring objectives, methods and techniques.

First of all, a positive discovery is that partner regions having developed a great variety of general but also specific tools for collecting evaluation/monitoring data. The variety of these tools creates richness, objectivity and multi-faceted character to the collected information about cluster policies and cluster organizations. At the same time, however, as the data and tools are so diverse, it challenges the generalization or harmonization of the results across and/or with other territories, limiting some of the potential for learning. This is also seen in terms of the variety of measurement indicators employed. Therefore, focusing some attention on **harmonizing the tools and approaches** could provide an interesting basis for comparison across territories, increasing legitimacy among regional agents and leading to potentially richer policy learning.

Secondly, it is also positive to note that most partner regions do cluster policy and association evaluation with both internal and external inputs, as this assures neutrality and objectivity. At the same time, in certain partner regions there seems to be no one-stop focal point within the institutions to conduct evaluation and monitoring. This can lead to non-sustainability of processes and loss of knowledge or information on previous results. Establishing/naming one department/unit/group for monitoring and evaluation could ensure comprehensiveness and long term vision of information.

Finally, most of the attention in the process of evaluation is set on activities, results and actors. Meanwhile, a focus on the resources and the social elements of clusters in the monitoring/evaluation activities is less present. This is problematic as the social aspect within clusters is acknowledged as one of the key drivers of success, and greater understanding of the links with more tangible results is very much needed.

5. Territorial Regional Smart Specialization Strategies blended with Cluster policy

5.1. *Designing regional smart specialization strategies*

This section reviews the main characteristics of the regional partner's smart specialization strategies (RIS3). All **partner regions** have regional smart specialization strategies, and have set from **5 to 7 strategic areas for their RIS3**. More detailed information on each of the RIS3 strategic areas can be explored in the online resource database, **S3 platform**, specifically created by European Commission for learning across regions (see Tip below).

Theoretical note

Regional Smart Specialization Strategies

The smart specialization concept arose from debates on innovation and regional policies in Europe, and amidst concerns that regions were streaming their science, technology and innovation resources into similar domains like biosciences, nanotechnologies, etc., without really taking in account their territorial contexts (Aranguren & Wilson, 2013). Its specific roots can be found in the work of the expert group on "Knowledge for growth", set by DG Regional Policy in 2005. As established by Foray (2015), "the basic idea governing the generalized adoption of smart specialization strategy within the framework of Cohesion policy was to effect a change of paradigm (...): to encourage each region to identify transformation priorities that reflect and amplify existing local structures and competencies, and thus produce original and unique competitive advantages" (p.2).

While underlining that the logic of specialization is intact (importance of scale, scope, and spill-overs) (Foray, 2013), smart specialization strategies aim: to close the innovation gap between research and its application; to stimulate more coherent regional development; to be more in line with new Industrial policy by helping regions to reveal areas of desirable intervention and stream research and innovation into unique territory specific domains defined via entrepreneurial discovery processes (Foray, 2015). As such, the European Commission (2013) identifies the key features of smart specialization strategies as: 1) place based character; 2) focus on R&D and innovation; 3) cross sectorial connections and "domains" (need to seek intra-sectorial and inter-sectorial development associated with related variety); 4) key role of entrepreneurial actors; and 5) crucial mass and scale of activity.

In the process of smart specialization there is a need to follow at least five principles (Foray, 2015): 1) entrepreneurial discovery (prioritization in an interactive process, in which the private sector is discovering and producing information about the new activities, the government assesses potential and then empowers the actors capable in realizing it) and granularity (identify the right level for sectorial prioritization, which is typically between sector and in micro-activities); 2) inclusiveness and the sleeping giant, exciting goblins and hungry dwarfs (mixing more progressive with less noticed but potential sectors and clusters within the economy); 3) evolving and dynamic prioritization; 4) monitoring and evaluation of what is happening; and 5) support for early stages and growth of new activities.

Tip

S3 Platform, <http://s3platform.jrc.ec.europa.eu/home>

The Smart Specialisation Platform provides advice to EU countries and regions for the design and implementation of their research and innovation strategies for smart specialisation (RIS3). Their services include: providing guidance material and good practice examples, conducting high quality research projects to inform strategy formation and policy-making, facilitating peer-reviews and mutual learning, supporting access to relevant data, training policy-makers, and organising information sessions for policy-makers.

To access partner region specific RIS3 strategic areas, follow the links:

Basque Country - [RIS3 Link](#)

Three Priority Domains: Advanced Manufacturing, Energy and Bioscience-Health and Four Opportunity niches: Cultural and Creative Industries, Environment Ecosystems, Urban Habitat, and Food.

Highlands & Islands – [RIS3 Link](#)

Energy; Marine energy ; Financial & business services; Universities; Creative industries; Tourism; Food & beverages; Life sciences

Northern Ireland – [RIS3 Link](#)

Sustainable Energy; Advanced Materials and Manufacturing; ICT; AgriFood Technology ; Life & Health Science

Piedmont – [RIS3 Link](#)

Aerospace; Automotive; Chemicals; Made in Piemonte: textile and fashion, food, style and design; Mechatronic; Life Sciences

Lubelskie – [RIS3 Link](#)

Green economy: Environmental technologies; Innovative industry: Automotive industry; Health & quality of life: Medical technologies; Innovative industry: Wood, furniture & paper industry; Innovative industry: Metal industry; Innovative industry: ICT; Green economy: Bioeconomy; Green economy: Advanced environmental services; Innovative industry: Mining & quarrying; Health & quality of life: Health tourism; Health & quality of life: Healthy & safe food; Green economy: Other supporting sectors: ICT, metal industry, logistics; Health & quality of life: Other supporting sectors: ICT, metal industry, logistics

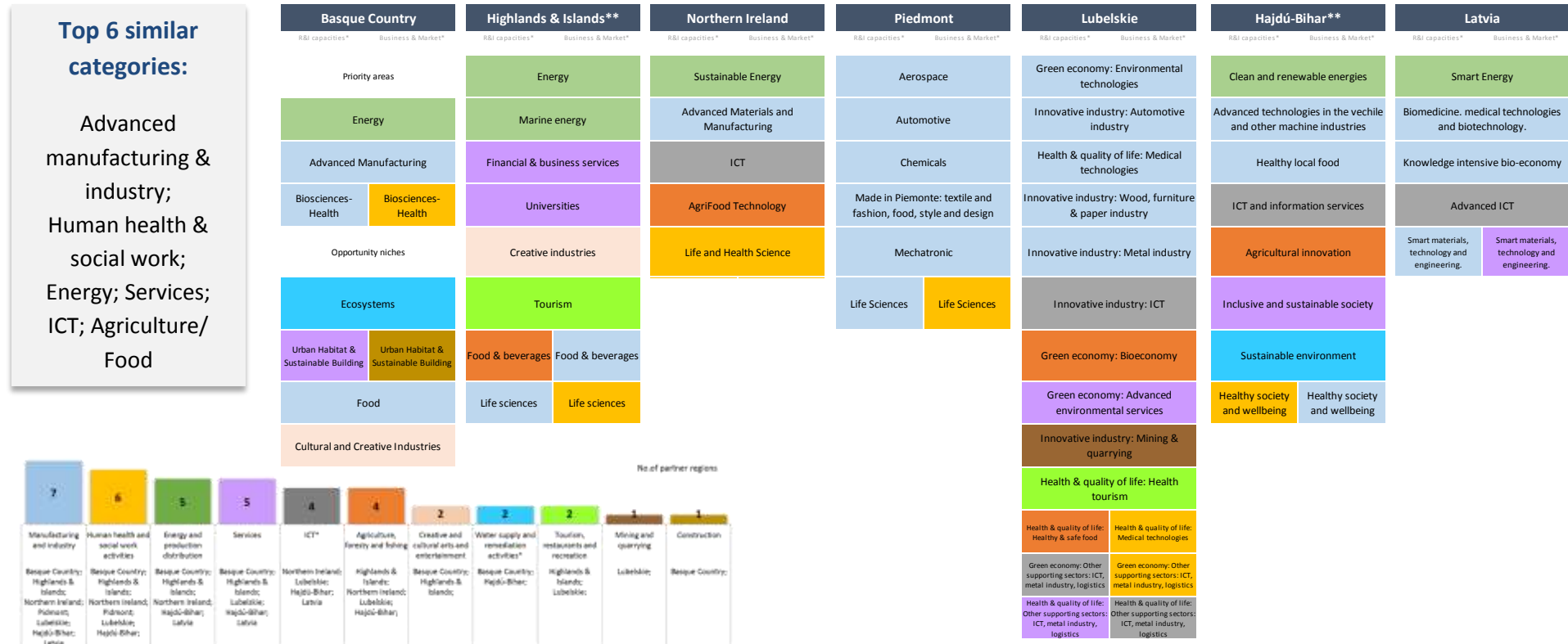
Hajdú-Bihar – [RIS3 Link](#)

Clean and renewable energies; Advanced technologies in the vehicle and other machine industries; Healthy local food; ICT and information services; Agricultural innovation; Inclusive and sustainable society; Sustainable environment; Healthy Society and Wellbeing

Latvia – [RIS3 Link](#)

Smart Energy; Biomedicine: medical technologies and biotechnology; Knowledge intensive bio-economy; Advanced ICT; Smart materials, technology and engineering.

Graph 37 Partner region smart specialization strategic areas



Notes: Each partner region strategic areas of RIS3 has been associated to categories such as* Research and Innovation Capacities; and Business Areas (1) & Target Market (2); The color-coding stands for respective category referred as per Online S3 Platform (01.2017); Data specifics: **Highlands & Islands based on NUTS UKM Scotland; Hajdú-Bihar based on NUTS HU Hungary; ***Non-referred categories: Public administration, security and defense; Wholesale and related trade;

5.1.1. RIS3 strategic areas

Each partner region has identified a specific set of 5-8 priorities in their RIS3 (Graph 37), and on the whole these address a wide range different but related sector/industry technologies and markets. The association of partner regions' RIS3 strategic areas has been done based on information given at Online S3 platform. In there the partner regions respective authorities have associated each of their RIS3 strategic areas to 3 category-groups: (1) Research and innovation capacities, (2) Business areas and target market and (3) EU priorities.

For this analysis, the association with only the first two category-groups was used, and indeed most of the strategic areas were similarly associated across both categories (for examples see table below).

Partner region	Strategic area	Category in both groups: (1) research and innovation capacities and (2) business area and market target
Basque Country	Energy	Energy and production distribution
Lubelskie	Innovation industry: ICT	ICT
Hajdú-Bihar	Agriculture innovation	Agricultures, forestry and fishing
Latvia	Knowledge intensive bio-economy	Manufacturing and industry

In some cases strategic areas of the partner regions were associated with different categories within each of the two groups (for examples see table below).

Partner region	Strategic area	Category in group: (1) research and innovation capacities	Category in group: (2) business area and market target
Basque Country	Biosciences - Health	Manufacturing and industry	Human health and social work activities
Highlands and Islands	Food and beverages	Agricultures, forestry and fishing	Manufacturing and industry
Piedmont	Life Science	Manufacturing and industry	Agricultures, forestry and fishing
Lubelskie	Health & quality of life: Healthy and safe food	Agricultures, forestry and fishing	Human health and social work activities

An analysis of Graph 37 reveals that many of the strategic areas appear to be similar across the partner regions, and the most common 6 areas are found in the RIS3 of at least 4 of the partner regions:¹⁷

- **Advanced manufacturing and industry (7 partner regions)** related priorities can be observed in the Basque Country (Advanced manufacturing), Northern Ireland (Advanced manufacturing and mining), Piedmont (Automotive, Aerospace, and Mechatronics);
- **Human health and social work activities (6 partner regions)**, can be noticed in Highlands and Islands (Life Sciences), Northern Ireland (Life and Health Sciences), Piedmont (Health); Hajdú-Bihar (Healthy local food; Healthy society and wellbeing);
- **Energy related (5 partner regions)**, appears under the same or related name in the Basque Country (Energy), Northern Ireland (Sustainable Energy) or Hajdú-Bihar (Clean and renewable energies);
- **Services (5 partner regions)**, in a broader meaning have been noticed across following partner regions as Highlands and Islands (Financial and business services, Universities), Lubelskie (Green economy: advanced environmental services), Hajdú-Bihar (Inclusive and sustainable society);
- **Information and communication technologies and related (4 partner regions)**, is seen in Northern Ireland (ICT), Hajdú-Bihar (ICT and services), Latvia (ICT);
- **Agriculture, forestry and fishing (4 partner regions)** addressed agriculture and food related production and consumption in such partner regions as Northern Ireland (AgriFood Technology), Highlands and Islands (Food & Beverages), Lubelskie (Green economy: Bioeconomy; Health & quality of life: Health & Safe Food) and Hajdú-Bihar (Agricultural innovation).

The analysis also highlights two categories – public administration, security and defence and wholesale and retail trade – that are absent in the partner regions’ RIS3.

Similarities in categories and focus should not be a big surprise. In 2015 a group of experts from the EU Joint Research Center (Sörvik & Kleibrink, 2015) conducted a thorough review of the strategic areas across Europe and identified the 10 most common labels. Moreover, they (ibid) studied how the priorities are related to the economic structure in territories (based on number of local units, employees and patents per sectors). The findings have shown that connections between RIS3 strategic areas and economic and innovation structures overall seem to be weak and if noticeable, then mainly in terms of relative growth of the number of firms and employment, and the absolute number of patent applications.

¹⁷ The 13 categories were given by S3 platform and are: Manufacturing and industry; Agriculture, forestry and fishing; Construction; Creative and cultural arts and entertainment; Energy and production distribution; Human health and social work activities; ICT; Mining and quarrying; Public administration, security and defense; Services Tourism, restaurants and recreation; Water supply and remediation activities; Wholesale and related trade

Graph 38 List of most common R&D priorities

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Energy 2. Health 3. Food 4. Advanced materials 5. ICT | <ol style="list-style-type: none"> 6. Tourism 7. Services 8. Sustainable innovation 9. Cultural and creative industries 10. Advanced manufacturing systems |
|--|---|

Source: (Sörvik & Kleibrink, 2015), p.16

In terms of this project the thematic similarities across partner regions are indeed interesting, as they can and should provide a rich basis for partner regions: 1) to identify areas of potential cooperation across similar and related areas; and 2) to learn from each other not only in general policy design and implementation, but also along area specific practices (making the knowledge and learning richer and more specific).

5.1.2. RIS3 stakeholder engagement

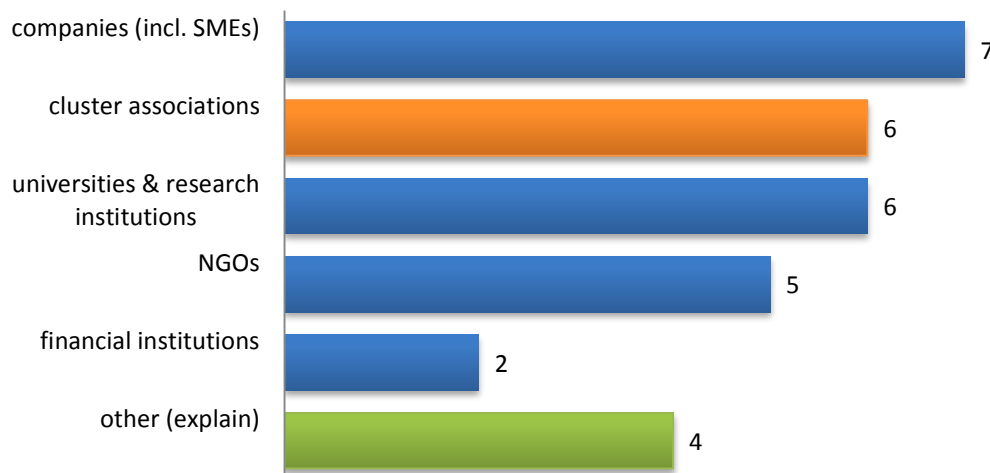
One of the central objectives of RIS3 definition and implementation is to create domains and spaces for entrepreneurial discovery involving a number of different interdisciplinary institutions. Looking at the responses provided by partner regions in the graph below (Graph 39) it seems that in all regions the participation of **companies and within them SMEs** has taken place. Moreover, in **6 out of 7 partner regions the RIS3 design process has been supported by the engagement of cluster associations**. The active role of **universities and research centers** has been highlighted in 5 partner regions. Within some (e.g. Lubelskie) it was even stressed that the role of the aforementioned institutions is overwhelmingly present and risks to create an unbalanced private-public mix in the RIS3 implementation process. Beyond that, another result that stands out is the low engagement of and by financial institutions. Finally, at least 4 partner regions have mentioned institutions involved in RIS3 associated with the **“other” category** (Graph 39) (going beyond such institutions as companies, cluster associations, universities & research centers, NGOs or financial institutions).

In the Basque Country it is the regional administration that took the lead in the process of setting-up the basis for the regional smart specialization strategy. Within the defined 3 priorities and 4 opportunity niches for the implementation the process has been passed to working groups built up of multi-institutional representation and led by the private sector.

In Hajdú-Bihar, the design was also supported by the government and administration along with the involvement of multi-sector business institutions, like e.g. trade associations. This is likewise the case for the Polish partner region, where the contribution of such multi-sector business institutions as the business environment institution was mentioned.

Beyond that the relation to international (World Bank) bodies and online resource tools (S3 Online Platform) has been acknowledged.

Graph 39 Main stakeholders participating in the RIS3



5.2. Implementation of RIS 3

5.2.1. Governance of RIS3 implementation

Policies have lifecycles, which typically follow **1) design, 2) implementation; and 3) monitoring and evaluation** phases. Since 2014-2015 territories have already passed to the implementation of their RIS3 strategies. In the process of implementation and generally in RIS3 development, a central role has been given to the fostering of **processes of entrepreneurial discovery**.

Theoretical note

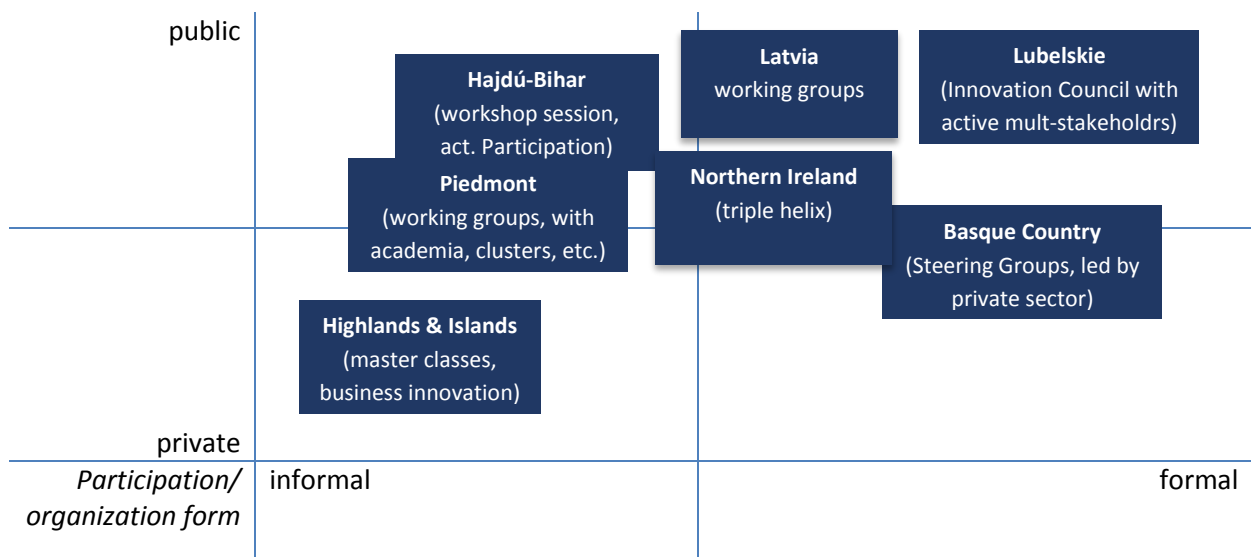
Smart Specialization: Process of entrepreneurial discovery

*“An effective appreciation of **entrepreneurial dynamic** can only be performed if entrepreneurial actors and management and governance bodies responsible of RIS3 engage in direct discussion. A RIS3 should hence provide for a set of consultation and auditing tools, as for instance technology auditing, interviews with cluster management and firms, mixed working groups, setting up of observatories and monitoring organization” (Foray et al., 2012) p. 20*

From the review of partner regions a key feature, which has been noted is the strong determination to establish and assure processes of entrepreneurial discovery via engagement of multiple stakeholders, and through this to reach the participation of all triple (and even quadruple or quintuple) helix actors. To reflect the similarities and differences in how partner regions are approaching this process, a matrix

has been constructed on axes reflecting: 1) the informal (volunteer based) or formal (juridical institution) organizational form of RIS3 implementation; and 2) the private or public leadership of the process.

Graph 40 Governance mode- distribution across partner regions



As reflected in the Graph most of the partner regions have stronger public leadership in RIS3 implementation, while there is more variation in organizational form.

Example	<p>Governance of RIS3</p> <p>Piedmont: The EDP takes place through working groups involving academia, research centers and enterprises (directly or through cluster associations) for the implementation of specific actions. They participate in the definition of the themes and rules of the funding calls.</p> <p>Lubelskie: When designing RIS3 there was a change in the approach taken from top-down to a bottom-up process whereby the regional government acts more as a facilitator, rather than a sole leader of this process. During the process almost 250 entities (including 10 clusters) participated in approx. 70 events (seminars, workshops). Additionally the Council for Innovation has been established at the beginning of the process and since then the competences of the Council include: strengthening and consolidating partnerships at the decision-making level through active involvement of the members, reaching agreements, recognizing common goals, building up mutual trust, encouraging consultation in individual environments; giving opinions on the documents related to the preparation of the RIS LV 2020, its implementation, monitoring, evaluation and updating; participating in the RIS3</p>
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2020 monitoring and evaluation actions, including proposals for improvement of regional research and innovation system.

Another important objective of the RIS3 concerns their contribution to facilitating a widening of technology/industry domains and incorporating cross-cutting KETs. Strengthening the development of KETs is a key element of industrial modernization due to its cross-sectoral and product contribution to diverse industries, and as argued by Foray et al., (2012) smart specialization strategies can strongly contribute to their development. The central argument is that these strategies can address and smooth the gap between research and its commercialization across various manufacturing goods and services.

Tip

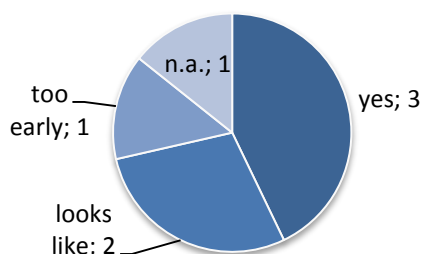
KETs Visualization Tools, <https://ec.europa.eu/growth/tools-databases/kets-tools/>

Key Enabling Technologies (KETs) provide the basis for innovation in a range of products across all industrial sectors. They underpin the shift to a greener economy, are instrumental in modernising Europe’s industrial base, and drive the development of entirely new industries. Their importance makes them a key element of European industrial policy.

More information has been prepared by EU DG Growth via **KETs Visualization Tools: 1) KETS Observatory and 2) KETs Technology Infrastructure.**

Taking into account that the process of RIS3 design and implementation has been in place already for 2-4 years, it was assumed that the partner regions could already have gathered some experiences and perceptions regarding the results of the process.

Graph 41 Partner regions consideration on whether RIS3 helps to widen technology/industry domains and incorporate cross-cutting KETs



For now the responses seem to show a predominantly positive experience with RIS3 in terms of helping to widen technology/industry domains through the process of entrepreneurial discovery (Graph 41). 3 out of 7 partner regions have confirmed and 2 more stated “looks like” that RIS3 helps to widen technology and industry domains and incorporate cross-cutting KETs.

Example

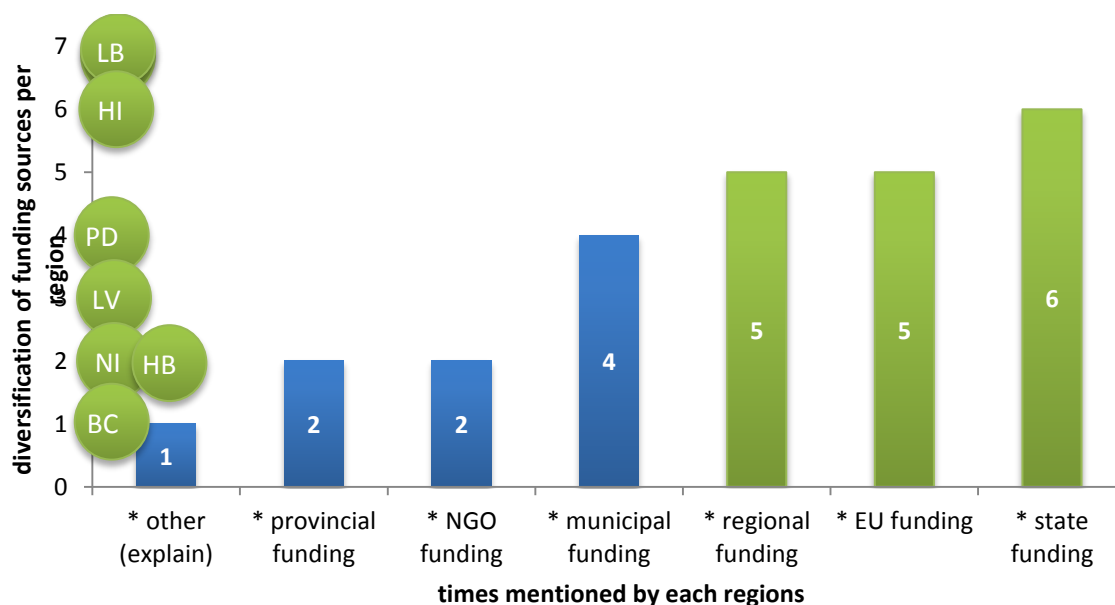
RIS3 & clusters facilitating KETs

Latvia: RIS3 is a hybrid strategy that targets traditional sectors of the economy as well as the sectors where products and services with a high value added exists or could emerge. Compliance with the KETs has been evaluated and taken into account in the RIS3 specialization areas setting process.

5.2.2. RIS3 financial resources

Funding for RIS3 in most of the partner regions comes from diverse sources (Graph 42). This diversity corresponds well with the funding scheme analysed and proposed by Foray et al., (2012) in their Guide to Research and Innovation Strategies for Smart Specialization (RIS3). Within the mentioned funding sources the state, regional and EU administrations have been the most frequently referred to. A detailed example of the broad range of (non-)competitive EU programmes accessed by the Hungarian partner region, Hajdú-Bihar, and is provided below. Taking into account the richness of potential funding sources, not all partner regions are fully exploring these opportunities (Graph 42). For example, along with the Basque Country, Northern Ireland and Lubleskie have mentioned only 1 or 2 primary funding sources.

Graph 42 RIS3 funding sources



Example

Specific EU funding schemes mentioned by Hajdú-Bihar

Domestic managed funds - Economic Development and Innovation Operational Programme (EDIOP) - source: ERDF, ESF, IKF; Competitive Central Hungary Operational Programme (CCHOP) - sources: ERDF, ESF; Human Resources Development Operational Programme (HRDOP) - sources: ERDF, ESF; Rural Development Programme (EU and national fund); Hungarian Fisheries Operational Programme (HFOP) – EU and national fund; H2020 Programme

5.3. Cluster policy blended with RIS 3

Considering that regional smart specialization strategies have been set as a condition for regional innovation funding, all EU regions had to identify their priorities. The rush behind identification of RIS3 priorities have in many cases obstructed one of the important policy stages: review of existing local, national and international policies. Within already existing policies, there is one with a special interest for the RIS3 and the project: cluster policy.

Theoretical note

Why blending cluster policies with RIS3

Since the start of smart specialization strategies, the discussion around the role or contribution of clusters and cluster policies appeared. One of the discussion points has been brought by Asheim (2013), who asked if the smart specialization concept was “old wine in new bottle or new wine in old bottle?”. Basically, the main question set was whether the new concept is about specialization done in a smarter way (which has represented a mainstream industrial and regional development strategy since Marshall, if successfully leading to positive lock-ins), or is it about the diversity of existing specialization (which should be seen via regional branch-building on related variety towards path renewal or creation via new technology integration). In his (ibid.) understanding these two concepts are close, which could lead to confusion and misreading of both and therefore challenges in their implementation and impact. Nevertheless, the stress on differences and the need to see smart specialization through the prism of a related variety approach (and associated diversification of economies) has been prevalent.

In further early arguments Aranguren & Wilson (2013) noted the need to incorporate the learnings from already implemented cluster policies into RIS3, as they have dominated the regional competitiveness policy landscape for recent decades and are still in place. Further to this, both concepts share many basic characteristics, even despite clear differences in regard to scale, focus and tools. Some of the core synergies identified are: 1) they seek to facilitate multiple forms of cooperation between firms and other agents and therefore, new forms of governance, 2) they are both place specific, building on existing place based characteristics, 3) they both experience challenges in the tasks of prioritization and selection and 4) they both experience challenges in evaluation.

In Castillo et al. (2014) it is also stated that clusters and smart specialization “share many of their basic conceptual aspects”, in particular by seeing clusters as “a specification (instrumental approach) within the theory of smart specialization”. Going beyond different arguments the authors see three main elements for synergies between these two concepts: global context, specialization patterns and related variety (Table 10 in Annexes). For example, the element of specialization can be contributed via social capital and intermediary between regional actors, which is then addressed by clusters providing critical mass and systematic performance.

The European Commission's (2013) report on “The role of clusters in smart specialization strategies” also discussed similarities and differences between the concepts, and proposed six leveraging points for clusters and their policies to be used in RIS3 (Table 11 in Annexes). As an example, in a multilevel governance context cluster policies could share their experiences, as they often rely on different sources of funding and have a history of applying for funding that can be shared with others.

Finally, although, Foray (2015) numerous refers to the differences between the clusters and smart specialization strategies, he also agrees on the connections/links. While referring to Rodriguez-Clare (2005), who stated that clusters and policies promoting entrepreneurial discovery are complementary, Foray argues that “these policies [clusters] must be activated during the different stages of the smart specialization cycle, with the entrepreneurial discovery policies as the departure point of this cycle” (p.60).

Taking in account the relations and opportunities from existing sectoral strengths, clusters and their policies clearly serve as an additional opportunity to extract findings with regards already developed local resources for strengthening RIS3 design, implementation and monitoring.

While the process of RIS3 design and implementation in different partner regions was different, in most cases clusters had some degree of participation. Moreover, partner regions were asked for this study to match their existing RIS3 priorities with the clusters and cluster associations potentially contributing to them. The results from the exercise are presented in Table 5.

A first observation is that this exercise of RIS3 and cluster matching itself can be considered to have been an opening or foundation for exploring the opportunities for how, which and why clusters could be leveraged for successful RIS3 implementation.

Secondly, all RIS3 priorities are shown to have been associated or supported via one or more cluster association, meaning there are good institutional opportunities to explore within RIS3 priorities from their linkages and externalities.

Further to the RIS3 and mapping exercise of cluster associations, partner regions were asked about the benefits of integrating the cluster concept into the design and implementation process for RIS3. With reference to the 6 areas of potential cluster and cluster policy contribution proposed by the European

Commission (2013),¹⁸ it can be noted that the responses from the partner regions were in line with these priorities. Table 6 presents some examples given by partner regions in relation to their experience of the cluster concept and its policies contributing to RIS3 strategy.

The findings show that in most of the regions the highest contribution from clusters and cluster policies is seen via **creating sustainable stakeholder engagement**. Cluster associations (or collaborative networks) often have and are able to provide a platform or a local focal point for reaching different institutions within their sectors. Moreover, if the processes in the clusters are strongly private or market driven, reaching out to cluster actors or cluster associations can facilitate bottom-up processes for RIS3 implementation.

Another common experience shared across partner regions was the cluster association (or collaborative network) contribution in terms of a **cross-border dimension**. Clusters and cluster associations via their often cross-sector (cross-cluster) dimensions and international experiences and connections are able to reinforce the often weak international, cross/trans-border dimension of RIS3 domains. They can also attract foreign investment and foreign funding for projects facilitating collaboration between the institutions across their domains. The last point is also linked to another area of contribution: **multi-level governance**. Here cluster associations by being used to rely on different sources of funding from different origins, have learnt how to be more efficient, agile and achieve synergies across sources and objectives of various institutions. This is of great significance for RIS3 strategy implementation.

Finally, experience with the identification of clusters and selection of cluster associations, or projects in collaboration via quantitative and qualitative methods has also served as a good basis for a number of partner regions in order to identify **RIS3 priorities**. The value of communication with local stakeholders has brought clarity and confidence in prioritization of certain domains.

¹⁸ Detailed description in Table 11, which from our point of view also includes arguments on what RIS3 can learn from Aranguren & Wilson (2013) (

Table 9).

Table 5 Research and investment capacities associated to RIS 3 priorities, associated cluster associations¹⁹

Group: R&D capacities	Basque Country	Highlands and Islands	Northern Ireland	Piedmont	Lubelskie	Haidú-Bihar	Latvia
Manufacturing and industry	<ul style="list-style-type: none"> Biosciences-Health: Biosciences Cluster and Food Cluster Advanced manufacturing: Advanced Manufacturing Technologies Cluster; Automotive Cluster; Aerospace Cluster; GAIA; all other manufacturing Clusters; Food: FOOD CLUSTER 	Life Sciences - sub sectors include • digital health • medical devices • Life Sciences advisory body • "Life Sciences Association" • "Life Sciences Scotland", and two Innovation Centres, namely •" The Industrial Biotechnology Innovation Centre (IBiIC) and • the "Digital Health and Care Innovation Centre (DHIC)"	Advanced manufacturing: NIPA; Causeway Aero	<ul style="list-style-type: none"> Aerospace: Aerospace district Automotive: Smart products and manufacturing Green Chemistry/Clean tech: Green chemistry Energy/clean tech Health: Life sciences Mechatronic: Smart products and manufacturing Made in Piemonte: Agrifood Textile 	<ul style="list-style-type: none"> Bioeconomy: Chemicals & chemical products (industrial biotechnology); Medicine & Health: -Biotechnology (personalized pharmacotherapy, biomedical products chain) -Nanotechnology & engineering (tissue engineering, advanced materials, regenerative medicine) IT & automation: nanotechnology & engineering (mechatronics, automation, robotics, computer engineering, smart buildings, control systems) 	Advanced technologies in the vehicle and other machine industries: not relevant <ul style="list-style-type: none"> Healthy local food: Pharmapolis Innovative Functional Food Cluster H2 Inclusive and sustainable society, viable environment: Green Technology Cluster, Pharmapolis Innovative Functional Food Cluster, LENERG Building Energy Cluster 	<ul style="list-style-type: none"> Bioeconomics: Bioeconomics Association (not a cluster) Biomedicine (medical technologies and biotechnology): Life Sciences Cluster "LifeScience.lv" Smart Materials, Technology and Engineering: Latvian Wood Construction Cluster
Energy production and distribution	Sustainable energy: (Energy Cluster, FMV (Shipbuilding Cluster), GAIA (ICT), ACLIMA (Environment) and ACICAE (Automotive).)	Energy : Scottish Renewables Marine Energy	Sustainable Energy	Resource efficiency trajectory: Energy and Clean tech	Low-carbon emission energy: Advanced manufacturing systems (bio-energy, renewable energy sources, biorefineries, biofuels)	Clean and renewable energies: LENERG Building Energy Cluster	Smart energy: Clean Technology Cluster "CLEANTECH LATVIA"

¹⁹ Notes: Corresponding cluster associations are highlighted with blue script; some partner regions did not associate a specific cluster to a certain RIS3 priority. In the aforementioned cases the RIS3 priority (block) has been fully highlighted blue. The RIS3 are matched to Research and Innovation capacities stated in EYE@RIS3 tool at S3 Online Platform.

Group: R&D capacities	Basque Country	Highlands and Islands	Northern Ireland	Piedmont	Lubelskie	Haidú-Bihar	Latvia
Information and communication technologies (ICT)			ICT: Capital Markets; IT3Sixty	Smart trajectory: ICT	<ul style="list-style-type: none"> • Medicine & Health: ICT (mobile applications, telecare & medicare, e-health) • IT & automation: ICT (social innovation): Lublin Mechatronics Land, Lublin IT Cluster, Eastern Cluster of Metal Processing, Polish Cluster R&D for Internet of Things, Lublin Cluster of Advanced Aviation Technologies, Eastern ICT Cluster, Cluster of Lublin Road Construction; Cluster Group.pl 	H1 ICT (infocommunication technologies) & Services: Silicon Field Regional IT Cluster; Észak-Alföld IT Cluster	Advanced ICT: Latvian Information Technology Cluster
Agriculture, forestry and fishing		2S: Food & beverages: Scotland Food and Drink	3NI: AgriFood Technology: Food Fortress		5P: Bioeconomy: crop & animal production (food security & safety)	6H: <ul style="list-style-type: none"> • Sustainable environment: Green Technology Cluster • Agricultural innovation: Pharmapolis Innovative Functional Food Cluster 	

Group: R&D capacities	Basque Country	Highlands and Islands	Northern Ireland	Piedmont	Lubelskie	Haidú-Bihar	Latvia
Services	Urban Habitat: ERAIKUNE (Construction), HABIC (Wood, Furniture, Habitat) and Energy Cluster	Finance and Business: None in the HIE area; Universities			<ul style="list-style-type: none"> • Bioeconomy (scientific research & development): Lublin Biotechnology Cluster, Lublin Cluster for Food Sector, Cluster of Waste Management and Recycling, Cluster Lublin Egg, Cluster of Ecoinnovation, Organic Food Valley, Lublin Eco-Energy Cluster, Eastern Cluster Eco-friendly Energy-saving House, Eastern Cluster of Innovation • Medicine & Health (Scientific research & development): Lublin Medicine • Low-carbon emission energy: Scientific research & development (eco-innovation) 		
Creative and cultural arts and entertainment	Cultural and Creative Industries: EIKEN, LANGUNE	Creative Industries: Creative Industry networks (1.Screen and Broadcast, 2.Writing and Publishing, 3.Craft, Fashion and Textiles, 4.Music)					
Human health and social work activities			Life and Health Sciences: IHAC			Healthy society and wellbeing: Thermal-Health Industry Cluster; MSE Hungarian Sports and Lifestyle Development Cluster	

Group: R&D capacities	Basque Country	Highlands and Islands	Northern Ireland	Piedmont	Lubelskie	Haidú-Bihar	Latvia
Water supply, sewerage, waste management and remediation activities	Environmental Ecosystems: ACLIMA (Environment) , HABIC (Wood, Furniture, Habitat)				Bioeconomy: management of pollution level (waste management)		
Mining and quarrying					Low Carbon Energy: Lublin Eco-Energy Cluster , Eastern Cluster Eco-friendly Energy-saving House		
Tourism, restaurants and recreation		Tourism • " Destination Management Organisations " (DMO's) bring together business in a locality - FW, Aviemore, Loch Ness each have one • " Sail Scotland " • " Scottish Tourism Alliance "					

Table 6 Cluster contribution to RIS3, partner region experience

Partner region experience on cluster contribution to RIS3	1. Prioritization	2. Integrated policy mixes	3. Smart, evid. policy making	4. Multi-level governance	5. Cross-border dimension	6. Sustainable stakeholder engagement
<p>Basque Country:</p> <p><i>All relevant clusters are participating and/or coordinating the Steering Groups put in place for all RIS3 Priorities. For instance, in the "Basque Industry 4.0 Pilot Group", together with the Basque Government, SPRI, the Basque Innovation Agency INNOBASQUE and MANUFACTURING KIC (Knowledge and Innovation Community) and the Scientific Advisory Committee, four clusters are active members: Advanced Manufacturing Technologies Cluster, Automotive Cluster, Energy Cluster and ICT Cluster. Each cluster is part of the Steering Committee and of a Thematic Committee and has a concrete responsibility; AFM is in charge of identifying the required transversal technologies; ICT Cluster is in charge of selecting and recommending the most adequate measures to introduce Industry 4.0 (intelligent Systems) in the industrial tissue.</i></p>						
<p>Highlands and Islands</p> <p><i>Our sectors and groups, while not formally known as clusters are contributing towards the development of each sector without being formally involved in the smart specialisation process. The sectors have strengths and receive investment and support to assist in delivering outputs aligned to HIE's areas of responsibility (i.e. Internationalisation, Inward investment, Inclusive growth, and Innovation). A clusters policy is currently under development in Scotland and the Highlands and Islands.</i></p>						
<p>Northern Ireland</p> <p><i>The majority of projects funded under Invest NI's Collaborative Growth Programme, while not directly required to link to RIS3 priorities, tend nonetheless to fall naturally into one of the region's MATRIX thematic areas, which are in turn aligned to RIS3. Projects are encouraged to identify work streams within their collaborative projects which support export growth; build international networks; identify new markets; drive cultural change in approach to innovation, risk and collaboration; encourage knowledge transfer; and enhance capacity and competency amongst partner organisations.</i></p>						
<p>Piedmont</p> <p><i>During the process of definition of the regional RIS3, and specifically in the step of participation and consultation, the cluster management organizations have been fundamental players among the stakeholders involved in process and played a key role in the definition of the priorities of the RIS3. All the cluster management organizations have been involved in the process of participation both through meetings and the submission of a questionnaire. They were asked to highlight the technological area of specialisation in which they act; sub-sectors and market niches referred to market applications and foremost domains within the specialisation area; key enabling technologies related to the specialisation area; impacts and crosscutting ways; strengths and future trends. In parallel to the RIS3 process a working group consisting of cluster management organizations, experts and policy makers undertook a cluster revision process in order to make them more operational for pursuing the objectives of the Strategy</i></p>						
<p>Lubelskie</p>						

Partner region experience on cluster contribution to RIS3

- 1. Prioritization
- 2. Integrated policy mixes
- 3. Smart, evid. policy making
- 4. Multi-level governance
- 5. Cross-border dimension
- 6. Sustainable stakeholder engagement

Cluster contribution was seen via strengthening the absorption capacity of firms by managing networking and providing support services for SMEs; improving capacity of the cluster to self-organise and to pro-actively shape the future of the cluster; cluster organisations as innovation support providers; unlocking new business opportunities for SMEs in new value chains and creating synergies through interregional cooperation;

Examples: Active role in RIS3 design process (moderated by Lubelskie Voivodeship); Cluster organisations as partners in projects within RIS3 priorities: for example FRL in EmplInno (BSR Interreg) - FRL as a business environment support institution is the lead cluster organisation of the Eco-Energy Cluster and at the same time Partner in the project aimed at SME empowerment and internationalisation (**sub-objectives: to enhance the innovation capacity of SMEs in the smart specialisation - low carbon energy; to boost the competitiveness of SMEs; to establish external relations for capturing knowledge and synergies in order to exploit each nucleus for innovation and growth in medium-sized cities and regions in the priority low carbon energy; activities: R+D transfer workshops, transnational delegation trips, matchmaking events, round table events, good practices exchange**).

Hajdú-Bihar



Through networking and clustering (cooperation with research and higher education actors) entrepreneurs/companies can achieve the size/scope required for international/EU level competitiveness; strengthening export-oriented activities with high added value also promotes economic competitiveness.

Latvia



Cluster Associations foster interdepartmental cooperation to take full advantage of the state's available scientific potential. This year in April RIS3 priority guidelines was officially approved. Include activities to contribute to the RIS3 strategy implementation. This is one of the project application requirements. All clusters who have applied for funding in their project proposals has intend some activities to fulfil after projects approvals, but until now concrete activities hasn't been observed.

Cluster organization interests were represented in the designing process of the RIS3 strategy framework in Latvia. There were various cluster stakeholders (scientific institutions, enterprises and educational institutions) involved in this process (meetings, conferences, working groups etc.).

To raise awareness and knowledge on RIS3 specialisation areas (content, needs, impact on the economy), Ministry of Education and Science (MoES) in cooperation with the State Education Development Agency have prepared analytical descriptions of each specialisation area (published in January 2016), int. al. organizing public discussions on November 2015. In addition, at the end of November 2016 MoES completed the work on material explaining the role of social sciences and humanities on implementation of RIS3 growth priorities and their contribution to the transformation of the economy.

Additionally, Cluster programme foresees quality criteria which states that project applicant should provide implementation of cluster actions contributing to RIS3 targets. All clusters who have applied for the EU funding in their project proposals intended some activities to fulfil these criteria.

It is evident therefore that in all partner regions cluster associations are contributing to RIS3 implementation. In general 6 areas of their contribution have been noticed: (1) participation, (2) coordination, (3) initiative (propose), (4) expert/strategic advice, (5) evaluation & monitoring and (6) bridging as well as streaming up/down knowledge (Graph 43). At the same time, based on the responses received most of the partner regions' cluster associations are contributing via:

- Participation in working groups, committees, session, etc.;
- Give strategic sector/ industry/ domain related advices;
- Bridge and stream up/ down information on cluster/ sector/ company trends to RIS3 strategies implementation and vice a versa.

Graph 43 Activities of cluster associations in the RIS3 implementation



It is worth stressing that not only clusters and their policies could contribute to regional smart specialization strategies; rather this road is two-sided. RIS3 via entrepreneurial discovery processes, cross-sector linkages development, especially to KETs, globalization of research and integration into value chain(s) can also lead to growth and strengthening of clusters and their diversification. RIS3 through their cross-sectoral nature could contribute to bringing institutions from different sectors and therefore creating processes leading to upgrading, diversification or development of new products and value chains. The above argument is also shared by a number of partner regions, with slight caution in terms of earliness in the results.

Example	Basque Country
	<i>"RIS3 deployment has contributed to broaden the scope of clusters and to explore new value chains within existing clusters also in a cross-cluster dimension, such as: "offshore energy", resource efficient manufacturing or medical devices (Biosciences</i>

Cluster + Advanced Manuf. Cluster"). The Bioscience Cluster, for instance, has modified its statutes to allow membership to medical equipment manufacturers."

Latvia

It's expected that RIS3 implementation process will foster growth and structural changes of Latvia's economy and that it will have an impact also on new industry or industry niche expansion, incl. emergence of new clusters or SME networks. At the same time regular RIS3 monitoring system will be provided thus ensuring that the RIS3 strategy meets its main objectives and expectations. RIS3 monitoring process will include analysis of results gained within the entrepreneurial discovery process, public discussions and micro level (enterprise level) analysis to identify existing obstacles at the product or niche level, incl. identification of products and niches with higher added value and export potential, evaluation of the current resource base (human resources, infrastructure), an in-depth analysis of the industry sectors (manufacturing), as well as the identification of challenges that impede development of innovative businesses, products and technologies with higher added value. Thus, RIS3 monitoring process could have a positive impact on the emergence of new products, niches as well as appropriate clusters.

5.4. RIS3 contributing towards opportunities for territories

Concluding the part on RIS3 and clusters, it is worthwhile highlighting the partner regions responses on their specific opportunities from defining the RIS3 strategy with regards to territorial development. Specific opportunities across partner regions have mainly appeared on the three levels: **(1) Policy, (2) Operations** and **(3) Sectors**.

Graph 44 Opportunities for territories from RIS3

Policy
<ul style="list-style-type: none"> align different policies (e.g. Cluster Policy and Economic Development Strategies (Basque Country)); opportunity to make a revision of the clusters and cluster associations, where the process went beyond the simply matching of the technological areas to the strategy's priorities and pursues the following objectives (Piedmont) narrowing and re-defining the strategic policy areas by setting stronger focus on emerging areas and on the opportunities to be found in the overlap between sectors (Northern Ireland); providing transformation of national economy via science and technology-driven growth and progress towards a knowledge-based capacity development (Latvia)

Operations	
Process	Products
<ul style="list-style-type: none"> • a trigger for inter-departmental coordination and collaboration (Basque Country); • participation of stakeholders at all stages of the RIS3 process (Lubelskie); • Representation and participation of the experts from partner region in higher territorial level of operation (Hajdú-Bihar); • produced joint design of strategic initiatives (Basque Country) • towards higher added value, productivity and more effective usage of resources (Latvia) 	<ul style="list-style-type: none"> • evidence based foresight reports for specific sectors (Northern Ireland); • promotes the creation of innovation ecosystem in the spirit of trust and collaboration (Lubelskie); • during the development of the RIS3 three types of regions have been defined in Hungary: Knowledge regions, Industrial production zones and Low S&T driven regions. County is assessed as Knowledge region (Hajdú-Bihar); • it is a hybrid strategy that sets out 3 directions of economic strategy, 7 growth priorities and 5 specialization areas (Latvia)
Sectors and areas	
<ul style="list-style-type: none"> • Basque Country: "Industry 4.0", "Offshore Energy", "Medical Devices"; • Highlands & Islands: Adventure tourism, Food and drink subsectors, Strands of Creative Industries (cultural aspects); • Northern Ireland: Life and Health Sciences, ICT and Advanced Manufacturing; • Lubelskie: Bio-economy and Latvia: Bioeconomics • Latvia set 3 main directions/ domains: 1) change of production and export structure in the traditional sectors of the economy, 2) growth in sectors where there is or is likely to create products and services with high added value and 3) branches with significant horizontal impact and contribution to economic transformation. 	

OPPORTUNITIES AND CHALLENGES

All partner regions have identified their **RIS3 strategic areas**. Cross-matching has resulted in identification of common areas across a number of partner regions. Specifically, these areas are associated with advanced manufacturing systems and industries, energy, bio- and health sciences, ICT and food & agriculture. These commonalities suggest great opportunities for rich knowledge and policy exchange and potential collaboration across partner regions stakeholders and institutions. Therefore, one of the first recommendations is to explore these opportunities for strategic theme-specific learning across partner regions.

A more profound exploration of the common strategic areas and their specific technological or market focus is needed, and greater granulation in the specialization areas of each territory will potentially identify more concrete spheres for collaboration or exploring new inter-sector dynamics.

The financial side of the RIS3 implementation tends to come from the state, sub-state (regional) and EU funds. This is similar to the funding resources in terms of the cluster policy, which provides a great basis for territorial actors to explore current or previous knowledge for the implementation of projects or further activities. However, a number of regions show quite low diversification of resource origin for RIS3. Low diversification from one side could make the institutions in partner regions very competent in acquiring certain funding, but at the same time also dependent and reduce entrepreneurial character or innovativeness/rigor of the application idea. This is especially relevant for business and research centers, whose application for non-traditional funding resources would be challenging for their competitiveness and agility with foreign competitors.

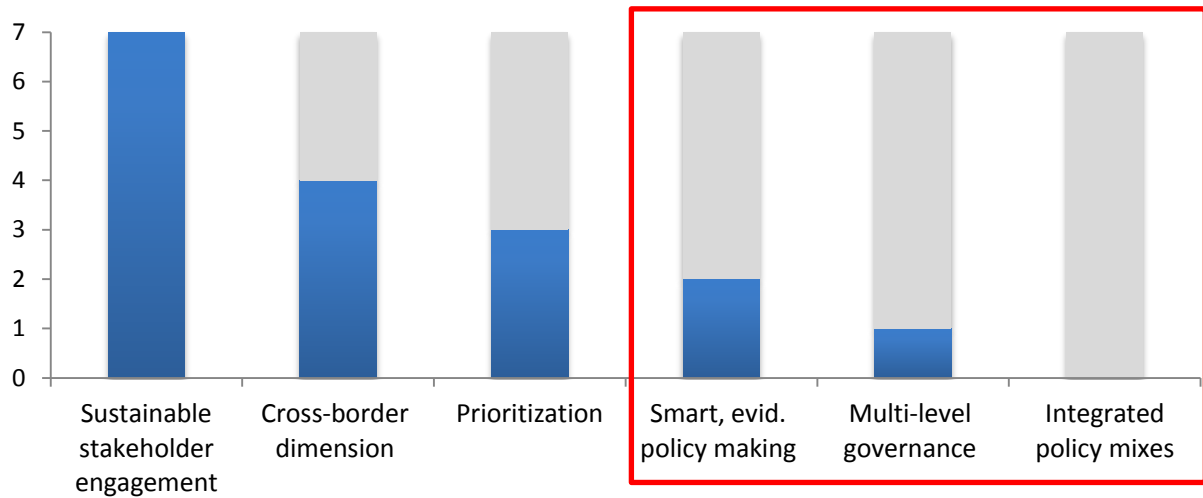
Beyond the identification and prioritization of strategic areas, the partner regions have also followed different approaches in terms of designing and implementing the RIS3 strategy. A wide range of forms, from more public to private as well as more formal to less formal institutional structures and participation in terms of RIS3 implementation has been found. The mapping tends to show stronger public (balanced between formal & informal) driven implementation of the RIS3. This may have more to do with a so far rather top down character of RIS3. Therefore, a general call could be for a stronger business/bottom-up participation of institutions, and there are opportunities for learning across the partners in how clusters and cluster policy might contribute to this.

In addition, another opportunity for the institutional involvement could be stronger engagement of finance institutions, which seem to either not be considered or not be aware of their space for contribution. This should not be the case. Financial institutions, especially international ones can contribute to the process of RIS3 design from multiple sides: guidance and broad experience on the global market trends, trends in the areas of future investment funding and/or access to data for better mapping of local strengths, etc. An example of the contribution from the financial institutions can be found in Ukraine, Lviv IT cluster, where the members of the cluster association can get a loan with a reduced fee from a contributing bank.

Clusters and their formal-informal facilitating organizations such as cluster associations constitute one of the most important institutions in RIS3 design and current implementation, and are also likely to be key for ongoing monitoring and evaluation. The cluster associations' role in RIS3 has been confirmed by almost all partner regions. Moreover, almost all partner regions have successfully done the matching of cluster associations (or collaborative networks) with one or more RIS3 strategic areas. Taking into account the existing RIS3 linkages with clusters, there is room for exploring more deeply the contributions of cluster as the RIS3 process moves forward.

This exploration of opportunities and linkages across RIS3 and partner regions could be focused on the framework areas identified by the European Commission (2013); areas such as 1) integrated policy mix, 2) multi-level governance and 3) smart, evidence based policy making (Graph 45 and Annex Table 11).

Graph 45 Contribution of clusters to RIS3 as per partner regions responses



Finally, following the developments in KETs and the opportunities for implementation, instruments to facilitate linkages should be important components of the strategies. Substantial advantages will lie in the opportunities for matured industries to regenerate and avoid decline, as well as potentially leading to creation of new industries, sectors, clusters and products. Therefore, constant acknowledgement that RIS3, clusters as well as other institutions in the territories form one eco-system facilitating a two-way stream is necessary for identification of linkages of opportunity.

6. Resume: SWOT of Cluster Policy within RIS3 context

6.1. SWOT general picture

A review of the SWOT specifics of all partner regions in relation to their cluster policies and RIS3 produced some general observations that are reflected in the combined SWOT below.

Table 7 SWOT picture for all partner regions' cluster policies and RIS3

<p style="text-align: center;">Strengths</p> <ul style="list-style-type: none"> • many similar strengths across partner regions gives opportunity to learn from each other; • sectors - prioritization - clusters are in line with RIS3; • along with the availability of institutional infrastructure to support, their is also high grade of participation - strong and broad, from all sides business, research institutions, development agents, etc.; • high engagement level across companies; • good knowledge of territorial economic and industrial strengths; • financial support; • value of long term cooperation as well as government support; 	<p style="text-align: center;">Weakness</p> <ul style="list-style-type: none"> • very specific - requiring partner region specific approaches to tackling them; • within common: <ul style="list-style-type: none"> • financial challenges; • cooperation challenges within some clusters and some specific institutional groups, e.g. research and business; • challenges and misunderstanding related to such concepts as clusters, innovation, leading to vague policy prioritization; • another peculiarity is the weaknesses related to the partner regions institutional context. In such partner regions from EU 15 are less challenges by weaknesses in the economic or business environment, and have higher level of cooperation experience
<p style="text-align: center;">Opportunities</p> <ul style="list-style-type: none"> • looking for opportunities in the new emerging industries, KETs, facilitating cross-sector/ cluster initiatives, which would also stimulate the identification and emergence of new clusters and cluster associations; • exploring new types of clusters; • improve the quality of cluster associations' operation; • enhance, strengthen the result based cooperation between companies and especially research centers; • explore stronger the opportunities from international networks; • enhancing selected types of services given by cluster associations; • evaluation methods; • policy mix 	<p style="text-align: center;">Threats</p> <ul style="list-style-type: none"> • increased competition; • keep local strengths while promoting internationalizing; • some weaknesses are further expressed in threats, which is the case if weaknesses are not being addressed over the long period of time, among these ones are: <ul style="list-style-type: none"> • budget cuts; • wrong perception of cluster associations as money providers; • facilitate cooperation within certain groups/ institutions; • provide adequate support to clusters in a specific development stage; • partner regions coming from the non EU15 state are facing the threats from the side of overall low business environment;

6.2. SWOT general picture: details

6.2.1. Strengths

Overall most of the partner regions showed a number of quite similar strengths. First of all, the partner regions seem to have successfully completed the exercise of defining their RIS3 strategic areas. Beyond that the partner regions also clearly know their key sectors and industries, which are being included in or coincide directly with their prioritized areas. Moreover, not only public (managing and implementing institutions) are aware of the thematic areas, but also the leading institutions and territorial actors. Thus one of the strengths is that businesses, research institutions, development agents, etc. are aware of the strategic RIS3 areas and have a high interest in participation. Particularly on the private-sector side, cluster associations and companies seem to show high level of interest and engagement both in RIS3 as well as in the cluster policy (or clusters seen from a broader perspective).

Beyond the above, some partner regions have specific strengths. In the case of the Basque Country, for example, one of the key strengths is their long term experience with cluster and innovation policy implementation, which has been progressively adjusted and modified providing rich experience for RIS3 implementation. Piedmont region sees its strengths in the development of feasible and strategic R&D investments. Hajdú-Bihar due to its geographic location and the historic specifics of Central and Eastern Europe is strong in the area of cross-border cooperation. Finally, Latvia from the perspective of state coordination has strengths in taking decisions and making changes to a wide range of policies.

6.2.2. Weaknesses

On contrary to the strengths identified, weaknesses are very specific for each of the partner regions, requiring territory-specific approaches to tackling them. For example Latvia identifies its main weaknesses in capacities of cluster actors and associations to self-finance and the absence of guidelines and dialogue space in some of the areas related to connecting RIS3 and clusters. The Highlands and Islands meanwhile sees their weaknesses in the wide dispersion of businesses and the absence of all components of the value chain locally, and Lubelskie stresses a weakness in the level of social capital (based on trust and cooperation) among different entities.

There are also a number of common weaknesses. Some of the central ones are the financial constraints or challenges associated with the funding of cluster policies as well as RIS3. Beyond that, the advantages of cooperation are not similarly acknowledged and perceived among all groups of agents, and misunderstandings and different approaches to concepts such as clusters and innovation can result in vague policy prioritization..

6.2.3. Opportunities

Partner regions see their opportunities in line with the European call for stronger specialization within strategic priorities and clusters, as well as value chain(s) diversification. Due to the character of the partner regions all of them identify opportunities in emerging industries via facilitation of inter-sector / cross-cluster linkages. These issues are seen as a principal opportunity for their territories, which would also assure their successful escape from industrial lock-in and path dependency. In this line, the

exploration of new types and kinds of clusters in their territories along with the identified RIS3 priorities are seen as an opportunity.

Several partner regions also identified opportunities related to enhancing the management, services offered and overall performance of cluster associations. While aware that formal cluster associations are only one of the instruments of cluster policies, they are increasingly recognized as a bridging institution between government (policy) and market (business) needs & reality. Strengthening the performance of cluster associations therefore could facilitate the natural cluster, and also the information / knowledge flows between slightly “different worlds”.

Another set of opportunities that the partner regions have seen is in strengthening the results of cooperation between companies and especially with research centres, as well as stronger exploration of the opportunities from international networks and platforms. Finally, the Basque Country and Latvia, in particular, have also addressed opportunities from improvement of evaluation methods and stronger policy mixes.

6.2.4. Threats

Most of the threats tend to reflect territories weaknesses, in particular those that have not been addressed over a longer period of time. In brief, among the most general threats across partner regions one can state a constant increase in external as well as internal competition, where the issue of keeping local strengths and scope while balancing with companies’ internationalization strategies is a concern. In addition to the above, the financial sustainability of cluster associations’ resources, especially the public side, is seen as a concern across the partners, and something that could grow into a threat, especially if firms and other institutions are unable to perceive the benefits and advantages of cooperation and collaboration.

Similarly to weaknesses, many of the threats were very place specific. Partner regions from outside of the EU15, for example, are facing threats rooted in a poor overall business and competitiveness environment, which is feared to affect the business absorption of the cluster concept. In Hajdú-Bihar for instance prime threats are centred on inefficient use of innovation capacities and lack of bridging with business needs. For the industrial regions of Piedmont and the Basque Country, on the other hand, there are threats in orienting cluster activities to the needs of the most active cluster members and re-enforcing path-dependency in mature industries. Finally, for Northern Ireland one of the key threats for clusters lies the lack of scale in terms of numbers of businesses operating in key sectors.

II. REFLECTION PART: LEARNINGS FROM COMPARISON AND SUMMARY ON PARTNER REGIONS KNOWLEDGE/ INFORMATION TOWARDS STRENGTHENING CLUSTER POLICIES WITHIN RIS3 STRATEGIES

This part of this Policy Learning Document – SWOT Analysis aims to do the reflection on the partner regions along the set thematic framework presented in the Discourse part of this document. The main objective is to resume the main **strengths and weaknesses** identified which are being faced by the partner regions and therefore drive main **opportunities or areas of action** starting with the project period decade.



1. Territorial development and cluster policy practices

1.1. Strengths

- Positive evolution of growth rates of GDP and GDP per capita;
- Cluster policies are different across partner regions. From the policy side the support can come in form of a dedicated cluster programme, or from different economic/ structural programs stimulating innovation or internationalization of the companies with the central promotion of cooperation;
- Rich experience in resource accumulation (different funding schemes and sources), especially from state and sub-state levels;
- Common RIS3 and cluster (cluster associations) prioritization across a number of strategic areas and cluster policy priorities;
- Although all partner regions have rather own definition of the cluster concept, in its conceptual grounds it follows the traditional cluster concept of Porter (1998), and therefore from one side supports partner regions in conceptually approach cluster development and from another side builds a common understanding of the matter creating common understanding between each other;
- Taking the broad definition of cluster policies all of the partner regions have cluster policy with its specific characteristics; Three supporting instruments for cluster development tend to be preferred by partner regions: projects (in collaboration with various conditions and thematic areas), cluster associations (or collaborative networks, as well as other formal forms, such as sector/ cluster managing organizations) and general activities related to collaboration and joint R&D promotion.

1.2. Weaknesses

- GDP per capita in a number of partner regions is lower than EU28 average;
- Overall industrial and manufacturing decline in terms of GVA and employment;
- Cluster policies should take in account that support to clusters can/ should go beyond only cluster associations (which is however often a useful policy instrument/ tool for reaching/ or being a birding point with the business);
- The issue of clusters is generally addressed by departments dealing with economic, industrial or international development; here the involvement of other departments in charge of, e.g. employment (job creation), education or infrastructure is also necessary to assure the inclusiveness of the ecosystem;
- A number of partner regions explore financial resources from the same character of institutions;

2. Cluster Organizational ecosystem

2.1. *Strengths*

- In most of the partner regions cluster policies have been in place for some time, therefore the actors in RIS3 could use the skills developed in cluster policy implementation, e.g. funding generation. Both (cluster and RIS3) can explore opportunities to exploit each other's funding sources;
Cluster associations (or collaborative networks) may seem to be very structured and suitable mechanism for cluster policy coordination, monitoring and implementation, however they are not the only instrument in the implementation of the cluster policy;
- The position of cluster manager within a cluster association is taken seriously, meaning that most of the association's management tended to have good sectoral experience, gained primarily in the private sector, although managers with an academic background were also noted;
- Financially cluster associations tend to be supported via both public and private funding;
- Most of the partner regions have developed and introduced methodologies for the evaluation and monitoring of cluster policies, making them able to respond quickly to external and internal changes;

2.2. *Weaknesses*

- Although a number of cluster associations (or collaborative networks) have been reviewed and compared across partner regions, there is limited common ground;
- A number of newly established cluster associations (or collaborative networks) face some challenges in setting a fee and convincing its members to pay it, therefore remaining more reliant on public financing;
- The variety of evaluation/ monitoring techniques on the one hand creates richness, objectivity and the collection of multi-faceted data, however on the other hand, as all these tools are dispersed, it becomes more difficult to harmonise these results across, or with, other territories. A similar trend is seen in the variety of measuring indicators.
- While most of the attention in the process of evaluation is on activities, results and actors, the focus on resource efficiency and the social element of the monitoring/ evaluation is rather less present and could be addressed more strongly.

3. RIS 3 and Cluster policy

3.1. *Strengths*

- Integrated implementation across different economic, industry and innovation related departments within managing and implementation authorities;
- All partner regions have identified their RIS3 strategic areas. Cross-matching of these areas has resulted in the identification of common areas across a number of partner regions. Specifically, these areas are associated with advanced manufacturing systems and materials, energy, bio- and health sciences, ICT and food- & agriculture. These priorities moreover coincide with a number of priorities across European Union, meaning opportunities for collaboration inter and cross-border;
- The financial side of the RIS3 implementation tends to come from the state, sub-state (regional) and EU funds. This is similar to the funding resources in terms of the cluster policy, which build great basis for territorial actors to explore current or previous knowledge for the implementation of projects or further activities;
- A wide range of forms, from more public to private as well as more formal to less formal institutional structures and participation in terms of RIS3 implementation has been found;
- Clusters and their formal/ informal facilitating structures such as cluster associations (or collaborative networks) build one of the important institution pillars in the RIS3 design and current implementation, and is also recommended to be continued in evaluation & monitoring. The cluster association's role via activities in participation, coordination, proposing initiatives, giving expert/strategic advice, evaluation & monitoring and bridging as well as streaming up/down knowledge between public and private territorial stakeholders in the RIS3 has also been confirmed by almost all partner regions.

3.2. *Weaknesses*

- There are certain risks with very general prioritization of strategic RIS3 priorities, namely that this generalization could be maintained until the project level and therefore may not lead to the development of a territory specific research and innovation base;
- A number of regions show quite low diversification of resource origin for RIS3. Low diversification from one side could make the institutions in partner regions very competent in acquiring certain funding, but at the same time also dependent and reduce entrepreneurial discovery process or innovativeness/ rigor of the application idea.
- The analysis of RIS3 implementation tends to show stronger public (balanced between formal & informal) driven implementation of the RIS3. This may also have to do with so far a more top down character of RIS3.
- In RIS3, as in cluster policies, finance institutions seem to either not be considered or are not aware of their space for contribution. This should not be the case. Financial institutions,

especially international ones can contribute to the process of RIS3 design from multiple sides: guidance and broad experience on the global market trends, trends in the areas of future investment funding and/ or access to data for better mapping of local strengths, etc.

4. Areas of action/ opportunities

Concluding from the above findings a number of recommendations have been identified and are listed below. These recommendations are summarised below in line with the six CLUSTERS3 project topics defining the process of bridging / leveraging clusters and cluster policies for successful implementation of RIS3.

Design and deployment of cluster policy

Cluster diagnosis / re-mapping

Cluster (as well as cluster association) mapping could serve as a good basis to understand the representativeness of cluster associations (or collaborative networks) with the natural structural conditions of the territory. In this way, periodic renewal of cluster mapping exercises may support policy makers in identifying new hidden or emerging territorial trends and strengths, as well as cluster organisations in reflecting their scope and scale.

Reinforcing industrial strengths

Combining an updated review of regional cluster structures alongside scanning global business trends with a view to potential linkages and opportunities with Key Enabling Technologies (KETs) could support identifying and strengthening new industrial niches. This exploration could give some initial ideas of the industrial transformative process and enable a favourable policy agenda.

Cluster concept definition

The vision of the main cluster policy components can determine the form of clusters (and cluster associations) prioritization, as well as their potential resource pool. Therefore it is important to build a clear vision within the territory of what a cluster (and a cluster association) is. This definition should form the basis for associated policy instruments, and the starting point for a strategy of communication to institutions in the territory, assuring a coherent vision.

Implement the policy through specific support instruments and programmes

Task-based policy learning

There is large scope for exploring opportunities and learnings from the variety of instruments and organizational forms applied across partner regions for their cluster policies and RIS3 implementation, specifically via developing joint tasks (e.g. joint external/internal projects, market/business analysis, study/stakeholder visits) between cluster associations and also including cluster policy related departments at the managing and implementation authorities.

Openness to cluster policy and programme formulation

Some of the advantages in having a specific cluster programme are in having a better overview and tracking of sector/cluster development and performance, ease of monitoring and evaluating progress, ease of reaching a bigger number of institutions from specific sectors, etc. At the same time, such programme-based support can leave out the other programmes and funding resources available. In this context, having a cluster policy programme can build a baseline for cluster supporting activities, but policy makers should be open to constant exploration of synergies with other programmes and instruments (for their potential inclusion for cluster promotion).

Synergies and new sources in funding

There is scope to explore the synergies in funding resources and experiences between clusters/cluster policies and RIS3, especially in areas of EU and regional funding, seeking to balance between different funding sources. This explorative journey could stimulate both rigor and networking/collaboration/learning with new kinds of institutions. Examples of new funding resources could be local/international/European financial institutions via loans or microcredits (extension of very small loans) under specific conditions.

Development of cluster policy and alignment with RIS3

Open platforms and spaces

Following developments in KETs, where innovation bridges different technologies, skills, clusters and actors should be a central component of the alignment strategy between cluster policies and RIS3. This requires creating appropriate spaces for open exploration and facilitation of these linkages; for example, Cambridge Network is a well-known example of an open innovation platform.

Local actor, especially business, engagement

As the mapping of RIS3 implementation in partner regions showed stronger public (balanced between formal & informal) driven implementation of the RIS3, a general recommendation is to strengthen research and, especially, business engagement. In addition, opportunities to attract participation of finance institutions in RIS3 and cluster policy implementation are suggested.

Joint forms of governance

Most of the new technologies, innovation and business opportunities are being born in the intersection of scientific disciplines and industrial sectors, and without specific territorial restrictions. For example, - clusters in the area of transport and mobility; where transportation of goods and services relates to (as well as goes beyond) such industries as automotive, energy & electricity and ICT. Or a RIS3 strategic priority such as a clear and sustainable (or smart) energy; where the definition of industries to be included can vary from services and products related to energy production, consumption, storage and the energy types, etc. In similar line, the strategic areas that include a wide range of industries, from automotive, chemicals, mechatronics, etc. into advanced and/ or innovative manufacturing also produce rich grounds for developing new products and technology opportunities..

As such, public support for these processes isn't possible through the isolated engagement of one or two specific departments at provincial or municipal levels. A key recommendation, therefore, is to explore more areas of cluster policy contribution to RIS3, via such approaches as multi-level governance and integrated policy mixes. The two concepts call policy-makers to think about cluster and RIS3 domain development in the broader terms.

Monitoring and evaluation of cluster performance and cluster programmes

Harmonized and centralized monitoring and evaluation

Due to the wide variety in different evaluation instruments and techniques, it could be recommended to harmonize the tools and approaches for evaluation and monitoring, therefore providing better basis for comparison across territories leading to richer learning. In support of this establishing/naming one department/unit/group for monitoring and evaluation could ensure comprehensiveness and a long-term vision of information. As example can serve an established initiative of the Basque cluster policy implementing authority, which is aimed to engage cluster associations in creating and agreeing on common vision for evaluation.

Internationalization of cluster organizations

Cross-sector cluster cooperation within / between territories

Stimulate cooperation across the partner regions in the strategic RIS3 areas or cluster policy priorities, which would lead to new joint projects, experience exchange on the level of territorial stakeholders, establishing new product and innovation ideas streams, etc. Specific sector areas within these could be health and advanced manufacturing, bio-related sciences, energy, ICT technologies, food- and agro-industries as well as a number of other sectoral and cross-sector initiatives.

International cooperation in common RIS3 areas

Identified strategic RIS3 areas (associated with advanced manufacturing systems and materials, energy, bio- and health sciences, ICT and food- & agriculture) provide great opportunity for rich knowledge and policy exchange and potential collaboration across partner regions stakeholders and institutions, which should be explored during the project.

Building the capacity of cluster organizations

Cluster associations as a one of many policy tools

The importance of cluster associations (or collaborative networks) should be addressed and acknowledged, however, it should also be highlighted that this is not the only tool for the implementation of cluster policies. It is important to acknowledge that support for activities in collaboration between institutions could be either via cluster associations but also directly to groups of collaborating actors with clear objectives, innovation ideas and a strategic vision.

Survey among cluster associations and sharing good practices

A survey within the project could be developed for the cluster associations (or collaborative networks), which would cover specific topics related to their performance, management and governance. This would respond to the particularly strong interest among partner regions stakeholders in the thematic area of cluster management and capacity building. In addition, it would stimulate and strengthen already started initiatives and process of learning by benchmarking, sharing experience in the learning session and identification of good practices within/across partner regions.

Membership fees

Membership fees are a common instrument for cluster associations (especially formal cluster associations) to diversify their financial resources. However, some of the members do not realize immediate advantages from membership and therefore face certain concern in paying it. Awareness and communication of the benefits from introducing membership fees (e.g. increase the level of cluster actors participation, engagement, motivation and dedication) could be highlighted and shared across the private sector participants.

Methodology

The methodology for this SWOT Policy Learning document is based on qualitative comparative case study analysis of 7 partnering regions within the Interreg project CLUSTERS3: “Leveraging Cluster Policies for Successful Implementation of RIS3”. The partner regions are the Basque Country (Spain), Northern Ireland (United Kingdom), the Highlands & Islands (United Kingdom), Piedmont (Italy), Hajdu-Bihar (Hungary), Lubelskie (Poland) and Latvia (Graph 46). These partner regions represent well the diversity of regional context and therefore, build an excellent basis for mutual learning.

Graph 46 Clusters3 partner regions



The essential component in conducting the comparative case study for SWOT analysis was the design of a coherent and inclusive policy learning framework, which served for collecting and processing information on clusters, cluster policies and RIS3 across all selected regions.

The methodology to design the policy learning framework incorporated a **participative approach**, meaning that the initial conceptual design of the learning framework has been discussed with the partner regions with the aim of integrating their specific experience and interests. Joining the results from a literature review and from partner regions’ feedback, a policy learning framework was developed setting a rich basis for the policy learning experience within the project.

The designed comparative policy learning framework is based on 5 levels: 1) territorial context, 2) cluster policy context, 3) cluster organizational ecosystem 4) cluster policy and organizational monitoring/ evaluation and 5) territorial RIS3 focus.

The levels are defined in the most coherent manner to reflect the characteristics of the studied partner regions in a way that will facilitate the exploration of synergies between two concepts – clusters and smart specialization – across regions.

Territorial context (1) provides deep insights into the territory-specific economic, business and institutional infrastructure. This review of territorial context is central to understanding the place-based specifics of each region as a setting for both concepts and the policies.

Cluster policy context (2) sets out information on the content, objectives, institutions and tools related to existing cluster policy. Here an important aspect a broad conceptualization of cluster concept, meaning it includes activities that are clearly formulated and defined by public institutions as a cluster policy programme, and also those that are indirectly implemented by public institutions with the aim to stimulate cooperation between the institutions of the triple helix related to specific sectors/activities. The need to address the context based aspects of these policies has been strongly addressed within academic debates (European Commission, 2013). Reviewing cluster policies, namely their programmes, funding sources and organizational structures, builds a learning basis that addresses such RIS3 challenges as integrated policy mixes and multilevel governance.

Cluster organizational ecosystem (3) sets out a review of existing cluster associations or similar non-institutional formats (collaborative networks) of cluster management that are present in the regions. This is a more operational level of learning, where the general concepts and strategies are set into implementation mode. This is where the blend of clusters policies and their instruments with smart specialization strategies addressing such challenges as sustainable stakeholder engagement can be found.

Cluster policy and organizational monitoring/evaluation (4) looks into the methods and modes of data collection and processing that form the basis for making a self-reflection. Herewith via identified gaps the policy and cluster management can be adjusted in order to ensure learning and improved operationalization of policy instruments across partner regions. This level has been recognized as one of the most acute ones across all regions.

Territorial RIS3 (5) part, specifically targets information on the design and implementation of RIS3 and the relationship with cluster policy and its instruments. Questioning the role and integration of clusters makes the regions rethink their blend of both aspects, stimulating them to see the potential overlaps, complementarities and opportunities. Seeing links between RIS3 domains and existing cluster structures supports two core principles in the implementation of the smart specialization; the evolving nature of prioritization; and granularity for identifying the right level for sectoral prioritization.

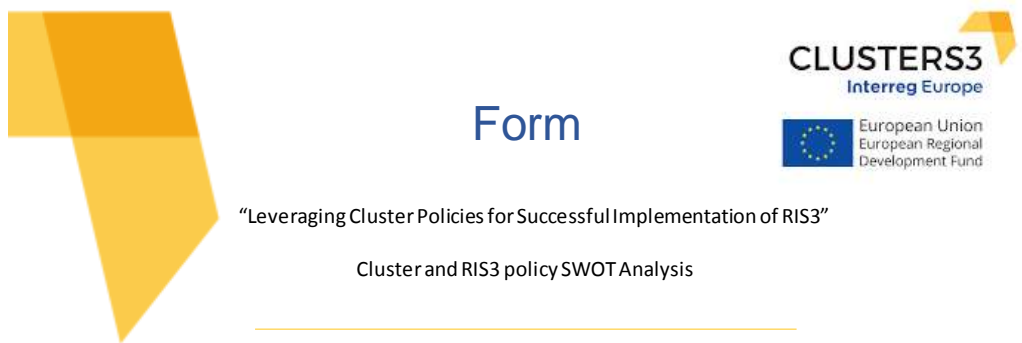
Finally, this comparative policy learning framework dovetails neatly with the **6 project thematic priorities** set at the outset of the project: (1) design and deployment of cluster policy, (2) implement the policy through specific support instruments and programmes, (3) development of cluster policy and alignment with RIS3, (4) monitoring and evaluation of cluster performance and cluster programmes, (5) internationalization of cluster organizations and (6) building the capacity of cluster organization

Table 8 Policy Learning Framework

Policy Learning Framework and Document Structure			
Discourse part: Review of the partner regions and their cluster policy in the framework of smart specialization strategies			
Level 1: Territorial context	Level 2: Cluster policy context	Level 3: Cluster organisational ecosystem	Level 4: Cluster policy and associations (or collaborative networks) monitoring/ evaluation
<ol style="list-style-type: none"> 1. Economic information related to the region 2. Policy authority (institutions and departments) 3. Business and institutional structure in partner regions 4. Clusters (natural agglomerations of related activities) 	<ol style="list-style-type: none"> 1. Cluster policy background: definition, rational 2. Cluster policy programme: <ul style="list-style-type: none"> • Background definition • Overall content and objectives • Target sectors and criteria for selection of cluster associations (if applicable) • Source and scope of funding • Main activities 3. Main actors and institutions 	<p>Cluster associations (or collaborative network) operationalization/management (based on examples of three selected cluster associations in each region)</p> <ol style="list-style-type: none"> 1. Background information 2. Organizational and financial structure (number of members, budget) 3. Organizational governance (assembly, board) 4. Management 5. Services and tasks (vertical and horizontal) 	<p>Cluster policy and association(s) monitoring and evaluation</p> <ol style="list-style-type: none"> 1. Managing institution/actors/characteristics 2. Methodology and its advantages 3. Format for collecting information 4. Format of results/data sharing 5. Main challenges
Level 5: Territorial RIS3			
Part 1 RIS 3 Design		Part 2 Blending clusters for successful RIS3 implementation	
<ol style="list-style-type: none"> 1. RIS3 design process (main stakeholders involved; sources of funding) 2. Main RIS3 priorities (domains, sectors, clusters) 		<ol style="list-style-type: none"> 1. Cluster organisations' role in RIS3 design and implementation 2. Cluster development and "dynamic evolution" of industries/sectors in RIS3 3. Future of RIS3 processes and incorporation of clusters 	
Overall SWOT of cluster policy within RIS3 context			
Reflection part: Learnings from comparison and summary of partner regions knowledge/experience towards strengthening cluster policies within RIS3 strategies			
2.1. Learning from partner region cluster policy practices			
<ol style="list-style-type: none"> 1. Cluster policy 2. Cluster organization ecosystem 3. RIS3 & Clusters 			

Annexes

Graph 47 Survey form for SWOT analysis



Outline

Introduction	Background
Part I	Territorial Context
Part II	Cluster and RIS3 policy 1 - Cluster Associations (or Collaborative Network) policy 2 - Cluster Associations (or Collaborative Network) operationalization/ manager 3 - Cluster policy (association) monitoring and evaluation 4 - RIS3 strategy
Part III	Conclusions

Background

Note: Provide information related to your profile

Partner region and member state: In this and further documents the term 'partner region' is used to refer to the unit of operation of the project partner, which refers both to national or sub-national coverage. The term 'member state' is used in order to reflect highest level of a country's administrative system. It could coincide with the level defined as region in the case where the partner region has the highest coverage in the country.

Category	Description
Partner region	
Member state	
Respondent name	
Institution	
Department	
Responsibilities	
Telephone	
Email	

Part I Territorial context

Note: For all information related to the partner region/member state, indicators refer to the EU database: Eurostat (<http://ec.europa.eu/eurostat/web/main/home>). In case the information is not available, member state statistical offices could be used to collect the data. The reference should be indicated if other than the Eurostat source is used.

1. Policy authority

Responsibility	Managing authority (name)	Budget (2015)	Implementing agency (name)	Budget (2015)	Comments (if any)
Clusters					
<i>Economic dev.</i>					
<i>Industry</i>					
<i>Trade</i>					
<i>Innovation</i>					
<i>Employment</i>					
<i>Infrastructure</i>					
<i>Other related to cluster</i>					

2. Economic information related to partner regions

Indicators	Partner region	Member state	Year	Comments (if any)
GDP per capita			2015	
			2014	
			2010	
GDP growth			2015	
			2014	
			2010	
Unemployment rate			2015	
			2010	
Population			2015	
Geographic area			2015	
Economic activity (share of GDP, as per NACE Rev 2)				
Agriculture, forestry and fishing (A)			2015	
			2010	
Industry (B-C)			2015	
			2010	
<i>High technology manufacturing (C_HTC)</i>			2015	
			2010	
<i>Medium High technology manufacturing (C_HTC_M)</i>			2015	
			2010	
<i>Low technology manufacturing (C_LTC)</i>			2015	
			2010	
<i>Medium Low technology manufacturing (C_LTC_M)</i>			2015	
			2010	
Electricity, Water supply, Construction, Wholesale (D-G)			2015	
			2010	
Other services (TI-U)			2015	
			2010	
<i>Knowledge intensive activities (KIA)</i>			2015	
			2010	
<i>Information and communication technology (ICT)</i>			2015	
			2010	
<i>ICT Manufacturing (C ICT)</i>			2015	
			2010	

3. Business and institutional structure in partner regions (or member state)

Companies in respective category	size of company (enterprise) as per no. of employees	no. of companies	year	Name some leading companies	Comments (if any)
Micro companies	<10		2015		
Medium	10 - 250		2015		
Big companies	>250		2015		

Main science and research centers related to cluster development	Name	Main focus	Comments (if any)
1			
2			
3			

4. Clusters (natural industrial agglomerations)

Question	Extended answer
How do you define a cluster?	
Have you done a statistical cluster mapping exercise?	NO
<i>If yes, explain how you did the mapping exercise (the data/methodology used)?</i>	
<i>If yes, which clusters were identified in the statistical mapping?</i>	
<i>If no, explain how do you identify/decide which clusters to support/develop?</i>	

Part II Cluster and RIS3 Policy

1 - Cluster (or collaborative network) policy

Note: We use the term 'cluster policy' in a broad sense, including any policy/programme supporting collaboration across companies and other sector/activity-specific institutions (such as research centers, university departments, etc.) through instruments such as Cluster Associations or Collaborative Networks (or similar forms of collaboration among businesses in a cluster context).

1. Cluster (or Collaborative Network) policy

Question	Extended answer	
Do you have a dedicated cluster policy programme?	NO	
Do you have any policy/programme supporting the cooperation/networking across companies and sector specific institutions?	YES	
Describe/comment in brief the main characteristics of the programmes in support of collaboration/networking between companies and related institutions?		
If you don't have any policy/programme supporting cooperation/networking across companies, how (by what means) do you stimulate cooperation across public and private institutions (businesses, science and research centers, development agencies, etc.) in your territory?		
Describe/comment in brief the main characteristics of your dedicated cluster policy programme		
What was/is the rationale for cluster policy initiation or interest to initiate?		
	Year	Extended answer
Year of first cluster policy activity		

2. Cluster Programme

Question	Answer	Comments (if any)
What are the selected sectors/areas of the cluster programme?		
List existing cluster associations (collaborative networks) and their sector orientation		
Indicate criteria for the choice to support the above cluster associations (collaborative networks)? <i>(remove inapplicable)</i>	<ul style="list-style-type: none"> * interest from private side * interest from public side * interest from both the public and private side * existence of industrial agglomeration in specific sector * other (explain) 	
What are the source(s) of programme funding? <i>(remove inapplicable; and indicate the appx. share of the selected source of funding)</i>	<ul style="list-style-type: none"> * municipal funding * provincial funding * regional funding * state funding * EU funding * NGO funding * other (explain) 	

<p>What are the main objectives of the cluster policy? <i>(remove inapplicable)</i></p>	<ul style="list-style-type: none"> <i>* promote/ strengthen/ develop private sector</i> <i>* attract new institutions from the private sector</i> <i>* identify & develop territorial strengths and opportunities</i> <i>* drive innovation in/ across companies and other public/ private institutions</i> <i>*strengthen technological development in/ across companies and other public/ private institutions</i> <i>*promote internationalization of the private sector</i> <i>* other (explain)</i> 	
<p>What are the main instruments/activities of the cluster policy? <i>(remove inapplicable)</i></p>	<ul style="list-style-type: none"> <i>* establish institutions in support of clusters</i> <i>* provide financial support to the institutions in support of clusters</i> <i>* provide financial support to the projects developed in cooperation by members of cluster institutions</i> <i>* provide financial support to the action plans of cluster associations</i> <i>* provide financial activities of the cluster/ companies activities</i> <i>* other (explain)</i> 	

3. Main actors/institutions

Name	Contribution of each institution	Comments (if any)
Government		
Development agency		
<i>Cluster Association (if so)</i>		
Research institutions		
Universities		
Companies		
Banks		
Other (if applicable)		

Part II Cluster and RIS3 Policy

2 - Cluster associations (or collaborative network) operationalization/management

Note: Provide information based on 3 best examples from established Clusters Associations, when applicable, or collaborative networks (or similar forms of collaboration among businesses in a cluster context).

Cluster Association (or Collaborative Network)	Cluster 1	Cluster 2	Cluster 3
--	-----------	-----------	-----------

1. Background Information

Name			
Webpage Link			
Sector	<i>as per NACE Rev. 2</i>	<i>as per NACE Rev. 2</i>	<i>as per NACE Rev. 2</i>
Year of establishment			

2. Organizational and financial structure

Number of affiliate members (total)		2015
		2014
		2013
		2010

Typology of affiliate members (share of total number, 2015)		<i>research centers and universities</i>
		<i>public institutions</i>
		<i>other (if applicable)</i>

Number of employees		2015
		2014
		2013
		2010

Budget (total)		2015
		2014
		2013
		2010

Composition of budget		public (total)
		<i>public_municipal</i>
		<i>public_regional</i>
		<i>public_national</i>
		<i>public_EU</i>
		private
		<i>comments (if any)</i>

Membership fee	NO	NO	NO	
				<i>*amount</i>
				<i>*comments (if any)</i>

3. Management structure				
Does the Cluster Association have an established management structure?	NO	YES	YES	
General Assembly	NO	YES	NO	
				*no.of meetings per year
				*describe other issues
Board of Management	NO	YES	NO	
				*list character and number of public and private institutions (companies, research centers, etc.), which form part of it
				*period in charge
				*no.of meetings per year
				*describe other issues
Advisory Board	NO	YES	NO	
				*list character and number of public and private institutions (companies, research centers, etc.), which form part of it
				*period in charge
				*no.of meetings per year
				*describe other issues
Characteristics of the current leading Manager				gender
				age
				professional experience
				years in the current position
				years of experience as a cluster manager
Other forms of organizational structure				

4. Services and Tasks			
The services offered (remove inapplicable)	* information (sharing) * strategy * collaboration * projects * technology * other (explain)	* information (sharing) * strategy * collaboration * projects * technology * other (explain)	* information (sharing) * strategy * collaboration * projects * technology * other (explain)
* if other indicate			
Thematic focus of services offered (remove inapplicable)	* internationalization * technological progress * non-technological innovation * people * other (explain)	* internationalization * technological progress * non-technological innovation * people * other (explain)	* internationalization * technological progress * non-technological innovation * people * other (explain)
* if other indicate			

Part II Cluster and RIS3 Policy

3 - Cluster policy (association) monitoring and evaluation

Note: We use the term 'cluster policy' in a broad sense, including any policy/programme supporting collaboration across companies and other sector/activity-specific institutions (such as research centers, university departments, etc.) through instruments such as Cluster Associations or Collaborative Networks (or similar forms of collaboration among businesses in a cluster context).

	Cluster Policy	Cluster Associations
Do you have systematic process for monitoring/evaluation?	YES	NO
Who does the monitoring/ evaluation?		
<i>internally</i>		
<i>externally</i>		
Main characteristics		
<i>internally</i>		
<i>externally</i>		
Methodology/main indicators applied to monitor & evaluate (if applicable)		
What is the format of collecting information for the evaluation? <i>(remove inapplicable)</i>	<ul style="list-style-type: none"> * survey * questionnaire * personally via interview * informal * other (explain) 	<ul style="list-style-type: none"> * survey * questionnaire * personally via interview * informal * other (explain)
Do you conduct an ex-ante evaluation?	YES	NO
Do you conduct ex-post evaluation?	NO	YES
What is the main advantage/benefit of your methodology?		
How do you share and/or apply the data collected and information processed?		
What is the main challenge you are facing in monitoring/evaluating ?		
Other comments		

Part II Cluster and RIS3 Policy

4 - Regional Smart Specialization (RIS3) strategy

1. RIS3 Design Process

Category	Answer	Comments (if any)
Participating institutions <i>(remove inapplicable)</i>	<ul style="list-style-type: none"> * research institutions * universities * clusters * companies * SMEs * NGOs * financial institutions * other (explain) 	
Sources of funding <i>(remove inapplicable)</i>	<ul style="list-style-type: none"> * municipal funding * provincial funding * regional funding * state funding * EU funding * NGO funding * other (explain) 	

2. Main RIS3 priorities

Category	Answer
Domains	
Sectors	<i>as per NACE Rev. 2</i>
Clusters	

3. Cluster Organisations' Role in RIS3 Design and Implementation in the Territory

	RIS3 priority area	Cluster Association
What Cluster Associations (or Collaborative Networks) are/could be associated/integrated with the specific RIS3 specialization? (if yes, then which were)	1	
	2	
	3	
	4	
	5	
	...	
	...	
	...	
In what ways are Cluster Associations (or Collaborative Networks) contributing to RIS3 strategy? (If possible, give some concrete examples)		

4. RIS 3 Development and "Dynamic evolution" of industries/ sectors

What specific opportunities for territorial development have emerged in defining the RIS3 strategy?	
How is the "entrepreneurial discovery process" among respective actors in the territory taking place?	
Is RIS3 helping to widen technology/industry domains and incorporate cross-cutting KETs? If yes, in what ways?	
Is RIS3 helping the emergence of new clusters or cluster expansion towards emerging Industries? If yes, in what ways?	

Part III Conclusions

Note: The analysis should address the most relevant features/characteristics related to SWOT categories in relation to clusters, cluster policy and RIS3 strategy;

SWOT Analysis on Cluster Policy and RIS3	
Category	Answer
Strengths	
Weaknesses	
Opportunities	
Threats	

Table 9 Lessons from cluster experience for the six steps to S3 design

Steps to RIS3	Contribution from clustering experience
(1) Analysis of the regional context and potential for innovation	The existence of cluster policy and functioning cluster initiatives can provide a strong basis for analysis and knowledge about regional context, through for example existing diagnostic processes within clusters, cluster mapping exercises, and in-depth cluster analysis
(2) Governance: ensuring participation and ownership	Clusters themselves exhibit a long experience with ensuring participation and effective governance, and there is a significant potential to learn from and improve these governance structures and approaches in the development of RIS3
(3) Elaboration of an overall vision for the future of the region	The strategic reflection processes of existing clusters can provide lessons in constructing common vision, and the clusters themselves are important vehicles for construction and communication of a regional vision
(4) Identification of priorities	Inter-cluster approaches and collaboration among and between KET actors and clusters can play an important role in facilitating the coordination of bottom-up and top-down input into prioritization processes
(5) Definition of coherent	Cluster policies have followed a similar path, and experience shows the

policy mix, roadmaps and action plans	importance of policy flexibility and mechanisms to ensure sophisticated policy intelligence.
(6)Integration of monitoring and evaluation mechanisms	Experience with cluster policy evaluation suggests the importance of mixed methodologies and policy learning focus

Source: Aranguren & Wilson (2013)

Table 10 Synergies between clusters and smart specialization

Main elements of smart specialization	Definition	Clusters linked to smart specialization	Smarts specialization addressed by clusters
Global context	Reach competitive advantages through the specialization starting from possibilities that the actual really offer (comparative advantage)	Progressive formation of Global Value Chains	Generation of internationally competitive advantages; Interregional networking under a business model
Specialization patterns	Achieving competitive advantages prioritizing choices of specialization based on key enabling technologies	Social capital and intermediary between regional actors	Critical mass (agglomeration economies); Efficiency and effectiveness of public policies (leverage); Systematic performance
Related variety	Exploring the potential of specialized diversification from the relation between different but related activities/ technologies	Dynamics of inter-cluster collaboration	Exploration of related variety based on specific priorities; Spill-over effects and externalities

Source: (Castillo, Paton, & Barroeta, 2014)

Table 11 Cluster contribution to RIS 3 challenges

RIS 3 Challenge	Cluster contribution
Prioritization	Methods to identify these domains can benefit from quantitative and qualitative approached used by cluster selection and roadmaps defined by clusters
Integrated policy mixes	The diversity in cluster policies implies diversity in their potential contribution to RIS3 policy mixes.
Smart, evidence-based policy making	Lessons from cluster evaluation can be used to fine tune policy portfolios. Even if the availability of robust and impact-oriented evaluations are still limited, the newer methods at play, focusing on cluster dynamics and trends, are potential inputs for iterative RIS3, which need periodically to revise strategic choices and policy mixes to support domain selected

Multi-level governance	Cluster policy instruments rely most often on sources of funding from different origins. With respect to public funding it is crucial to achieve synergies, rather than duplications between these various sources, and to align goals pursued by various authorities. Some clusters have long term experience in achieving a good articulation.
Cross-border dimension	Reinforcing the international dimension of the clusters and the domains of RIS3 is the most pressing challenge: Europe needs clusters of worldwide excellence rather than sub-critical, inward-looking initiatives. RIS 3 also require trans-border strategies, building on complementarities.
Sustainable stakeholder engagement	RIS 3 can rely on existing platforms established in the context of clusters and cluster policies, and on regional champions associated to the clusters to stimulate bottom-up processes.

Source: (European Commission, 2013)

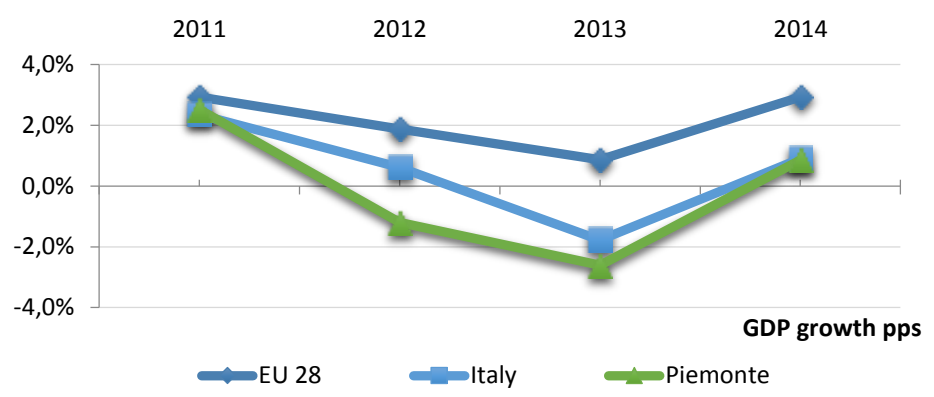
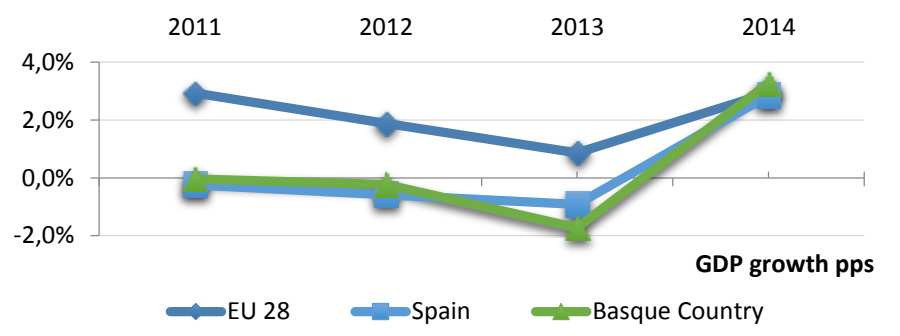
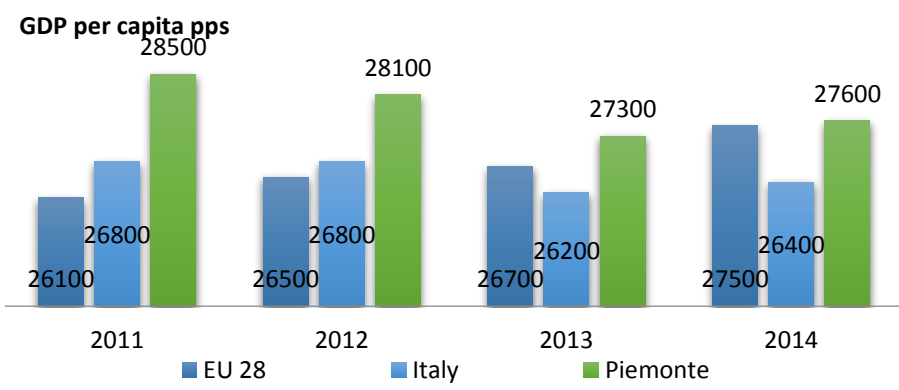
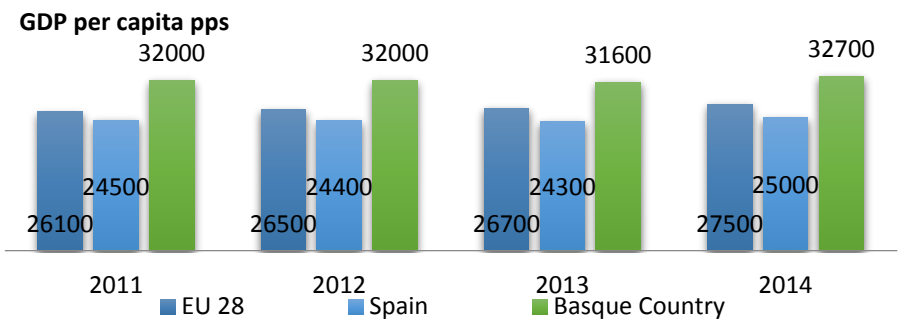
Table 12 Evaluation methods (in brief)

- **Reporting methods**, which are the least challenging instrument regarding the timeframe, data requirements and complexity, should be included in every evaluation. Besides making general information on the setting available to the evaluators, reporting can be used as a controlling tool.
- **The strength of case studies** lies in their intuitive understanding, flexibility and in-depth view. They can show the mechanisms of cluster development in detail, but generalizing results of case studies is difficult. Answers on the question ‘did the programme work?’ may be ambiguous.
- **Econometric methods** can quantitatively test the effects of cluster policy (mainly on single actors within the cluster), which increases the credibility of the results. Requirements regarding data and methodological capabilities are high, and often significant and positive results will be found only several years after the policy programme. The evaluation does not take into account soft facts and details.
- **Systemic approaches** in particular take the cluster idea into account, instead of focusing on single members of the cluster. I/O-analysis and network analysis provide quantitative results on cluster performance, but data requirements are high. In contrast, benchmarking can be used to analyse best practices and critical aspects in cluster policy.
- **Cost-related approaches**, finally, should be included in each evaluation to give an answer on the efficiency question: ‘was it worth it?’ But in particular due to data restrictions, reliable cost-related evaluations are difficult. They can be based on the above-named quantitative methods, and should ideally be combined with one of the qualitative methods to enable learning.

Source: (Schmiedeberg, 2010), detailed version p. 405-406

Graph 48 Evolution/ trends in GDP per capita pps and GDP growth pps per partner region, 2011-2014

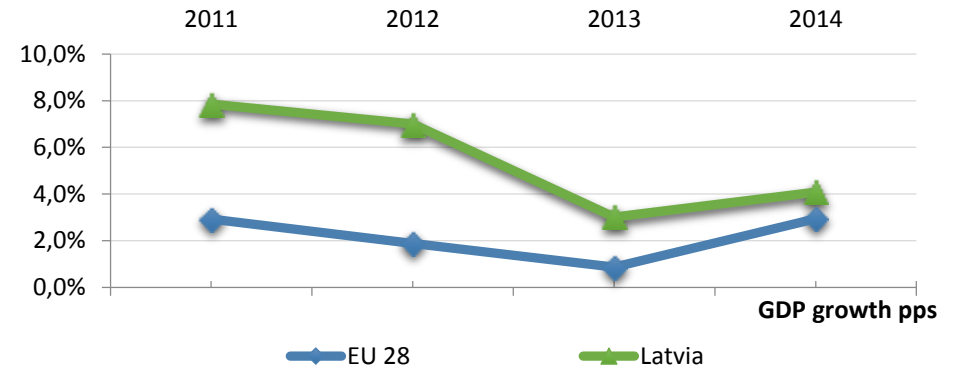
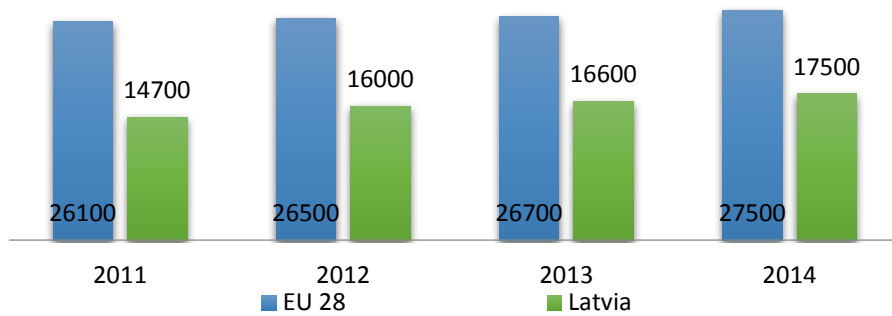
Basque country (top level) and Piedmont (bottom level);



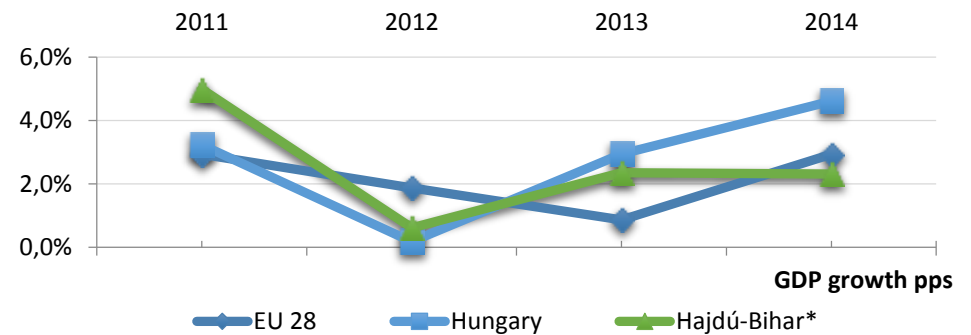
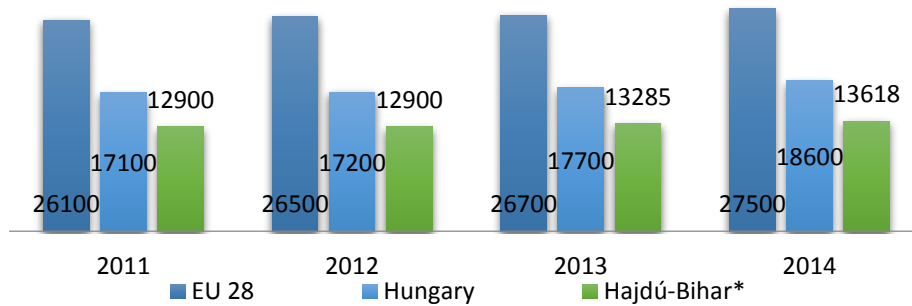
Note: Gross domestic product (GDP) at current market prices in million purchasing power standard (PPS)

Latvia (top level) and Hajdú-Bihar (bottom level);

GDP per capita pps

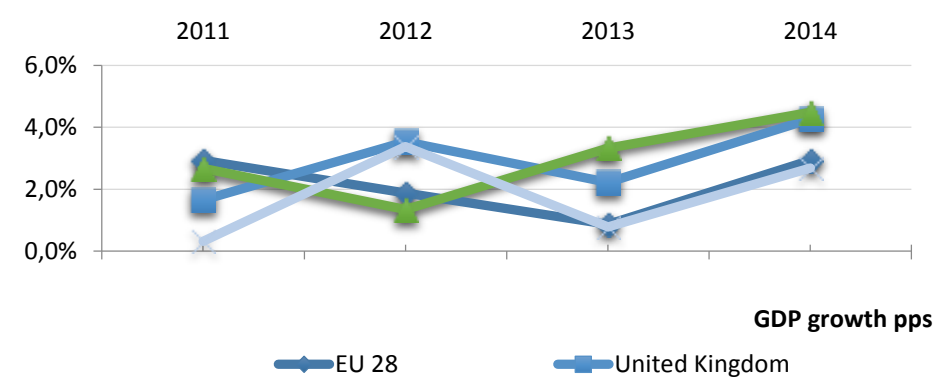
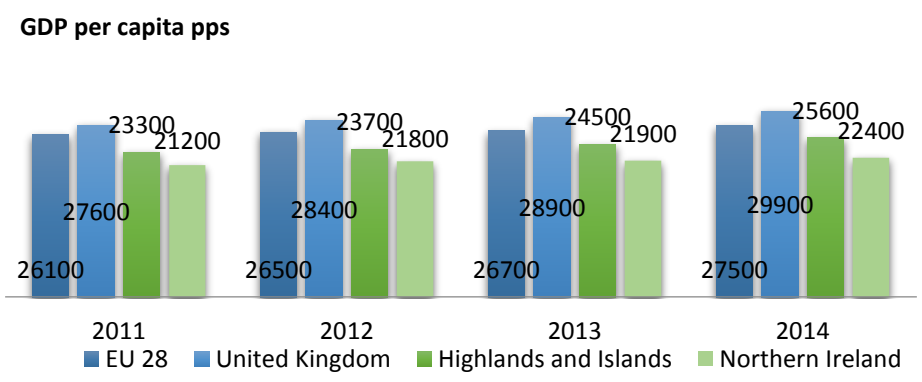
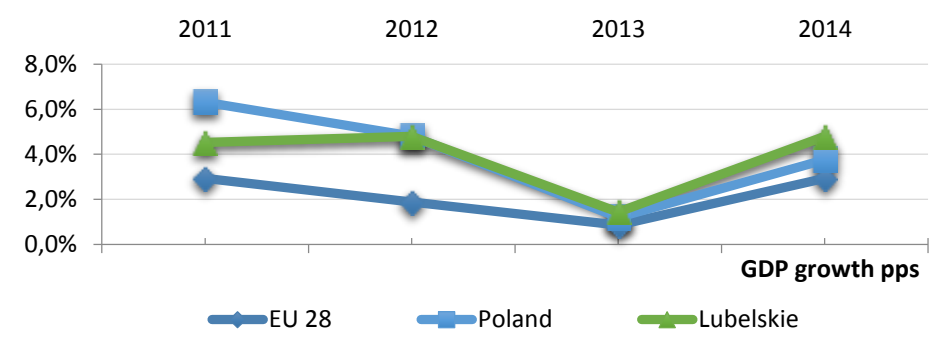
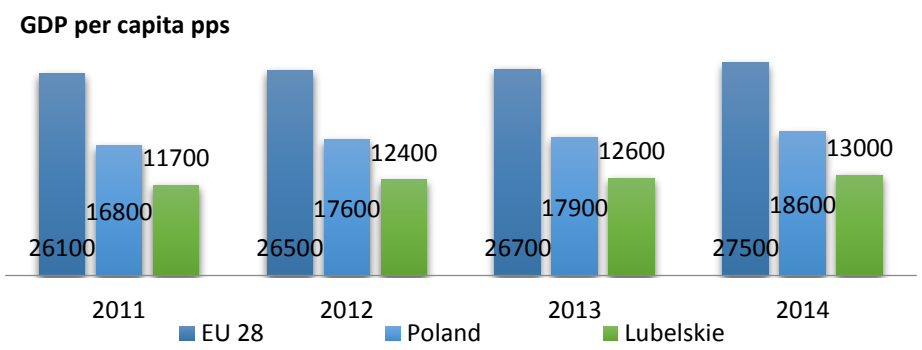


GDP per capita pps



Note: Gross domestic product (GDP) at current market prices in million purchasing power standard (PPS)

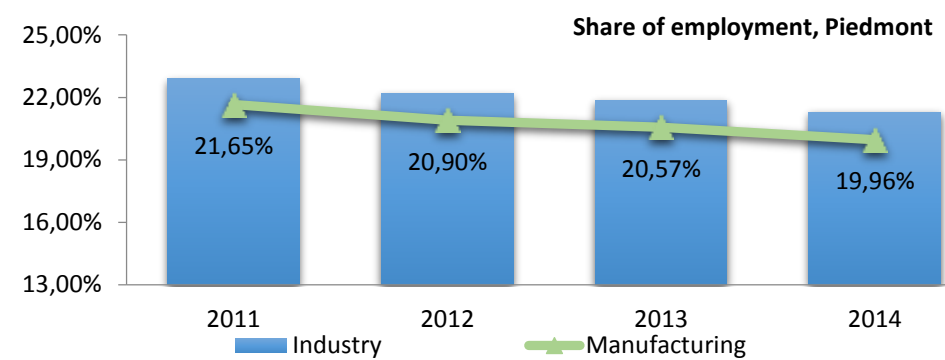
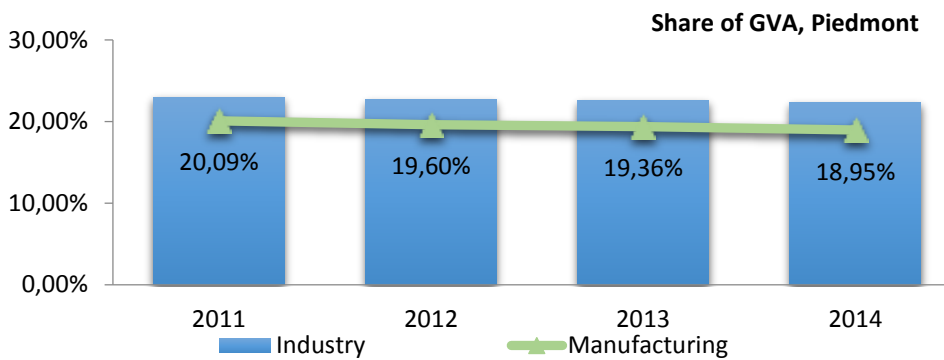
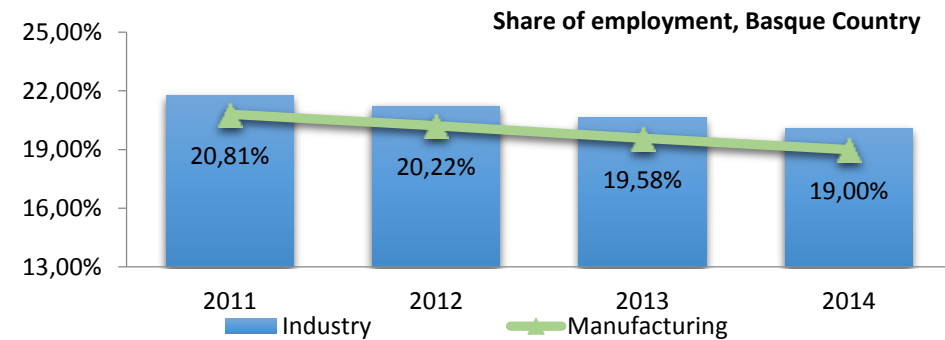
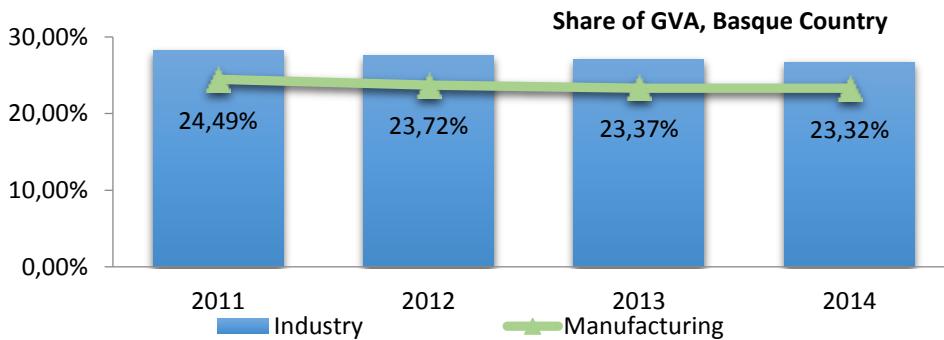
Lubelskie (top level) and the Highlands & Island and Northern Ireland (bottom level)



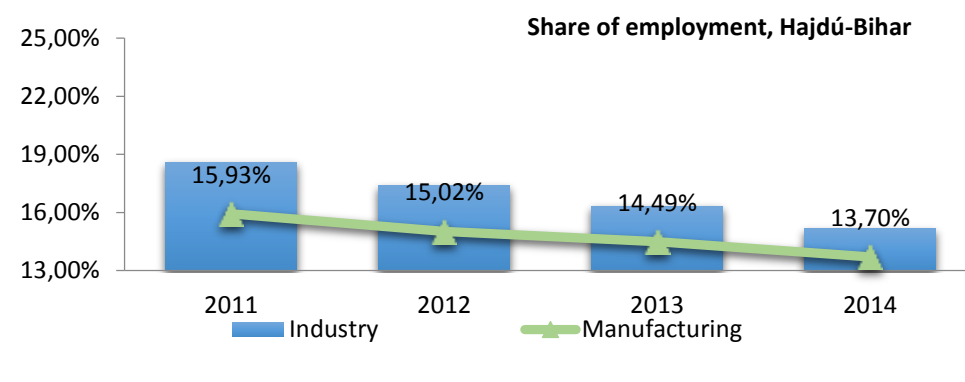
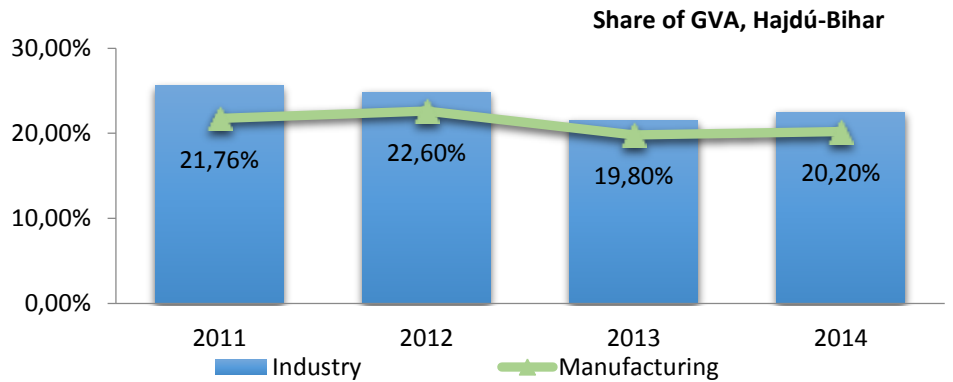
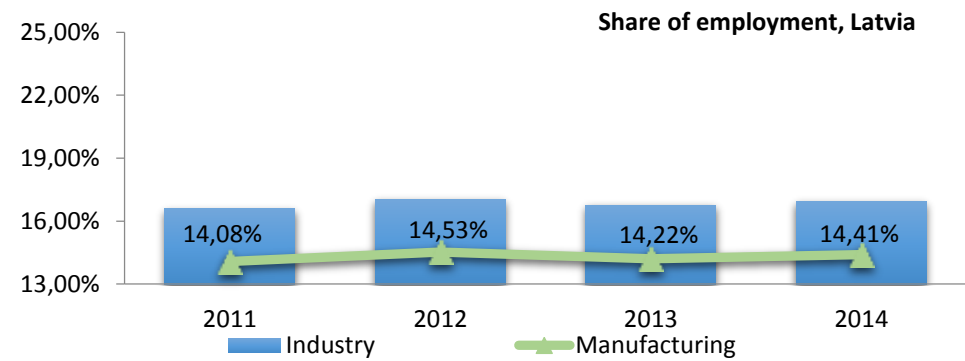
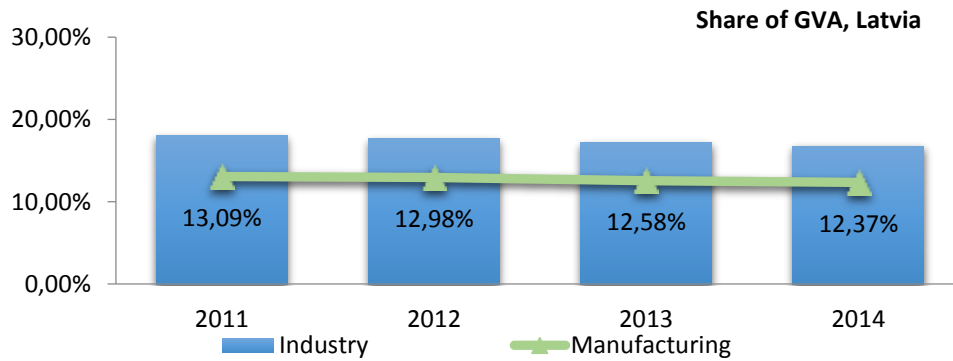
Note: Gross domestic product (GDP) at current market prices in million purchasing power standard (PPS)

Graph 49 Share of GVA and employment in industry and manufacturing per partner region, 2011-2014

Basque country (top level) and Piedmont (bottom level);

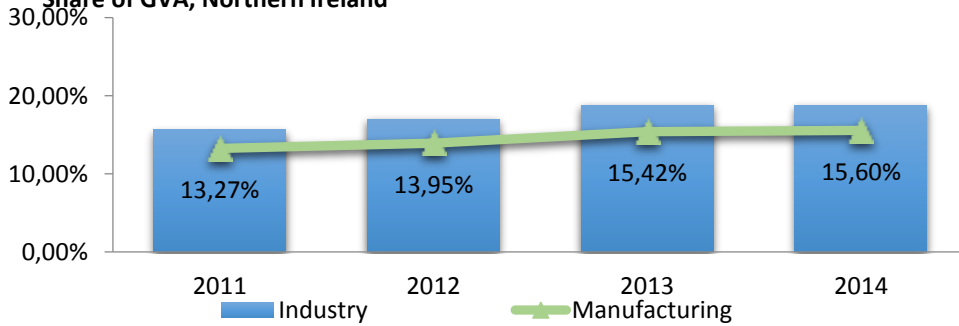


Latvia (top level) and Hajdú-Bihar (bottom level);

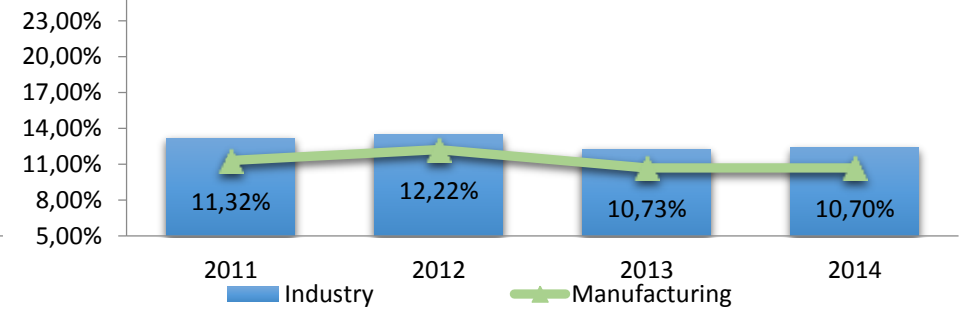


Northern Ireland (top level) and Highlands & Islands (bottom level);

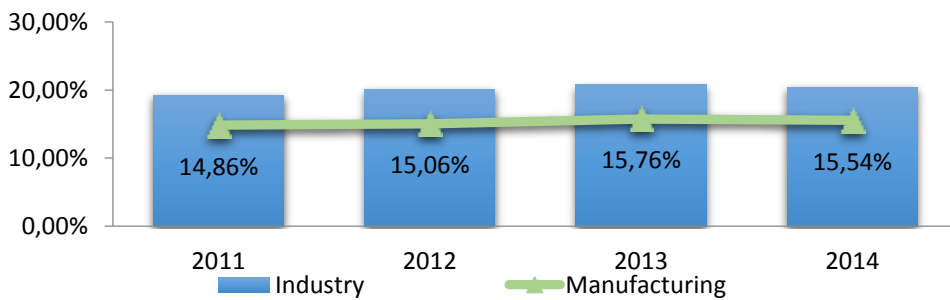
Share of GVA, Northern Ireland



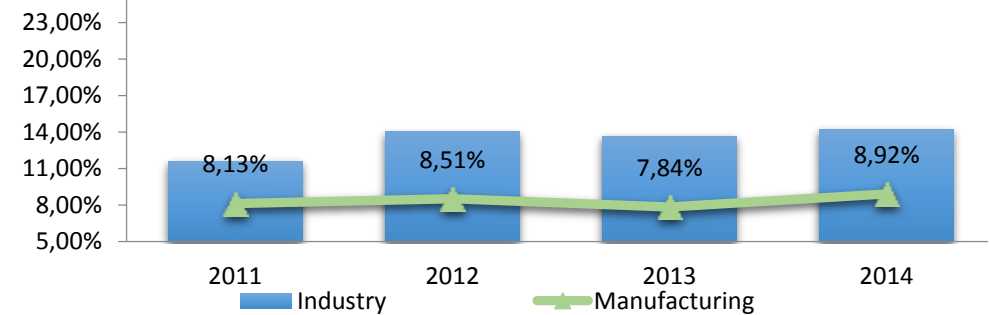
Share of employment, Northern Ireland



Share of GVA, Highlands and Islands



Share of employment, Highlands and Islands



Lubelskie

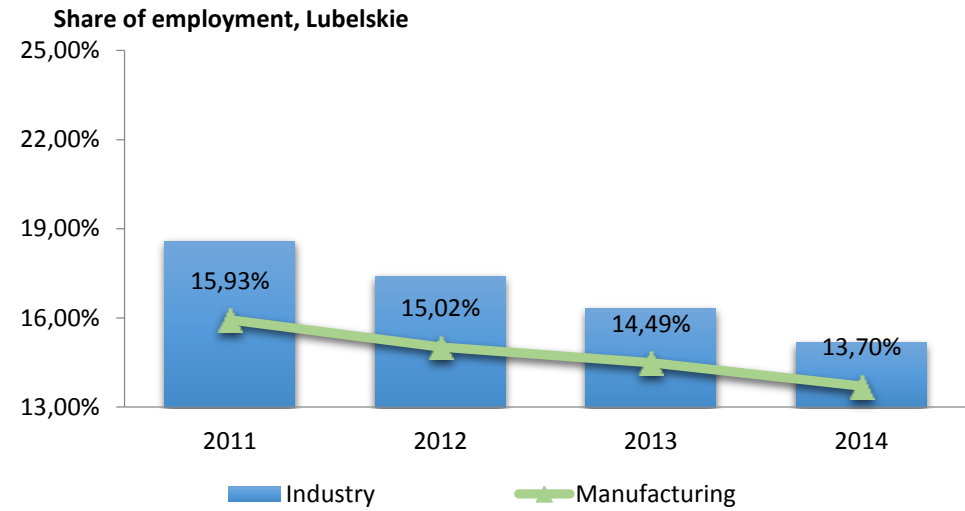
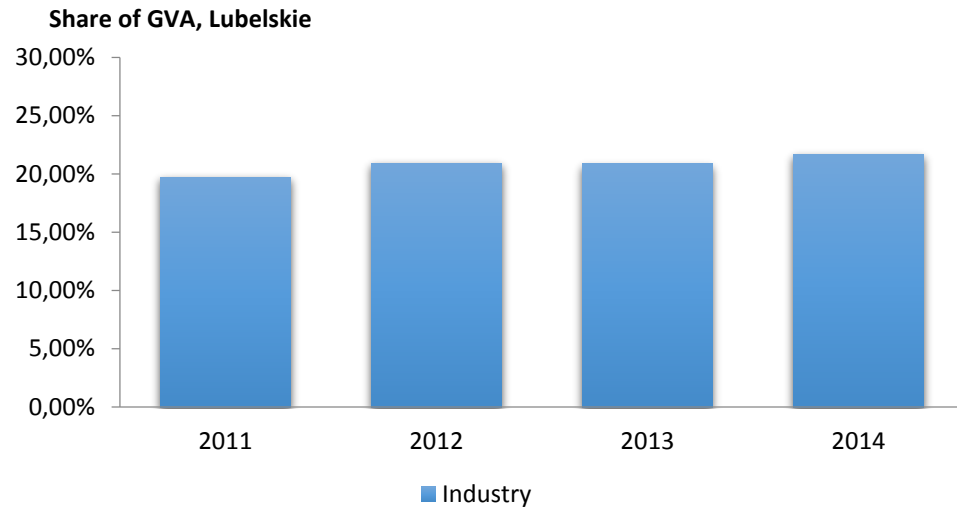


Table 13 Cluster and RIS 3 SWOT

	Strengths	Weaknesses	Opportunities	Threats
BC	<ul style="list-style-type: none"> continuity of cluster policy; political consensus and willingness to review and reformulate the policy in order to adapt it to the new scenario and challenges; strong and broad participation in definition and execution of RIS3; 	<ul style="list-style-type: none"> evaluation is in a process to be more systematic; coordination with other policies or other programmes within competitiveness policy; 	<ul style="list-style-type: none"> promotion and development of cross-sector initiatives, Technological Hybridization and Related Diversification integration of Clusters concept within a coherent Policy Mix; addressing systematically the dynamic evolution of clusters' borders and scope of cluster associations; carrying out identification of emerging clusters; setting up monitoring and evaluation in a systematic, learning and improvement oriented way 	<ul style="list-style-type: none"> path-development dependency and stagnation of certain cluster associations within their traditional sectoral boundaries; discontinuity of policy and/or eventually, lack of political commitment, in the long term;
HI	<ul style="list-style-type: none"> contentment with sectors; existing platform for launching clusters; good relationship between local businesses and dev.agency 	<ul style="list-style-type: none"> HIE area businesses are widely dispersed; Businesses are on different levels of collaboration; not all parts of value chains are present in the region, setting the need for broader collaboration; small number of businesses in the area 	<ul style="list-style-type: none"> targeting clusters abroad to increase sales; value chains - Perception of HIE and Scottish products as high quality, and goods gaining added value through Scottish heritage; looking for opportunities in virtual clusters and in areas such as Blue economy/Marine Bioscience, Adventure tourism, Renewable energy, Digital Health 	<ul style="list-style-type: none"> competition from other countries/the rest of the UK ; potential lack of co-operation between businesses; retaining value in the region by joining clusters elsewhere/collaborate nationally/internationally;
NI	<ul style="list-style-type: none"> existence of cluster in high-value sectors in MATRIX identified strategic markets; good universities and research base; global location and world class digital infrastructure 	<ul style="list-style-type: none"> access to finance; attitude to risk/collaboration/innovation; public-sector dominated economy 	<ul style="list-style-type: none"> provide more access to finance; increase FDI in regionally significant areas to create critical mass; build on world class digital infrastructure; provide more leadership 	<ul style="list-style-type: none"> budget cuts in UK expenditure; political and EU related uncertainty; increased competition from innovation and R&D focused regions; continuing 'brain drain' from the region
PD	<ul style="list-style-type: none"> in line with the priorities of RIS3; capability to strengthen enterprises participation; capability in developing R&D planning feasibility and investments 	<ul style="list-style-type: none"> restricted representativeness of members compared to the regional productive system; mainly territorial focused; 	<ul style="list-style-type: none"> more focusing on tech transfer and cooperation between enterprises and research centres; more cooperation among clusters and cross-clusters activities; more capability in providing services and representing the reference productive system 	<ul style="list-style-type: none"> risk of being seen as simple manager of funding; risk of restricting cluster activity to the interests of certain active associated members; risk of excessive self-reference

Strengths	Weaknesses	Opportunities	Threats
<p>LB</p> <ul style="list-style-type: none"> • significant number of cluster initiatives in ris 3 areas and considerable number of companies around which cooperation network might be established; • open public administration bodies to provide new solutions and innovation policy instruments; • high potential of the region's stakeholders in the sectors of regional smart specializations; 	<ul style="list-style-type: none"> • low level of social capital (trust and cooperation between different entities operating in the innovation system, including between science and economy, which might diminish expected results of RIS3 implementation); • majority of cluster initiatives are low-budgeted and meet basic barriers in their development (organizational, financial, other) 	<ul style="list-style-type: none"> • demands to incorporate the region into the network of scientific cooperation, both between other networks as well as leading centres in the country and abroad; • increasing opportunities and demand of clusters and collaborative networks to be incorporated into international networks/clusters/partnership 	<ul style="list-style-type: none"> • ambiguous and inconsistent legal system related to financing the science sector and cooperation between science and economy;
<p>HB</p> <ul style="list-style-type: none"> • ambition of business actors for co-operation; • business infrastructure: office houses, industry parks, favourable transport links; • wide range of business services; • potential for cross-border co-operations; • existing long-term co-operations; • enhanced cluster management experiences; • existing accredited clusters in different sectors, creating potential for sectoral synergies and cross-clustering; • strong knowledge base and significant innovation potential, potential in key enabling technologies; • strong intention to apply for calls (national and EU funds) 	<ul style="list-style-type: none"> • lack of dedicated cluster policy/strategy • lack of clear, well defined business environment • lack of cluster related experience and high rate of clusters without real co-operation (clustering only for subsidies) • recognition of clusters is controversial • Hajdú-Bihar County: located in less developed region • high rate of SMEs lacking capital • wrong understanding of clustering and misunderstanding of innovation • not appropriate composition of cluster membership • significant lack of trust among partners • lack of mutual vision and goals • low level inner cohesion within clusters • low activity of cluster members • lack of appropriate marketing and branding 	<ul style="list-style-type: none"> • prioritizing clusters, defining and getting the mutual understanding of cluster strategy, objectives by all cluster members; • new cluster funding scheme utilising the findings of former periods and supporting schemes (focus on effective co-operations instead of funding start-up clusters); • attracting new large international companies/new companies with high innovation and growth potential to the region; • Enhance cluster services, e.g. better marketing research results, internationalization; co-operation with other national/cross-border clusters; more practice-oriented training; harmonizing higher education offers with business needs; new incentives for innovation, excellence and international co-operation • dedicated representation of clusters/cluster organizations in different levels of economic development and strategy formulation 	<ul style="list-style-type: none"> • decrease of economic competitiveness and insufficient business environment; • reduced supplier opportunities; • inefficient cluster funding system; • lack of engaged support, long-term strategy; • recognition of clusters and their role degraded; • lack of internationally competitive clusters; • reduced labour force; • inappropriate/inefficient use of innovation potential;

	Strengths	Weaknesses	Opportunities	Threats
LV	<ul style="list-style-type: none"> clusters are encoed in the National Development Plan of Latvia; high level of support from state; funding from structural funds; building of SMEs capacity; potential for R&D's; development in higher education institutions; high export capacity; cooperation with involved parties; stable partners and members; 	<ul style="list-style-type: none"> difficult support programmes, that require high administrative capacity and there is no clear policy implementation system; not all activities are supportable; insufficient information sharing in the public space; no information about link between clusters and RIS3; low international level; micro-project level cannot perform in international science and innovation chains; shortage of large enterprises in Latvia; Too broad scope of RIS3; Areas of clusters overlapping; Best international practice is not implemented; Low capability of cluster self-financing and the support is only for SME's; 	<ul style="list-style-type: none"> more funding for experts; Unified development of the policy strategy and implementation creating self-sufficient operating RIS 3 and cluster model; strengthen cooperation across different fields; improve communication about RIS3; enhance cluster services, e.g. make actions more precise and carry responsibility; Attract more participants and members into clusters; Evaluation of the real cluster needs; improve competence of cluster managers; strengthen specialization of clusters; targeted investment of funds; establish evaluation of results; networking of entrepreneurs, researchers, scientists, • developers of states and regional policy; 	<ul style="list-style-type: none"> excessive focus on research and not business; bureaucracy and lack of transparency; unpredictable and selective financial support with dependence on external sources of funding; Incomprehension of RIS3 and without its proper communication policy won't have real implementation; disengagement of entrepreneurs in clusters; clusters distance themselves in their own field; risk that successful SME's will be bought and cluster will fall apart; loss of competitiveness in the Baltic States.

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Abbreviations

BC	Basque Country (ES21)
DDEC	Department for Economic Development and Competitiveness
Dept.	Department
DfE	Department for the Economy
Empl.	Employment
EU	European Union
GDP	Gross Domestic Product
Geo	Geographic
GVA	Gross Value Added
HB	Hajdú-Bihar (H321)
HI	Highlands and Islands of Scotland (UKM6)
ICT	Information and communication technologies
INI	Invest in Northern Ireland
KETs	Key Enabling Technologies
LB	Lubelskie (PL43)
LIAA	Investment and Development Agency of Latvia
LV	Latvia (LV)
M	Ministry
MoE	Ministry of Economy
NCBiR	National Centre for Research and Development
NGO	non-government organizations
NI	Northern Ireland (UKN0)
p.a.	per annual
PARP	Polish Agency for Enterprise Development
PD	Piedmont
pps	Purchasing Power Standards
SPRI	Basque Business Development Agency
SWOT	Strengths, Weaknesses, Opportunities and Threats