Bi-Regional
economic perspectives

European
Commission

Innopro Global Services, S.L.
Alias, Allied to grow S.L

EU-Latin America cooperation on regional innovation strategies in the framework of regional policy

innopro
CONSULTING

aliasgroup
Founder member of: TOPSINN

PUBLISHER:
FUNDACIÓN EU-LAC 2015
Hagedornstraße 22
20149 Hamburgo, Alemania
www.eulacfoundation.org

AUTHORED BY:
Innopro Global Services S.L.
Alias, Allied to grow, S.L.

Miquel Barceló
Ismael Abel
Enric Fuster
Natalia Marrugat
Andrea Ordenes
Neus Hernández
Emma Santarremigia
Aleix Pujolar
David Sánchez

The authors would like to thank Víctor Pascual and Bernardo Rondelli, from Siris Academic S.L., for their advice and contribution in the automation of the regional matching process.

TEXT REVISION AND EDITING:
Renaud Guillonnet, Viviana Lozano, Nestor Bercovich
GRAPHIC DESIGN: Tina Köppert

DOI: http://dx.medra.org/10.12858/0915EN3

This study was financed by the European Commission, the edition and publication was financed EU-LAC Foundation. The EU-LAC Foundation is funded by its member states and the European Union.

TABLE OF CONTENTS

EU-LATIN AMERICA COOPERATION ON REGIONAL INNOVATION STRATEGIES IN THE FRAMEWORK OF REGIONAL POLICY

LIST OF MAPS AND TABLES 04

Abstract 09
Executive summary 11

1 Introduction 23
1.1 Context and objectives of the study 23
1.2 Presentation of the contents 24

2 Methodology 27

3 Regional innovation strategies in Latin America 31
3.1 Previous developments in Latin American regional innovation strategies 31
3.2 Regional innovation strategies in centralised countries 32
3.3 RIS: they make a difference 34

4 Regional Innovation Strategies in the POLOS countries 35
4.1 Current situation of RIS in the POLOS countries 35
4.2 RIS in the POLOS countries: General conclusions 47

5 New Opportunities for EU-LAC Cooperation 53
5.1 Structure of the opportunities for EU-LAC cooperation 53
5.2 Regions with RIS 56
5.3 Regions without RIS 65
5.4 Shared priorities between POLOS countries and the EU 73

6 Methodology to draft a tentative roadmap for EU-LAC cooperation in regional innovation 81
6.1 Overview 81
6.2 Roadmap for cooperation 83

7 Further developments in the identification of cooperation opportunities 93
7.1 Development and further use of the POLOS RIS database 93
7.2 Multilateral cooperation between groups of regions (clusters of regions) that share a similar regional specialization 94
7.3 Analysis of the sophistication of regional innovation systems 95

8 Conclusions and next steps 99

LIST OF MAPS AND TABLES

Figure 1
Proposed and final methodology

Figure 2
Map depicting the presence and sophistication of RIS in the POLOS countries

Figure 3
Private investment in R&D

Figure 4
Regional specialisation of Jalisco (Mexico)

Figure 5
Ranking of specialisation sectors that appear the most in POLOS RIS

Figure 6
Bi-regional cooperation opportunities

Figure 7
Most selected sectors in Latin American RIS

Figure 8
Stylised example of region clustering

Figure 9
Number of innovation related documents in the regions of Peru

Figure 10
Presence of key words in the text corpus of Peruvian regions

ABSTRACT

Following the lead of the Latin America – EU Summits and of the European Parliament, the DG Regio and the EU-LAC Foundation support several initiatives aimed at strengthening policy and regional innovation systems in Latin America and at fostering EU-LAC exchange of experiences.

In this context, the objectives of this study are: i) Taking stock of existing regional innovation strategies in 9 Latin American countries; ii) Considering how RIS could contribute to improving sustainable territorial competitiveness and iii) Identifying new opportunities for EU-LAC cooperation in regional innovation strategies.

It has been found that around 1 in 4 LATAM regions have a RIS in place. A rich database of regional specialisation has been built which contains 1309 specialisation sectors in 219 European regions (extracted from the European Eye@RIS3 database) and 579 specialisation sectors in 49 Latin American regions. An automated process has been used to identify good cooperation opportunities, which have then been assessed manually.

46 particular opportunities for EU-LAC cooperation have been identified and characterised. 11 correspond to bi-regional EU-LAC cooperation in regions with RIS strategies in place. 31 correspond to challenges, opportunities and policy trends in countries with no RIS strategies in place. Finally, 4 correspond to potential multinational collaboration platforms addressing priority topics in LATAM and the EU.

EXECUTIVE SUMMARY

CONTEXT AND OBJECTIVES OF THE STUDY

The DG Regio and the EU-LAC Foundation have supported, and continue to support, several initiatives in Latin America regarding the definition of RIS strategies, EU-LAC bilateral exchange of experiences, and in a wider sense, projects aimed at strengthening regional innovation systems and improving regional innovation policy. In particular, the EU-LAC Foundation has been implementing an activity called POLOS de Competitividad (Competitive districts) since 2014. This activity seeks to analyse and draw models of the best practices in terms of development and cooperation between competitive territories in the EU and LAC, with a view to form the basis for future bi-regional value chains. POLOS operates, in its pilot phase, in 9 Latin American countries which in turn are the basis for this study. As a further step in this set of initiatives, the general objective of this study is to identify and support the generation of sustainable and socially responsible EULAC bi-regional value chains. This opens a vast field for potential long-term win-win partnerships where the EU experience could both be used and recycled. It also would form the basis of better mutual understanding and common practices in terms of economic development and cooperation.

The objectives of the study were: i) Taking stock of existing regional innovation strategies, policies and actions in 9 Latin American countries; ii) Considering how regional innovation strategies could contribute to improving sustainable territorial competitiveness in Latin America and ii) Identifying new opportunities for EU-LAC cooperation in regional innovation strategies in the territories concerned.

METHODOLOGY

The first step has been to assess extensively the existing policy documentation and third-party reports on RIS in Latin America. The conclusion of this first assessment is that four

POLOS countries have regional innovation strategies in place (Brazil, Chile, Colombia and Mexico). In the case of Chile, Colombia and Mexico, they respond to national agendas and are therefore present in most regions.

Meanwhile, Five POLOS countries do not have regional strategies in place, or they have not been found or clearly identified (Argentina, Costa Rica, Ecuador, Peru and Uruguay). None of these countries is, at the current moment, engaged in national or regional programmes to generate RIS strategies. Nevertheless, they clearly assess the importance of strengthening regional innovation systems and of decentralising public policy and private investment in R&D&I. The efforts in this direction vary in strategy, intensity and success.

General insights and conclusions on the status and development of RIS strategies and regional innovation ecosystems have been established for all POLOS countries. In countries and regions with a RIS in place, bilateral cooperation opportunities with European regions have been selected and defined. In countries without RIS, three types of cooperation opportunities have been characterised: i) Cooperation in horizontal national or regional priorities, ii) vertical priorities in regions building regional bilateral cooperation programs and ii) vertical priorities with thematic focus. Finally, multilateral, network-based cooperation opportunities focusing on shared European and Latin American priorities have also been identified, which could be understood as global challenges to be addressed via complex multi-level programmes.

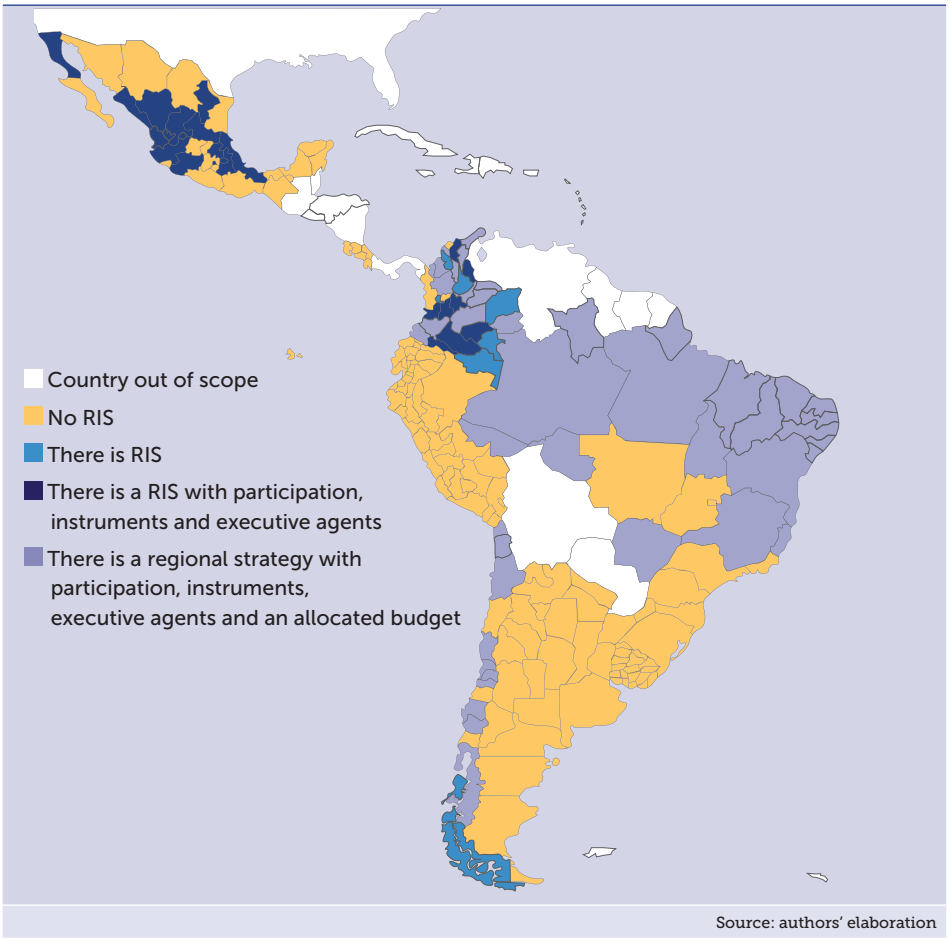
The task of identifying promising bi-regional matches between Latin American and European regions is conditioned by the high number of regions (over 200 in LATAM and over 250 in Europe). Thus, an automated methodology has been developed in order to find the European closest matches to Latin American regions, according to the similarities' in their selected specialisations. This process resulted in the pre-selection of around 120 cooperation opportunities, which were later analysed one by one according to quantitative and qualitative knowledge about the Latin American and European regions involved.

A very rich database of regional specialisation - as defined in Brazil, Chile, Colombia and Mexico's regional innovation strategies - has been built, following the format and content of the Eye@RIS3 database of the European RIS3 Platform. In its current state, this database contains 1309 specialisation sectors in 219 European regions (the original information compiled by the S3Platform (and 579 specialisation sectors in 49 Latin American regions or macro-regions (compiled during the current works). This database is a powerful tool capable of identifying new and more complex EU-LAC cooperation opportunities, and opportunities for policy improvement and the use of RIS tools at the regional and national level; it has only been narrowly exploited for the current report.

RIS IN LATIN AMERICA: KEY FINDINGS

The following is map portraying the state of RIS in the regions within the scope of the study. Only 49 regions have developed a formalised regional innovation strategy.

Figure 1. Map depicting the presence and sophistication of RIS in the POLOS countries



Source: authors' elaboration

Argentina: Argentina does not currently have Regional Innovation strategies in place in its provinces. However, some of them present strong innovation ecosystems, which have lead to the creation of provincial Innovation agencies. At a national level, Argentina has created the National Science, Technology and Productive Innovation Plan "Argentina Innovadora 2020". Most regions only have an office of the Ministry of Science, Technology and Productive Innovation (MinCyT for its name in Spanish), and policy tools defined at the regional level mostly run down from the central government.

Brazil: In Brazil the federal government concentrates the main agencies responsible for policy formulation and management and coordination of the system. The current Science, Technology and Innovation (STI) policy aims at consolidating and upgrading the National Innovation System by integrating all regions and growing public support for R&D and innovation policy. Some states have developed their own RIS strategies, at the state level, at sub-state level (for instance in Santa Catarina) and at supra-state level (for instance in Amazonia or Northern Brazil). It is important to note that the National Innovation System is highly formalised, and, in this framework, it is easier for states and regions to define their institutional and policy design.

Chile: In Chile, European cooperation was a milestone regarding the creation of Regional Innovation Systems (RIS) through the RED Project. The first phase of the RED project led to the development of RIS strategies in Arica and Parinacota, Tarapacá, Antofagasta, Coquimbo, O'Higgins, Biobío and the Metropolitan region. In a second stage, four more regions developed their RIS: Valparaíso, Araucanía, Los Lagos and Aysén. However, there are important gaps to be solved in the internal relations and functions of regional innovation systems.

Colombia: From 2012 onwards most Colombian regions have published a Departmental Strategic Plan for Science, Technology and Innovation – PEDCTI. The PEDCTIs are 10 year roadmaps for the development of policies and tools aimed at strengthening regional innovative systems and frame and focus future investment efforts by the public sector. As a result, most regions have established a 10 year budget and funding plan. Most of the funding for these regional plans come from Colombia's General System of Royalties ("regalias" from natural resources exports), and the expected (national) Science and Technology Fund.

Costa Rica: Costa Rica does not have RIS strategies in place. Regarding innovation, the national entity in charge is the Ministry of Science, Technology and Telecommunications (MICITT). The MICITT launched in 2014 "2021 ROUTE", which serves as a basis for developing the National Plan for Science, Technology and Innovation (PNCTI). The Plan sets out five priority areas at the national level: energy, food production, education, water/environment and health, and acknowledges the transformative strength of ICT across the board.

Ecuador: Ecuador regions do not have RIS in place. The country is currently undergoing a process to shift and add value to its national production matrix (Estrategia Nacional de Diversification Productiva - ENCMP). One of the pillars of the ENCMP is innovation and research, resulting in the creation of the National System for Science, Technology, Innovation and Ancestral knowledge (SNCTISA for its name in Spanish). Two of its main objectives are i) the generation, adaptation and dissemination of scientific knowledge

and ii) the development of technologies and innovations to promote national production, increasing efficiency.

Mexico: Leading a national initiative, the CONACYT (National Council of Science and Technology) has carried out the design and development of the Regional Innovation Agendas. The Agendas address economic and social challenges and opportunities by attracting private sector investment in technological development and innovation while generating synergies between sectors and regions and key technologies. It is expected that Innovation Agendas will become an instrument of public policy to coordinate the interaction of states with different levels of support for innovation and, in particular, programmes of CONACYT to promote joint investment in sectors and niches of high influence in regional economies.

Peru: Peru does not have RIS strategies in place. However, in 2014, the Ministry of Industry, in line with the National Plan of Productive Diversification, started a promising process that could boost the structuring of regional innovation systems and the development of sectors of higher added value. Another initiative is the National Innovation Programme for Competitiveness and Productivity, also known as Innóvate Perú, created in 2014, which centralises the actions, programs, funds and instruments supporting innovation of the Ministry of Production.

Uruguay: Uruguay currently does not have Regional Innovation Strategies in place. In Uruguay's National Plan for Science and Technology, one of the objectives is to promote local innovations within a decentralized regional development framework. However, they have not been able to advance this goal to their satisfaction. In 2014 the Industrial Extension Centre was established with the objective of linking the private sector in the regions with public policy instruments and knowledge and capacities at public R&D institutions and universities.

Topics of interest in Latin America: After reviewing the set of specialisation sectors in the POLOS regions with RIS, it is evident that some topics concentrate the interest of a large number of regions. It can be expected that in regions or countries without formalised RIS strategies, these topics are also relevant.

The following table lists the sectors and topics most usually selected in Latin American regional innovation strategies:
There is wide interest in the agriculture and food value chain, energy (particularly renewables), tourism human health, biotech, mining and raw materials and ICT. Some industrial specialisations (the automotive industry, textiles or pharma) are also specialisation topics of interest in LATAM.

Figura 2: Most selected sectors in Latin American RIS

Top 20 specialisation sectors	Number of regions
Crop & animal production, hunting & related service activities	101
Power generation / renewable sources	50
Food, beverage & tobacco products	40
Tourism, restaurants & recreation	38
Fishing & aquaculture	23
Human health activities (medical service)	23
Biotechnology	20
Mining of metal ores	19
Motor vehicle & other transport equipments	19
Textiles, wearing apparel & lether & related products	17
Information service activities	16
Water collection, treatment & supply	14
Other manufacturing	13
Basic pharmaceutical products & pharmaceutical preparations	12
Forestry & logging	11
Chemicals & chemical products	10
Computer programming, consultancy & related activities	9
Machinery & equipment n.e.c.	9
Other mining and quarrying	0
Other sectors	126
TOTAL	579

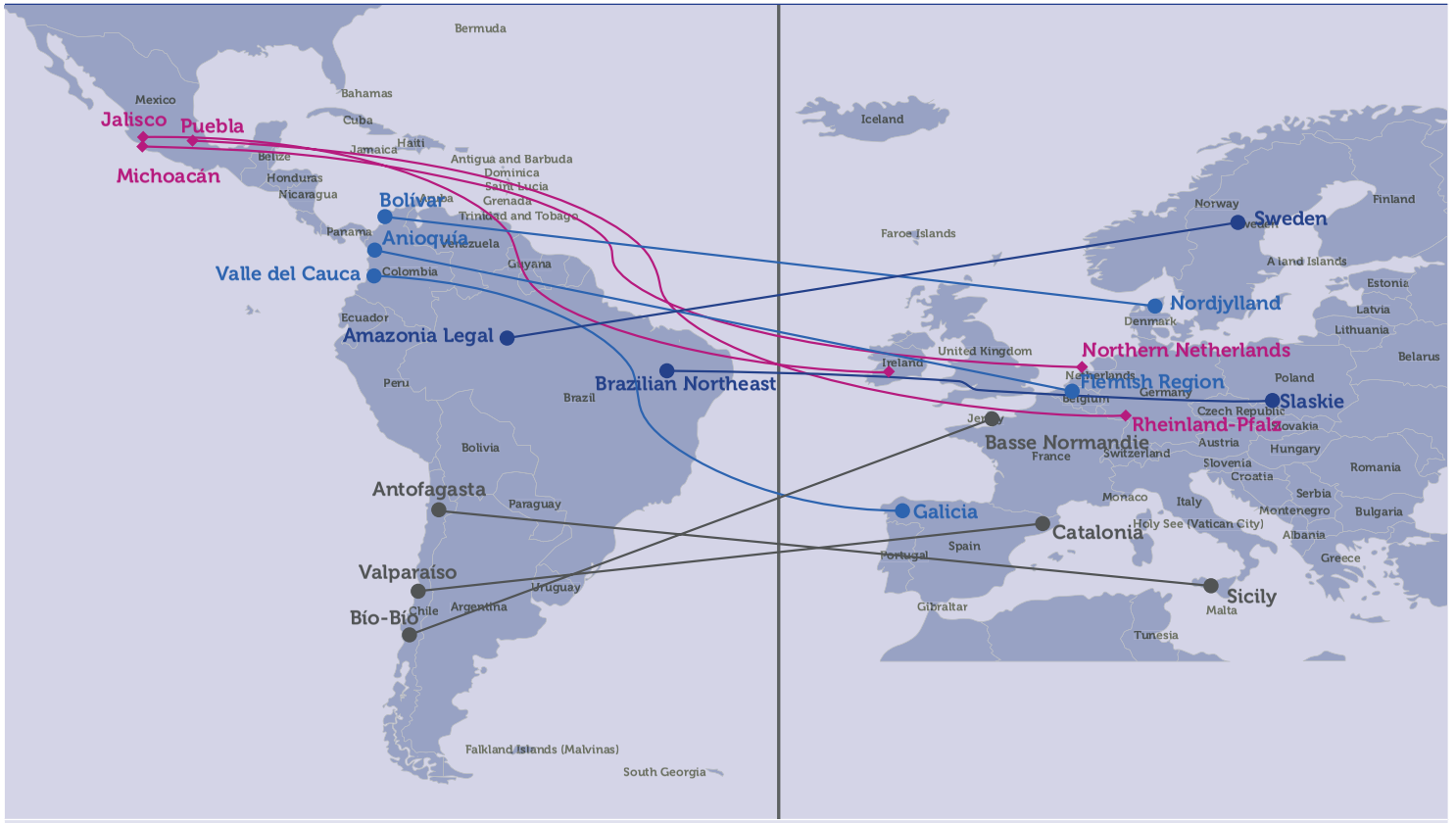
NEW OPPORTUNITIES FOR EU-LAC COOPERATION

46 particular opportunities for EU-LAC cooperation have been identified and characterised in the current document. These are mere proposals and have to be further analysed and be found of interest to all stakeholders involved. Of those:

1. 11 correspond to bi-regional cooperation between POLOS and EU regions which have RIS strategies in place. These opportunities have been selected according to the similarity in their specialisation vision and efforts, as defined in their RIS.
2. 31 correspond to vertical or horizontal challenges, opportunities and policy trends in countries and regions with no RIS strategies in place.
3. 4 correspond to potential multinational collaboration platforms addressing priority topics for the POLOS countries and for the EU.

During the process by which these particular opportunities have been selected, hundreds of alternative opportunities have been identified and characterised in varying degrees. This corpus of alternatives can be utilised in the future to expand or refocus EU-LAC cooperation.

Figure 3: Map of selected bi-regional cooperation opportunities



Source: authors' elaboration

1. Bi-regional cooperation between POLOS and EU regions

The selected bi-regional opportunities, including the shared topics or sectors of interested, are listed below.

Brazil

- **Amazonia Legal - Sweden**: Manufacturing & Industry and Mining & quarrying
- **Brazilian Northeast- Slaskie (Poland)**: Energy production and Manufacturing & industry.

Chile

- **Antofagasta – Sicily (Italy):** Agriculture, forestry and fishing; energy production and Distribution; tourism , restaurants and recreation.
- **Bio-Bio - Basse Normandie (France)**: Agriculture, forestry and fishing; Energy production and Distribution and ICT.
- **Valparaíso – Catalonia (Spain)**: Creative, cultural arts and entertainment; Energy production and Distribution; manufacturing and industry; transport and storage.

Colombia

- **Antioquía - Flemish Region (Belgium)**: Energy (production and Distribution) ad energy efficiency, ICT, agroindustry and food biotechnology, Advanced materials industry.
- **Bolivar – Nordjylland (Denmark)**: Transport and storage, tourism and heavy industry (naval).
- **Valle del Cauca - Galicia**: Meat production and the wider food industry, fishing and aquaculture, biomass/biofuels, human Health, software and ICTs, textiles, Automotive industry and tourism.

Mexico

- **Jalisco - Ireland:** Agriculture, Livestock and food industry, Health and pharmaceutical industry, ICT technologies and creative industries.
- **Michoacán - Northern Netherlands (Netherlands):** Agroindustry and renewable energies.
- **Puebla - Rheinland-Pfalz (Germany):** Advanced manufacturing (heavy Automotive industry), textiles and chemicals.

2. Cooperation opportunities in regions without RIS

Argentina

- Clusters Policy
- Agroindustry
- Environment and sustainable development
- Social development
- Industry / - Health

Brazil

- Cluster management and internationalisation
- Fostering Green economy and R&D+I for Social Development
- Improve the best practices in energy management

Costa Rica

- Strengthening the education system
- Energy
- Production of food and manufacturing
- Technologies, biosciences, related to health such as biomaterials and information systems
- Nanotechnologies

Ecuador

- Agroindustrial production chain
- Manufacturing chains articulated with basic industries
- Knowledge intensive service and sectors production chain
- Innovation ecosystem development
- Promotion of an innovative ecosystem in all regions

Peru

- Industrial parks in the framework of the Plan Nacional de Diversificación Productiva
- Science and Technology parks
- Technological Innovation Agendas (AIT)

Uruguay

- Regionalisation of innovation
- Advanced human resources
- ICTs and the Bioeconomy applied to the primary, agroindustry and service sector

3. Multinational collaboration platforms addressing priority topics for the POLOS countries and for the EU

1. Modernisation and added value in Agriculture and the Food Industry
1. Fishing and Aquaculture
2. Mining and raw materials
3. ICT and the digital Economy

Roadmaps for developing EU-LAC cooperation opportunities

A tentative roadmap for the development of the cooperation opportunities, adapted to the different cooperation typologies has been proposed. It covers the following elements: Objectives and description of the cooperation opportunity, Action plan, Leadership, Participants and stakeholders, Budget and economic model, Governance of the cooperation, Follow-up and evaluation system

FINAL CONCLUSIONS

The concept of regional innovation strategies, and more generally, the management and growth of regional innovation systems is pervasive in Latin American regional policy and documentation.

Multiple vertical and horizontal opportunities can be identified between these POLOS and EU regions and national systems. With the information compiled from Latin American and EU RIS strategies, smart bi-regional partnerships between regions with a shared specialisation can be identified. It is also possible to gauge widespread topics and challenges of interest that can lead to multilateral network-based collaboration platforms.

In countries with little fiscal and administrative authority and in regions where capacity for innovation is low, the best way to address existing challenges and opportunities is by means of focused horizontal and vertical policy, investment and cooperation initiatives. Therefore, regional innovation ecosystems can benefit enormously from focused projects and cooperation without the need (at this moment) of developing formal regional innovation strategies.

The current study, and particularly i) the large amount of information gathered and analysed, ii) the RIS database compiled for POLOS countries and iii) the automated process developed, configure a powerful platform and tool to identify and assess bi-regional, multilateral and thematic cooperation opportunities, and can guide future developments in EU-LAC cooperation in RIS, innovation policy, competitiveness and shared value chains.

The definition of RIS strategies in regions of POLOS countries contribute to improving sustainable territorial competitiveness in Latin America and establish innumerable development, innovation and collaboration opportunities that can be made the most by establishing multilevel cooperation between public administrations, value chains and quadruple helixes in all concerned countries and regions.

1 INTRODUCTION

1.1 CONTEXT AND OBJECTIVES OF THE STUDY

Regional innovation strategies are systematic, goal-oriented exercises carried out by regional partnerships with the aim to define or revise regional innovation policies[1]. They have been a tool for policy design and investment prioritisation in European regions, responding to local priorities and to the deployment of the EU Cohesion policy through regional funds. RIS are built according to regional vocations, opportunities and challenges, based on empirical data, and including participation from quad-helix stakeholders (government, academia and knowledge institutions, enterprises, and civil society).

As stated, at the most recent Summits of Heads of State and Government, the European Union Member States and the Latin American countries committed themselves to reinforcing the existing strategic partnership between the European Union and Latin America. Meanwhile, there is a call for putting EU regional policy into a stronger international context and for more cooperation with third countries.

RIS strategies offer a formal, shared and rich analysis, and most importantly, define priorities (both vertical and horizontal) and conceptualise and tune policies and instruments most suitable to the region's innovation and development vision. In this context, the definition of RIS3 strategies in European regions, similar initiatives in Latin American countries[2], particularly Chile, Colombia, Mexico and Brazil, and efforts in strengthening regional innovation systems in Argentina, Costa Rica, Ecuador, Peru

1 OECD Innovation Policy Handbook
2 As selected in the POLOS de Competitividad (Competitive Districts) project of the EU-LAC Foundation

and Uruguay, provide invaluable information resources and a framework for the analysis of regional realities and the identification of EU-LAC cooperation opportunities at all levels.

The DG Regio and the EU-LAC Foundation have supported, and continue to support, several initiatives in Latin America regarding the definition of RIS strategies, EU-LAC bilateral exchange of experiences, and in a wider sense, projects aimed at strengthening regional innovation systems and improving regional innovation policy. In particular, the EU-LAC Foundation has been implementing an activity called POLOS de Competitividad (Competitive districts) since 2014. This activity seeks to analyse and draw models of the best practices in terms of development and cooperation between competitive territories in the EU and LAC, with a view to form the basis for future bi-regional value chains. POLOS operates, in its pilot phase, in 9 Latin American countries which in turn are the basis for this study. As a further step in this set of initiatives, the general objective of this study is to identify and support the generation of sustainable and socially responsible EU-LAC bi-regional value chains. This opens a vast field for potential long-term win-win partnerships where the EU experience could both be used and recycled. It also would form the basis of better mutual understanding and common practices in terms of economic development and cooperation.

The objectives of the study are:

1. Taking stock of existing regional innovation strategies, policies and actions;
2. Considering how regional innovation strategies could contribute to improving sustainable territorial competitiveness in Latin America;
3. Identifying new opportunities for EU-LAC cooperation in regional innovation strategies in the territories concerned

Information regarding RIS3 specialisation is available in 223 European regions. The POLOS countries are formed by 210 regions. The current report aims at providing useful general insights about the situation of RIS in the selected Latin American countries (at the national and regional levels), and at systematising the characterisation and identification of interesting bilateral and multilateral cooperation opportunities within this very large universe of potential opportunities.

1. 2 PRESENTATION OF THE CONTENTS

Section 2 of the document presents the methodology followed during the development of the current work, and how it has differed with plans at the start of the effort. It summarises the path taken and decisions made in order to:

- Cover the wide topics at hand in a very large set of regions with varying degrees of sophistication and available bibliography.
- Create a platform for the automated analysis of RIS strategies and the identification of bilateral and multilateral cooperation opportunities in EU-LAC countries.

Section 3 of the document characterises previous efforts in Latin American RIS, particularly those supported by DG REGIO and the EU-LAC Foundation. It also provides some previous caveats about the potential of RIS in Latin American regions and acknowledges the importance of the existence of formalised RIS strategies in order to best identify bi-regional cooperation opportunities.

Section 4 of the document takes stock of the current situation of RIS in the POLOS countries, segmenting the analysis between the countries where there are indeed RIS strategies and those where there are not, and identifies some common challenges in regional innovation efforts and policy.

Section 5 identifies and characterises EU-LAC cooperation opportunities as a result from the insights provided by the previous section and the outputs of the automated system. It separates opportunities according to the following structure

- Regions with a RIS
- Regions without RIS
- Shared priorities between POLOS countries and the EU

Section 6 presents a Methodology to draft a tentative roadmap for EU-LAC cooperation in regional innovation, detailing the course of action depending of the typology of opportunity, and advancing some common features and functions that should improve the pertinence and quality of execution of particular cooperation initiatives.

Section 7 proposes lines of development that can provide better analysis of regional innovation ecosystems and strategies in the POLOS countries, and some methodologies for the identification of a new set of cooperation opportunities between and within EU-LAC countries.

Section 8 presents the conclusions and proposed future steps for EU-LAC cooperation in regional innovation strategies.

2 METHODOLOGY

The first step was to acknowledge the magnitude of the task: there is information available of RIS3 Specialisation for 223 European regions and around 210 POLOS regions, creating an enormous base pool of cooperation opportunities

In order to overcome this initial difficulty, it was proposed to establish sequential filters that would reduce the number and complexity of the analysis for each region, selecting ex-ante the regions and cooperation opportunities that would lead to greater value. Nevertheless, after a first assessment of the existence and formalisation of regional innovation strategies in POLOS countries, it was realised that only Mexico, Chile and Colombia, and to some degree, Brazil have actual RIS in place.

At this point, it was decided to diverge from the initially proposed methodology and:

- Provide meaningful information about the state of the art and potential for collaboration in all countries, regardless of the existence of RIS strategies
- Analyse all regions in the four countries with RIS in place,
- Analyse transversal opportunities for collaboration in countries without RIS and identify production sectors initiatives which could represent future cooperation opportunities.

In order to assess the cooperation potential of all the regions with RIS strategies in place (49 regions among MX, CO, CL, BR) an automated methodology was developed to find the European closest matches to Latin American regions, according to the similarities' in their specialized sectors. The input of this automated process is a newly built database covering prioritised sectors, as extracted from the regional innovation strategies of these

49 regions. The new LATAM RIS database is s a replica of the RIS3 Platform's Eye@RIS3 RIS3 Specialisation Mapping database. Further information about this process, and why it was deemed the preferred approach, can be found in section 5.2.1.

This process presents a clear and accepted limitation; it identifies bi-regional cooperation opportunities based only on the similarity of the sector specialisation profile of two regions, one Latin American and one European. This approach is unable to identify powerful cross-sectoral value chain innovation and collaboration opportunities, and other cooperation opportunities addressing common horizontal challenges or based on wider innovation and ecosystem strengthening policies. How the Latin American RIS database could be expanded and the automated process improved in that direction is discussed in Chapter 7 of the current report.

The automated process resulted in the pre-selection of around 120 bi-regional cooperation opportunities, which were later analysed one by one according to quantitative and qualitative knowledge about the Latin American and European regions involved. After this manual assessment, eleven cooperation opportunities were retained and analysed in depth as a main project result.

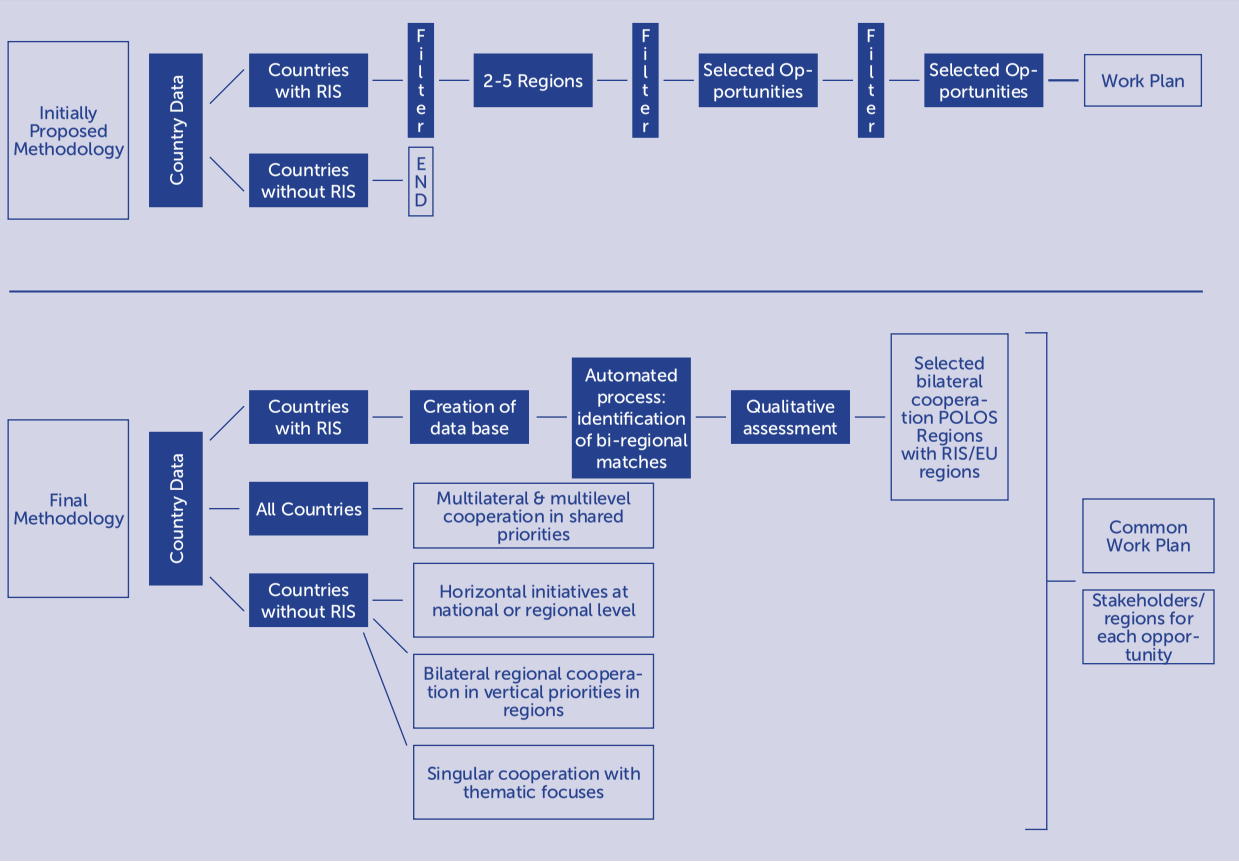
In countries without RIS, key regions were pre-selected and assessed (by a wide analysis of existing documentation) and relevant public officials in the fields of innovation, economic specialization or regional development at the National level were contacted, in order to identify:

- Current and future developments in RIS or regional specialisation / innovation
- Main innovation projects and trends in key regions, in order to identify vertical or horizontal cooperation opportunities with European countries
- Possible stakeholders to lead initiatives

All available vertical and horizontal priorities in regions with and without RIS have been compiled and treated. Meanwhile, policies and sector and technology priorities at the national level have also been listed.

The following figure shows the initially proposed methodology and the one finally used.

Figure 1: Proposed and final methodology



Source: authors' elaboration

3 REGIONAL INNOVATION STRATEGIES IN LATIN AMERICA

3.1 PREVIOUS DEVELOPMENTS IN LATIN AMERICAN REGIONAL INNOVATION STRATEGIES

The European Commission has been active in promoting the definition of Regional Innovation Strategies and the development of regional innovation ecosystems, with the objective of fostering added-value cooperation between countries, regions, companies and R&D institutions and universities, exporting and adapting the EU's model of Regional Policy.

This promotion has followed mainly two models: the development of nation-wide RIS development programmes, and the development of smaller cross-border or trans-Atlantic regional cooperation projects.

The most relevant example of the first model is the RED Project in Chile, co-funded by the EU, which produced regional innovation strategies for most Chilean regions, within the EU-Chile Dialogue on Regional Policy. The RED Project let to comprehensive region-wide efforts to define policy and investment priorities on innovation and R&D. It also lead to formal and informal knowledge exchange through numerous field trips and the participation of European consulting firms in regional projects. Nevertheless, the impact of the Chilean regional strategies has been uneven, due to the lack of long-term commitment, a shift in priorities by both national and regional administrations, and to the little innovation capacity (both in the public and private sector) of regional actors.

Mexico and Colombia have also developed national RIS definition programmes inspired by the European RIS and RIS3 models, which have resulted in one of the widest and

deepest set of regional strategies or agendas. These agendas have enjoyed high attention by its national and regional administrative bodies and in many cases European consulting firms with RIS3 experience in Europe have managed them. In Colombia, these strategies guide the use and investment of oil royalties ("regalias") in the regions, so a high impact on regional innovation systems can be expected.

In Peru, a comparative study[3] of two Peruvian regional innovation studies was carried out under the umbrella of an EU-Peru dialogue on regional policy and border integration. Nevertheless, a national programme similar to the Chilean one has not been implemented.

Other cross-border and EU-LAC cooperation efforts have been developed, most notably in Argentina and Brazil. Argentina agreed to establish a dialogue on regional Policy with DG Regio. In addition, Brazil and the EU have developed multiple cooperation and knowledge exchange programmes. Córdoba (Argentina) and Santa Caterina (Brazil) participated in wide benchmark and exchange programmes with Emilia Romagna (Italy) and Baden Württemberg (Germany) with the objective of building dense and operational cooperation links based on reciprocity within value chains.

The dimension of these bilateral cooperation programmes and benchmarks is very different from the current report, since they analyse deeply one or two Latin American regions, while the current report covers more than 200 in 9 countries. Thus, the level of study and conclusions is necessarily different.

3.2. REGIONAL INNOVATION STRATEGIES IN CENTRALISED COUNTRIES

An important element of debate is the need or relevance of Regional Innovation Strategies in centralized countries, where regional and local authorities have meagre autonomy and small or non-existent flexible funding to finance their policies and projects. In fact, RIS3 stresses the need for collaboration in the quadruple-helix in the co-design of the strategy, but the role of public administrations, particularly regional governments, is paramount.

A good example of this situation[4], that will be detailed later, is the Brazilian case. Brazil has a regional policy with objectives similar to those of the EU Cohesion Policy. However, the policy in Brazil is focused on the poorest and more isolated regions; it only covers some

3 GRANDA ALVA, G. *Estudio sobre Sistemas Regionales de Innovación en el Perú: Lecciones de Política,* Universidad del Pacífico, Lima, Perú. 2014

4 ISMERI EUROPA, *Regional Innovation Systems in Latin America: Policy Lessons* – Final Report, 2010, p.32

basic, discrete topics and it lies in the hands of Federal authorities, not regional. Thus regional cohesion objectives are achieved by top-bottom focused actions, in comparison to the bottom-up comprehensive approach of RIS and RIS3 in the EU.

Regional governments in the EU are the bodies responsible for the development and compilation of RIS3 strategies. The 1990's RIS and later RIS3 frameworks are linked to the EU regional policy, and although they have the ambitious vocation of road mapping the developments of a whole regional innovative ecosystem, in practical terms they only condition the use of European regional funds. Therefore, the definition of regional innovation strategies is a public sector tool devised for better using available public funding.

According to the discussion paper "Overview of the Decentralisation Process in Latin America"[5] , most Latin American countries are strongly centralised and top-bottom decentralisation programmes of the 1980s and 1990s (mainly fostered by international institutions and short-term national priorities) have been halted or even reversed. Furthermore, these decentralisation trends are characterised by regionalising national competences and attributions, with replicated structures and earmarked funding, not in developing regional governances or fiscal autonomy.

The lack, in many of the POLOS countries, of two elements central to the EU experience: regional autonomy and available funding, may recommend, in some cases, less focus on Regional Innovation Strategies and more focus on EU-Latin America cooperation, in particular vertical or horizontal approaches that support regional innovation, even performed at a national level. Despite the previous considerations, there is plenty of room for cooperation, innovation, mutual learning and construction of inter-regional value chains when there is no established strategy in a region.

The current report has the objective of evaluating the level of maturity of RIS across the POLOS countries, and will try to recommend a more formal approach for those regions with available RIS strategies, and a more flexible, per-case approach in countries with less or non-existent RIS strategies. In spite of this, an actual analysis of the regional innovation ecosystems in the 200 regions object of study is not viable in the framework of this project.

5 JEAN BOSSUYT – ECDPM. *Overview of the Decentralisation Process in Latin America: Main Achievements, trends and future challenges*. 2013

3.3. RIS: they make a difference

The existence of a RIS strategy reveals the preferences of a region in terms of its current specialisation, but also of its future vision and development path. In this regard, it is more conclusive than a simple look at the sector distribution of a regional economy, and can better inform the identification of cooperation opportunities in the areas of R&D, innovation and regional challenges.

In fact, RIS expresses a shared vocation of economic diversification (from bulk chemistry to pharmaceuticals), of value-chain complementarity (building a heavy machinery sector around existing mining operations), of solving regional challenges (water management linked to dry climate agriculture) or of developing a public sector R&D critical mass (biofuels from agriculture waste or ICT for the service sector).

The development choices exemplified in the previous paragraph are very good targets for EU-LAC cooperation, and thus, during the current report, regions with a RIS in place are prioritized and thoroughly analysed. Furthermore, RIS strategies provide invaluable information regarding leading institutions and existing governances, relevant actors in the private sector and low-granularity economic and technological priorities, which facilitate greatly the matching with European regions, institutions and companies in order to build complex international value chains.

4 REGIONAL INNOVATION STRATEGIES IN THE POLOS COUNTRIES

The present chapter presents an overview of the state of each evaluated country in regards to regional innovation strategies. The first section shows a map depicting the existence and sophistication of RIS in the observed regions. The second section points out their situation, explaining initiatives being taken in countries without RIS and a brief summary of the context of those that do have them in place. Afterwards, we also present a set of general conclusions derived from the analysis, including aspects that were repetitive in the documentation revised and that may explain the joint situation of the POLOS countries when it comes to regional specialization.

4.1. CURRENT SITUATION OF RIS IN THE POLOS COUNTRIES

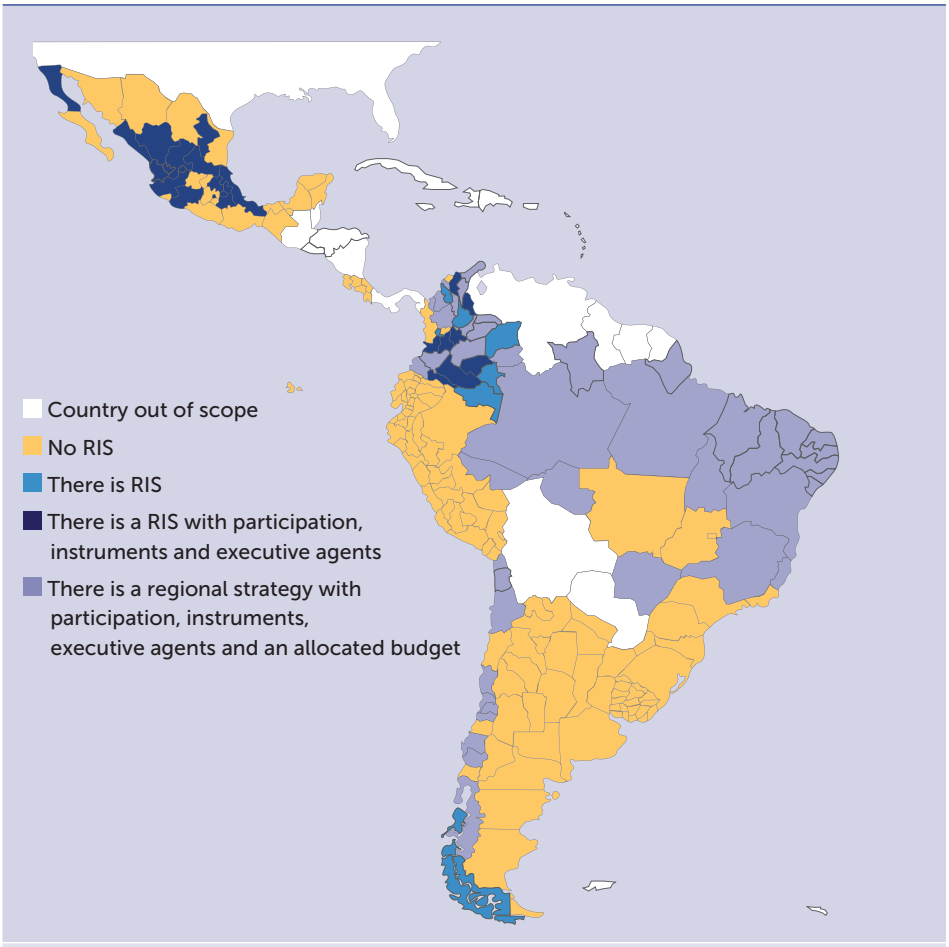
The following map presents a graphical expression of the situation in the POLOS countries in regards to regional innovation strategies.

4.1.1 Argentina

Argentina does not currently have Regional Innovation strategies in place in its provinces. However, in some of them it does possess strong innovation ecosystems, which have even lead to the creation of provincial Innovation agencies.

At a national level, Argentina has created the National Science, Technology and Productive Innovation Plan “Argentina Innovadora 2020”. In it, one of the greatest novelties with

Figure 1. Map depicting the presence and sophistication of RIS in the POLOS countries



Source: authors' elaboration

respect to previous versions, is the creation of Socio Productive Strategic Nexus (Núcleos Socio Productivos Estratégicos, NSPE), which aims at strengthening the association that must exist between the scientific system and local needs. Its objective is to promote productive, inclusive and sustainable innovation based on expansion, progress and the full use of the scientific and technological capacities in Argentina[6].

One of its objectives is the Promotion of Innovation in the production sector towards social inclusion and the strengthening of the State. For this, and regarding the industrial sector, it has established the following goals:

6 Plan Nacional de Ciencia, Tecnología e Innovación Productiva Argentina Innovadora 2020, Síntesis Ejecutiva.

- To strengthen innovation through public-private cooperation.
    - Promotion of public-private consortiums for the innovation of strategic sectors
    - Use of the General Purpose Technologies (TGP for its name in Spanish: Nanotechnology, Biotechnology, ICTs) in order to broaden the number of support initiatives for SMEs.
    - Promotion of the creation of technology-based companies
    - Strengthening of Connection and Technology transfer offices
    - Development of a platform to attend to technology demands
- Promote innovation in more companies.
    - Funding for innovation initiatives in prioritised sectors
    - Tax incentives
    - Innovative companies certification system
    - Promotion and funding for technology services in industrial parks, poles and districts

Most regions only have an office of the Ministry of Science, Technology and Productive Innovation (MinCyT for its name in Spanish), sometimes even instruments at a regional level, but mostly running down from the central government.

In an interview, Silvina Mochi, adviser to the Ministry of Science, Technology and Productive Innovation, concluded that it makes a lot of sense to develop Regional Innovation Strategies because more specific policies will enable more development for the regions. Right now, although there are instruments that are allocated to the provinces, it is in general a top-bottom action. Although the country's federalization is regularly put on the agenda, it is still a challenge to be achieved.

Argentina has created a strong national innovation plan, with clear identified topics and transversal technologies. However, the system is very centralized and this has caused the lack of RIS. Even though there are local agencies, in general they always point back to the MinCYT and are very much linked to national agencies.

4.1.2 Brazil

Brazil is a decentralized country regarding political and administrative functions where competences in science and technology are located both at the federal and the state level.

The federal government concentrates the main agencies responsible for policy formulation and management and coordination of the system. The current Science, Technology and Innovation (STI) policy aims at consolidating and upgrading the National Innovation System (NIS) by integrating all regions and growing public support for R&D and innovation policy. In 2007 the Ministry of Science, Technology and Innovation developed a three-year action plan, PACTI 2007-2010, that established a framework for all programmes of science and technology and ordered four strategic priorities and lines of action that prioritize innovation in SMEs and the consolidation of the STI systems.

Moreover, in recent years, Brazil has made a considerable investment effort in research, development and innovation, by the government sector and, to a lesser extent, by the business sector, establishing a leadership in Latin America. The country's agenda of economic and social development emphasises technological innovation, recognising that an important part of the innovation chain has a local component. Additionally, in recent decades almost all the states have created a Secretaria de Ciência, Tecnologia e Inovação, and many also have a Fundação de Amparo à Pesquisa e Inovação or equivalent entity. In the 2000s the states started developing their own legislation and strategies for science and technology, taking a more determined consolidation of its regional innovation systems, both at a state and regional level.

Some states have developed their own RIS strategies, at the state level, at sub-state level (for instance in Santa Catarina) and at supra-state level (for instance in Amazonia or Northern Brazil). It is important to note that the National Innovation System is highly formalised, and it is easier for states and regions to define their institutional and policy design within a clear common framework.

Parallel to the growing importance that state governments have given to territorial innovation policies, federal officials and large agencies implementing the policy of science and technology have promoted a distributed geographic implementation as a necessary condition to guarantee effectiveness. Therefore, some initiatives have emerged that strengthen regional innovation through long-term plans and the participation of different actors. These plans are examples of existing decentralisation in Brazil: they arise from the initiative of the state bodies without following a systematic calendar or pre-defined geographical areas. The only common element is to follow the same goals proposed by the PACTI, within the structure of the NIS.

As in many other dimensions, Brazil shows very marked state/regional differences in investment and performance on research and innovation. Brazil cohesion policies, centered in the most disadvantaged states, and focusing on basic infrastructures and social needs and the public sector, are not contributing very much to lowering inequalities

in the R&D&I activity. Moreover, state and regional-level investment in the richest and most industrialised parts of the country may be contributing in highlighting those differences. Universities have also played a prominent role in the technological development of Brazil, particularly in the most advanced states like Sao Paulo, Rio de Janeiro, Santa Catarina and Minas Gerais. Public investment prioritises universities and research centres when allocating resources. To some degree, this may have contributed to low absorption of qualified human resources by the productive sector and a low rate of transfer between knowledge generation and private sector. In exchange, Brazil has experienced a positive evolution in recent years regarding scientific and technological training.

Finally, there are several reports analysing opportunities and gaps in regional innovation systems, and interesting initiatives in structuring the productive sector, such as the Arranjos Produtivos Locais, (specialized sectorial clusters).

In conclusion, Brazilian states and regions show an important R&D&I activity, structured attention by national and regional authorities and some bottom-up defined RIS. It is clear that a sophistication of current and future RIS is the trend to follow, and there is enormous space for multilevel cooperation with the EU as a whole, with national and regional EU governments and with all stakeholders in a large number of sector and technology value chains.

4.1.3 Chile

In Chile, European cooperation was a milestone regarding the creation of Regional Innovation Systems (RIS) through the RED Project, presented at the 2010 Competitiveness and Innovation Programme of the European Union. The initiative comes at a time when the country, newly incorporated into the OECD, needs to make progress in decentralizing its innovation system.

RIS is an initiative promoted by the Undersecretary of Regional Development and implemented by regional governments. National entities such as CORFO, CONICYT, INAPI, CNIC; MINAGRI and MINMINERIA also joined as project partners.

The RED project, developed with the contribution of European funds, was initially supposed to be implemented in 3 regions. In the end, Arica and Parinacota, Tarapacá, Antofagasta, Coquimbo, O'Higgins, Biobio and the Metropolitan region joined in. In a second stage, four more regions developed their RIS: Valparaíso, Araucanía, Los Lagos and Aysén.

Chilean Regional Innovation Strategies provide an agreed strategic framework that combines the public and private views, and aims at focusing the Competitiveness and

Innovation funds available for the regions. At first, the RIS had mainly a transversal approach and were very focused on strengthening actions. However, in recent years (since 2014), there is a growing tendency to focus in the vocation and capacity for innovation of selected sectors.

These efforts represent advancement in the decentralisation process of the innovation system. However, there are important gaps to be solved in the internal relations and function of regional innovation systems. For example, there is lack of human capital with enough experience in the management of RIS structures and tools. Also, there is a need to strengthen the governance models in order to ensure the effective and proper implementation of strategies. Lastly, there is still a gap in trust between companies and public administrations, as well as among different public entities which slows or even jeopardises the execution of the agreed and defined policies and initiatives.

4.1.4 Colombia

From 2012 onwards, in Colombia most of the regions have published a Departmental Strategic Plan for Science, Technology and Innovation – PEDCTI. These Strategy Plans are a 10-year roadmap for the development of policies and tools for the regional innovative systems and frame and focus future investment efforts by the public sector. The Administrative Department of Science, Technology and Innovation, Colciencias, has in this sense worked to promote and consolidate the respective departmental PEDCTIs. In eleven (11) regions, these Strategic Plans have also been promoted by the IDB[7] and the World Bank under the project "Strengthening the National System of Science, Technology and Innovation - Phase I". It is the case of Arauca, Casanare, Cauca, Cundinamarca, Guainia, Magdalena, Norte de Santander, Putumayo, Quindio, Santander, Vaupes.

The aim of the Strategic Plans has been to identify the gaps and thematic axes in innovation and to establish the priority sectors and programmes. The starting point has been the existent effort led by Colciencias to increase the budget for the prioritised programmes and projects while building strategic alliances with and between regions.

Aligned with this, most of the regions have developed a funding plan that envisages the budget needed in the next ten years. Nevertheless, the regions still rely mostly in the Colombia's General System of Royalties ("regalias"), a large fund coming from natural resources exports and allocated in part to regional investment, and the resources expected from the Science and Technology Fund.

7 Inter-American Development Bank

4.1.5 Costa Rica

Costa Rica's economy has seen a deep structural change in recent decades, from a predominance of exports of traditional agricultural products (mainly coffee and bananas) to a decreasing loss of these towards the services sector, industrialization in ICT sectors, tourism, and exports of new products. However, several factors slow down this transformation such as the stagnation of public spending and the lack of skilled labour.

The Ministry of National Planning and Economic Policy (MIDEPLAN) develops every four years a National Development Plan (NDP 2015-2018) which involves an extensive process of consultation with various sectors of society, including participation in numerous public institutions both in the Central Government and the decentralized level considering two dimensions: sectorial and regional. The NDP is an instrument of governance with limited capacity to influence the dynamics of long-term development. The main reason is that it is linked to the specific term of government and not to a broader political backing. The government tends to correct its own goals to improve compliance levels. Despite these limitations and the lack of guarantees of a successful linkage between NDPs, the exercise is useful to define the priorities at a short or medium term. An interesting experience, derived from the NDP is the generation of Regional Competitiveness Councils, although they are only implemented in Alta de Guanacaste, Brunca, Caribe and Norte.

Regarding innovation, the national entity in charge is the Ministry of Science, Technology and Telecommunications (MICITT). From an activity launched in 2014 called "2021 ROUTE", some areas have been identified where the ICT should have a positive impact. "2021 ROUTE" served as a basis for developing the National Plan for Science, Technology and Innovation (PNCTI). The Plan sets out five priority areas for action at the national level: energy, food production, education, water and environment and health.

MICITT sources said the experiences implemented in the past have not produced positive results and there is a lack of collaboration to implement Regional Innovation Strategies. Meanwhile, there is a need to move forward with the definition of a national legislative framework so that the National and Regional Innovation Systems can be structured.

4.1.6 Ecuador

Ecuador is currently undergoing a process to shift and add value to its national production matrix (Estrategia Nacional de Diversification Productiva - ENCMP). This process, led by the National Vice-presidency, has the vision of promoting the economic transformation of Ecuador from an economy based on primary resources (characterised

by volatile global prices and low added value), specially oil and oil-derived products, to a knowledge-based economy. This initiative follows the tracks of the advances made by the Productive Transformation Agenda for 2010-2013. Ecuador understands that to reach its objectives, it requires a more diverse economic structure, and that by promoting productive chains it will increase its competitiveness, resulting in a substitution of imports for exports.

In 2013, 57% of Ecuador's total exports were oil and its derivatives, which implies a very specific structure and great vulnerability to international prices. Moreover, in exports not related to oil, 10 products represented 62.1% in 2012. In addition, 48.4% of exports are concentrated in five countries. Without a doubt, product, service, and final markets diversification is a priority. This is reflected in the new National Strategy for a Change in the Productive Matrix (ENCMP), which focuses on knowledge-intensive sectors and an expansion in international markets.

To carry out these changes, one of the pillars of the ENCMP is innovation and research, resulting in the creation of the National System for Science, Technology, Innovation and Ancestral knowledge (SNCTISA for its name in Spanish). Two of its main objectives are i) the generation, adaptation and dissemination of scientific knowledge and ii) the development of technologies and innovations to promote national production, increasing efficiency.

Furthermore, there is also the Ministry of Higher Education, Science and Technology, which finances research, technology development and innovation projects and programmes. According to our conversations with authorities in the Undersecretary of Innovation and Technology Transfer, the ministry promotes R&D+I projects globally, not according to prioritized sectors.

Lastly, another entity formed recently is the Alliance for Entrepreneurship and Innovation (AEI for its name in Spanish). The AEI is a network of public, private and academic entities that have the aim to promote entrepreneurship and innovation as a basis for the productive development of the country. The objectives of the AEI are:

- To increase the amount of entities that promote entrepreneurship and innovation and to improve their coordination.
- To encourage the promotion of entrepreneurship and innovation around industries with a high innovation potential.
- To promote an increase on private investment in research and development through a link between universities and companies.

The pillars that the AEI's strategy is based on are[8]:

- Global: It aims at the simultaneous development on all areas of the entrepreneurial ecosystem.
- Innovation and exports: Promote the support to entrepreneurial initiatives (promotion and development) and its presence in International Markets.
- Systemic: Support mechanisms in all levels of innovative business venture development and in all stages of the business cycle.
- National coverage: Developments in all regions of the country.
- Productive chains: Focus of efforts towards prioritized production chains and areas with development potential.

- Continuous learning: Control and monitoring mechanisms to get feedback and allow a continuous improvement of the strategy.
- Institutional Articulation: Collaboration instruments among public, private and academic institutions to increase synergies.
- Transversal objectives: To create incentives for the inclusion of the members of the ecosystem in Ecuador and the contribution to the creation of new business ventures and the development of innovative and export companies based on human talent, value adding and the creation of productive employment.

Ecuador is carrying out several actions to promote innovation and facilitate technology transfer to the productive system. However, in spite of the fact that their strategies have the goal of national coverage, regionalization is low, particularly regarding RIS instruments focused in regional vocations and leading sectors. However, according to conversations with local authorities, the vice-presidency is trying to promote participation of province governments and stakeholders in the selection of their prioritized sectors within the framework of the change in the productive matrix.

Provinces in Ecuador have a certain degree of autonomy and in the future it could very well make sense to generate regional innovation strategies, but not before and innovation and collaboration culture has been established, and initiatives start to flow not only towards the regions but also from them. For this to happen, it is likely that an effort will be required from national and regional entities both at a public and private level, growing and strengthening the innovation capacity of regional ecosystems.

8 http://aei.ec/ Strategy Promotion Video

4.1.7 Mexico

Leading a national initiative, the CONACYT (National Council of Science and Technology) has carried out the design and development of the Regional Innovation Agendas in Mexico. Based on smart specialization strategies like the ones established in European regions, Mexico has faced the challenge of identifying the characteristics, strengths and unique assets of each region. In this sense, the regions have involved regional actors and resources to provide a vision of regional innovation systems and to highlight their competitive advantages.

Nevertheless, the areas identified have also shown the diversity, complexity and asymmetries present in the country. Thus, it is expected that Innovation Agendas become an instrument of public policy to coordinate the interaction of states with different levels of support for innovation and, in particular, programmes of CONACYT to promote joint investment in sectors and niches of high influence in regional economies.

The Agendas pursue to respond to economic and social challenges by attracting greater private sector investment in technological development and innovation while generating synergies between sectors and regions, taking also into account the transversal technologies.

All Agendas published up to date include the priority sectors segmented in areas of specialization, and transversal opportunities and challenges that are addressed through programmes and policy tools. However, the Agendas do not include a forecast and planning of the funds needed to develop the programmes. In all regions, the actual planning of the execution is conditional to the availability of funds and to budget feasibility, yet undecided. Therefore, the regional entities rely only on the interest of private agents or on the external funding programmes to which the Agendas will be submitted. In this sense, an accurate monitoring and evaluation of the results is essential to assess the success of the Agendas. This creates an opportunity for the European Union and other international institutions in cooperating with Mexican regions and the national government in the implementation and funding of the Regional Innovation Agendas.

4.1.8 Peru

Peru has been growing in recent decades, and all macroeconomic data indicate high levels of performance, but there are huge gaps in the analysis of microeconomic factors. This growth has not led to improvements in competitiveness and productivity, nor there have been policies that have led to progress in the construction of regional innovation systems.

However, in 2014, the Ministry of Industry, in line with the National Plan of Productive Diversification (PNDP for its name in Spanish), started a promising process that could boost the structuring of regional innovation systems. The National Plan for Productive Diversification main objective is to boost the growth at a medium and long term through the generation of more productive and transformative capacity. The expected impact of the PNDP is mainly at medium and long term but some of their actions can have a short-term outcome, as can be seen in the axis focused on improving regulations and simplifying administrative processes. The second axis in the Plan is to promote diversification of production, for it states that the monitoring of production activities should avoid focusing solely towards more export-oriented sectors. The third axis intends to increase the productivity economy and the approach of the plan itself specifies to do an exercise in prioritizing productive sectors. Based on prior studies of specialization and mapping of relevant actors, the Plan foresees a model of inclusive governance while articulating sectorial policies. The current Plan aims at an integration of the productive sectors in global value chains, to boost the foreign investment and to consolidate a local innovative entrepreneurship. An example of this would be the recent actions on industrial parks and CITES (Technological Innovation Centers), developed in section 5.3.6.

Another initiative to be implemented by the National Plan of Productive Diversification is the National Innovation Programme for Competitiveness and Productivity, also known as Innóvate Perú, created in 2014. This platform centralises the actions, programmes, funds and instruments of the Ministry of Production to increase innovation along the country. Innóvate Perú focuses on increasing business productivity financing the actors of the ecosystem of innovation and strengthening the relationships between them. To aim that purpose the platform administrates several funds: FINCyT, FIDECOM and FOMITEC. The projects promoted by FINCyT and FIDECOM focuses on several actors and a variety of projects. The actors covered by the platform are firms, universities and students while the projects funded are aimed to promote the development of innovative processes, products and services and the transfer and dissemination of technology to practical application. The third fund, FOMITEC, supports innovative technology companies in the market and improves the quantity and quality of advanced research facilities, number of products, services and Science, Technology and Innovation solutions in strategic productive sectors and key sectors for social inclusion. Also it improves the number of doctors in science and technology. Innóvate Perú started with an estimated budget of S 700M (€ 197.88M).

4.1.9 Uruguay

Uruguay currently does not have Regional Innovation Strategies in place. In Uruguay's National Plan for Science and Technology, one of the objectives is to promote local innovations within a decentralized regional development framework. However, they have not been able to advance this goal to their satisfaction.

Not only Uruguay has not been able to promote innovation in other regions besides Montevideo, it also shows very low investment in R&D&I in the private sector: at only 28.5% of total expenditure. Approximately 30% of manufacturing companies carry out some form of innovation activity, but the most alarming fact is that this number has not increased in the last 15 years.

Public expenditure in R&D is strongly focused in two organizations: 44.06% of public R+D expenditure funds go to the University of the Republic, Uruguay's largest public university (which has started a decentralisation process in 2007) and 24.96% to the Agriculture and Livestock Research National Institute. Ten percent (10.4%) goes to the National Research and Innovation Agency in charge of promoting research and the application of new knowledge to the industry. Although this could seem a large figure taken independently, it is appears to be insufficient compared with the top-two leading public institutions and the effort that has to be made to promote innovation in other regions.

To face these challenges, different initiatives have been generated. In 2010, the National Plan for Science and Technology was published, and it defines generic strategic areas of action. They also have a tax exemption instrument focused on innovation activities for which in 2012 they passed a decree stating that technological intensity of the activity can award a higher benefit.

In order to face the issue of low critical mass on private innovation, the following measures were taken: i) in May of 2014, the Industrial Extension Centre (CEI for its name in Spanish) was established. This centre aims at becoming the connection between the productive sector, especially industrial SMEs, with public policy instruments and knowledge at public institutions and universities; ii) creation of an Innovation Management Programme, which offers funds to promote innovation in companies and iii) the creation of sector-based technology centres, with 13 proposals already on the table for its approval this semester.

Uruguay has also realized that the number of companies that receive government support is too low: only 4%. Most of the companies not applying communicate a lack of interest or lack of knowledge. To change this situation, they have noticed that

there is a relationship between the number of high-level staff and the application to government support. Therefore, an effort is being made to facilitate private hiring of qualified professionals.

Furthermore, companies that do have innovation activity do so in a low level of sophistication. This is mostly based, authorities have identified, on an exogenous technology development model, which promotes the import of technology before, but also a low effort to acquire it.

Uruguay has not established regional innovation strategies but there is a (national) commitment towards the growth of innovation efforts in private companies and in the regions, with some instruments and policies in place.

4.2. RIS IN THE POLOS COUNTRIES: GENERAL CONCLUSIONS

Although there is great regional and national diversity in terms of RIS formalization, R&D and innovation activities and economic sector composition, there are certain issues that arise regularly in the previous analysis. These common elements are presented below as general conclusions.

4.2.1 Decentralisation of innovation, capacity building

In most of POLOS countries, even in those with existing RIS, there is a vital issue to be solved: centralisation. Centralisation has a very clear impact in the specialization and innovation profiles of the analysed regions, and on the design and efficiency of policy tools in place.

In many cases even with the active efforts of central governments to decentralize the innovation ecosystem, they have not found the optimal tools to motivate regional companies or administrations to participate in programmes and benefit from funding instruments and complex initiatives. A good example of this is Uruguay, where they face a double challenge: increase innovation in the private sector (and increase participation in public support programmes) and decentralise public and private innovation and R&D activities.

The current situation leads to a certain stagnation in the regionalisation efforts, and demands strong and focused public action at all administrative levels. It could be argued that in order to grow regional innovation systems, national and regional governments

have to invest in R&D&I capacity building in the public sector. Anchor R&D&I institutions can contribute to regional challenges and support local companies in their path to innovation, and start the virtuous circle that may lead in the future to the definition of full RIS strategies.

4.2.2 Common challenges

At a continental level and at a country level, the diversity between regions is very broad. There are rural regions focused on agriculture, natural resource-based economies, industrial regions, and some metropolis with strong service and international trade sectors. Nevertheless, some recurring topics emerge:

- **Modernisation of the agricultural sector**: In many regions, the priority is to bring and adapt new technologies and methodologies in the agricultural sector in order to improve processes and developed higher-added-value products.
  In order to address this challenge, a smart approach mixing capital investment, innovation, extension of best practices and positive legislation and public policies, is necessary.

- **Added-value and diversification in commodity-based regional economies**: Countries and regions with a high level of dependence on commodity exports are strongly betting on a productive shift towards industrialised and knowledge-based sectors. Ecuador's National Plan for the Change of the Productive Matrix, is a good example: they are trying to pull away from commodities, specially oil, and move towards new sectors. The entrance to new growing markets has also been presented as an objective. According to the OCDE, diversification is strongly related to sustainable growth in more advanced economies, it isolates dependence to international prices and reduces risk by hedging.

  Diversification and a shift towards added-value sectors are central and very complex challenges. Regional innovation strategies can contribute to this effort, within a multilevel strategic approach that guides all public policy and investment.

- **Development and sophistication of the industrial sector:** In more industrialized regions, the sophistication of products and processes and the application of transversal technologies is a recurring element in the current analysis. This is shared by the public sector and there are several instruments offered to companies in order to achieve it. However, innovation and participation is generally low because SMEs tend to be in initial development stages (before

they see innovation as a real competitiveness tool) and they lack the necessary financial and human capacity.

Policy and financial instruments have to be better designed, managed and communicate in order to allow Latin American companies, particularly industrial ones, to increase their investment in technology and R&D and their innovation activities.

- **Global cities and their impact on peripheral regional economies:** Through our research, we have confirmed that capital and other connected cities in Latin America have an enormous importance and most initiatives flow from them. Some examples:
  - **Región Central** (Costa Rica): 74.1% of national GDP, 64% of the total population
  - **Región Metropolitana** (Chile): 48.97% of national GDP, 41% of the total population
  - **Lima** (Peru): 44.96% of national GDP, 31% of population
  - **Montevideo** (Uruguay): 46% of national GDP, 41% of population

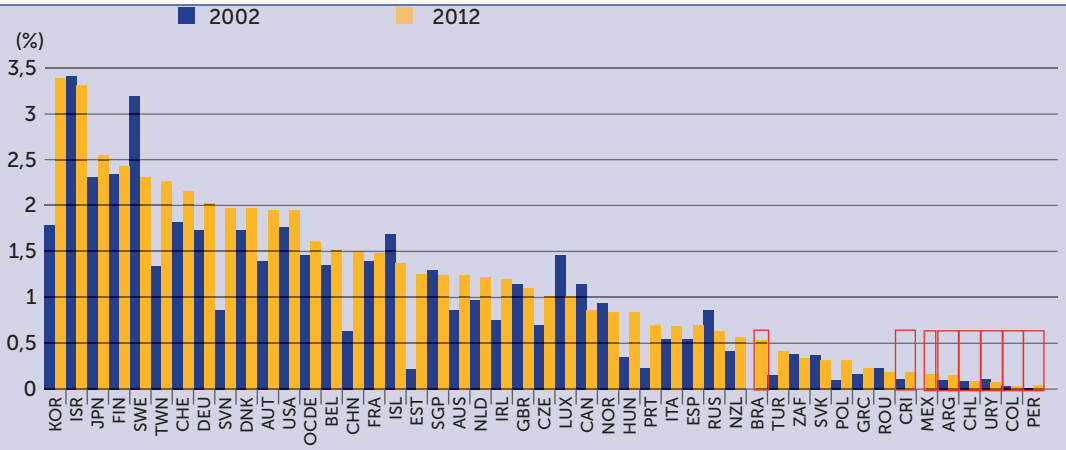
Science, technology and innovation policies are usually defined and managed at the national level, and public and private investment in R&D very centralised. In most cases, even after various attempts to decentralize, governments have not been able to motivate the participation of regional entities in public support and funding programmes.

The challenge in this regard is the balance between a set of policies that allow central cities to advance and realise global opportunities and a set of policies that decentralise public and private innovation efforts and allow for the consolidation of regional innovation systems that lead to growth and economic diversification in the regions. This is clearly a complicated balance.

- **Innovation as a value and its different forms**: Although there is a general idea that innovation is positive, it may appear to be unreachable to most companies that lack financial and human capacities, or that are far away from innovation hotspots. Also, the concept of innovation has to be extended from technology adoption to a wider menu of opportunities, such as innovation in strategy and business models, in basic functions and in operations.

Extending the value of innovation to more stakeholders and to social challenges is a key opportunity that can be partially addressed by connecting with European regions that have embraced innovation as a transversal cultural value.

Figure 3. Private investment in R&D (BERD intensity) in selected countries: 2002 and 2012 (% GDP, last available year)[9]



Note: South Africa: 2001 and 2011, Australia: 2011, Brazil: 2010, Iceland: 2011, Luxembourg: 2003, Mexico: 2011, New Zealand: 2001 and 2011, Sweden: 2001, Switzerland: 2000.

Source: OECD (2013e), Main Science and Technology Indicators Database, www.oecd.org/sti/msti; y OCDE forecasts based on RICYT.

Another very relevant issue is the practice of collaboration. Ex-post analysis of the definition and execution of RIS in advanced POLOS regional economies shows that there is a lack of trust between stakeholders in the quad-helix and these difficulties in collaboration regularly hinders the development of complex initiatives and collective projects and strategies. This element has to be well understood and managed in future RIS, policy and project developments.

4.2.3 Private sector investment in R&D&I:

A common challenge is meagre innovation culture and low level of investment in R&D in the private sector. In general, public investment in R&D has been increasing over the years, however, private sector investment does not seem to boost.

The figure 3 next page shows the intensity of private sector investment in eight of the studied countries. As it can be appreciated, the levels of private investment are very low in comparison to developed countries. Another fact is that in Latin America public investment in R+D is higher than private investment, unlike in most developed countries.

In the study, by the OECD, the authors concluded that private investment in R&D is not attractive to businesses because framework conditions do not make it profitable. These conditions may have a relationship with the actual market, low level of qualified human resources, low in-house innovation capacities, the position of the company in the value chain and the knowledge and ability to capture the return on the innovation investment[9].

In general, the POLOS countries have made efforts in different levels to promote innovation and to bring it into their productive sectors; however, there is still a long path ahead.

9 ibid

5 NEW OPPORTUNITIES FOR EU-LAC COOPERATION

5.1 STRUCTURE OF THE OPPORTUNITIES FOR EU-LAC COOPERATION

The present chapter shows the opportunity fields that we have identified. These vary depending on whether the country/region has a RIS initiative in place or not. The type of opportunities identified for each case is as follows:

5.1.2 Countries with RIS

In countries with RIS we have developed bilateral cooperation opportunities between POLOS regions with a RIS strategy and European regions through filtering and selection process described in further detailed in section 6.1.
These opportunities are:

Brazil

- Amazonia Legal-Sweden
- Brazilian Northeast-Slaskie

Chile

- Antofagasta-Sicily
- Bio-Bío-Basse Normandie
- Valparaíso-Catalonia

Colombia

- Antioquía-Flemish Region
- Bolivar-Nordjylland
- Valle del Cauca-Galicia

Mexico

- Jalisco-Ireland
- Michoacán-Northern Netherlands
- Puebla- Rheinland-Pfalz

5.1.2 Countries without RIS

In countries without RIS we have characterised three types of opportunities: cooperation in horizontal national or regional priorities, vertical priorities in regions building regional bilateral cooperation programmes and singular vertical priorities with thematic focus. We are considering Brazil as a special case: even that some regions have published their RIS, the country can be considered as a whole, a country without RIS. All these opportunities are specified in section 5.3. In this case we have taken into consideration official documentation and interviews to pinpoint the following opportunity fields per countries.

Argentina

- Clusters policy
- National specialization sectors
- Agroindustry
- Environment and sustainable development
- Social development
- Industry
- Health

Brazil

- Cluster management and internationalisation
- Fostering green economy and R&D+I for Social Development
- Improve the best practices in energy management

Costa Rica

- Strengthen the national educational system
- Energy
- Production of food and manufacturing,

- Technologies, biosciences, related to health such as biomaterials and information systems
- Nanotechnologies

Ecuador

- Agroindustrial production chain
- Manufacturing chains articulated with basic industries
- Knowledge intensive service and sectors production chain
- Innovation ecosystem development
- Promotion of an innovative ecosystem in all regions

Peru

- Industrial parks in the framework of the Plan Nacional de Diversificación Productiva
- Science and Technology parks
- Technological Innovation Agendas (AIT)

Uruguay

- Regionalisation of innovation
- Advanced human resources
- ICTs and the Bioeconomy applied to the primary, agroindustry and service sector

5.1.3 All regions

For a fifth typology, we have selected European priorities and listed regions in Latin America and Europe that share it. We have called them European-Latin American and the Caribbean Shared Priorities and have coded them **using its acronym:** EU-LAC SP1, EU-LAC SP2, etc. The priorities selected are:

- Modernisation and added value in agriculture and the food industry
- Fishing and aquaculture
- Mining and raw materials
- ICT and the digital Economy

5.2 REGIONS WITH RIS

5.2.1 Matching process for the identification of new EU-LAC cooperation opportunities

5.2.1.1 Finding the raw data and automating the process

The task of identifying promising matches between Latin American Regions and European regions is conditioned by the high number of regions (over 200 in LATAM and over 250 in Europe). As explained previously, this one-on-one matching between regions cannot be based on simple economic similarity; It has to respond to the aspirations and the vision of future development established by the relevant stakeholders of that region. That is the reason why the current report focuses on regional innovation strategies in Latin America, and why it also relies on RIS3 to find cooperation partners in Europe.

In order to assess the cooperation potential of all the regions with RIS strategies in place (49 regions in MX, CO, CL, BR), an automated methodology was developed to find the European closest matches to Latin American regions, according to the similarities' in their selected specialisations. The basic source for this matching is the Eye@RIS3 RIS3 Specialisation Mapping database[10], developed by the S3Platform, which contains 1309 specialisation choices for 219 European regions.

The Eye@RIS3 RIS3 Specialisation Mapping is a rich and powerful source which characterises each regional specialisation according to the EU priority it belongs to, the capability involved (typically technologies) and finally the target market of that specialisation (typically economic sectors or public administration topics). After analysing the RIS strategies of the 49 LATAM regions, we could observe that almost all of them identify target markets for innovation and growth (selected sectors) but almost never identify or choose the capabilities on which this growth will be based. Therefore, the target market is the preferred matching variable between Latin American and European regions.

We built a replica of the Eye@RIS3 database, codifying the specialisation choices of each Latin American region with a RIS strategy, using the same terms as in the European version.

As an example, the sector priorities of the Mexican region Jalisco (the regional specialisation vector) is presented as follows:

10 The full database can be exported and downloaded from http://s3platform.jrc.ec.europa.eu/map

Figure 4: Regional specialisation of Jalisco (Mexico)

ID	Region/ Country Names	Description Field	Description	Target Market (Sub)
MX15	Jalisco	Agriculture, Livestock and Food industry	State traditional products	Crop & animal production, hunting & related service activities
			Berries	
			Diversification of tropical fruits derivatives	
			Functional food	Food, beverage & tobacco products
			Organic food	
			Innocuousness and food safety	Agricultural service
		Health and Pharmaceutical Industry	Chronic degenerative diseases	Human health activities (medical service)
			High Tech for healthcare	Biotechnology
			Regenerative medicine	Human health activities (medical service)
			Biopharmacy	Basic pharmaceutical procucts & pharmaceutical preparations
			Oncology	Human health activities (medical service)
			Nutrigenomics and nutrigenetics	Basic pharmaceutical procucts & pharmaceutical preparations
		ICT technologies and Creative industries	Gaming	Computer programming, consultancy & related activities
			Digital animation	Motion picture, video & television programme production, sound recording & music publishing activities
			Big Data	
			Cloud computing systems	Information service activities
			Internet of things	

The following table is a pivot extraction of the database, presenting the most usual sectors in the Latin American RIS database:

Figure 5: Ranking of specialisation sectors that appear the most in POLOS RIS

Distribution of specialisation sectors in POLOS RIS	
Manufacturing & industry	179
Agriculture, forestry & fishing	141
Energy production & distribution	53
Mining & quarrying	43
Tourism, restaurants & recreation	38
Information & communication technologies (ICT)	31
Human health & social work activities	25
Water supply, sewerage, waste management & remediation activities	22
Services	17
Transporting & storage	9
Construction	7
Creative, cultural arts & entertainment	7
Public administration, security & defence	7
Total general	579

Source: Innopro

5.2.1.2 Identifying good bilateral (region to region) cooperation partners

The objective of the matching process is to find "good" cooperation partners for Latin American regions, and the methodology of choice is to compute the minimal distance between regional vectors that contain the prioritized subsectors of each region[11]. If a region has prioritized a given sector, while another one has not, the distance between the two regions, in that dimension, is 1. If both of them, or neither, have prioritized that sector, the distance is 0.

The distances between all regions have been computed, and for each Latin American region, a ranking of best potential partners obtained. Lower distances will be found between regions that share several prioritized sectors, and thus the quality of the opportunity for collaboration will be higher, with better potential for knowledge exchange (both at a vertical and horizontal level) and creation of shared value chains.

This automated process resulted in the pre-selection of around 120 cooperation opportunities, which were later analysed one by one according to quantitative and qualitative knowledge about the American and European regions involved. After this

11 The universe of sectors and subsectors in the Eye@RIS3 database can be found in Annex 7

manual assessment, 15 cooperation opportunities were retained and analysed in depth. These opportunities are presented in the following section.

The following map presents the proposed bi-regional cooperation opportunities:

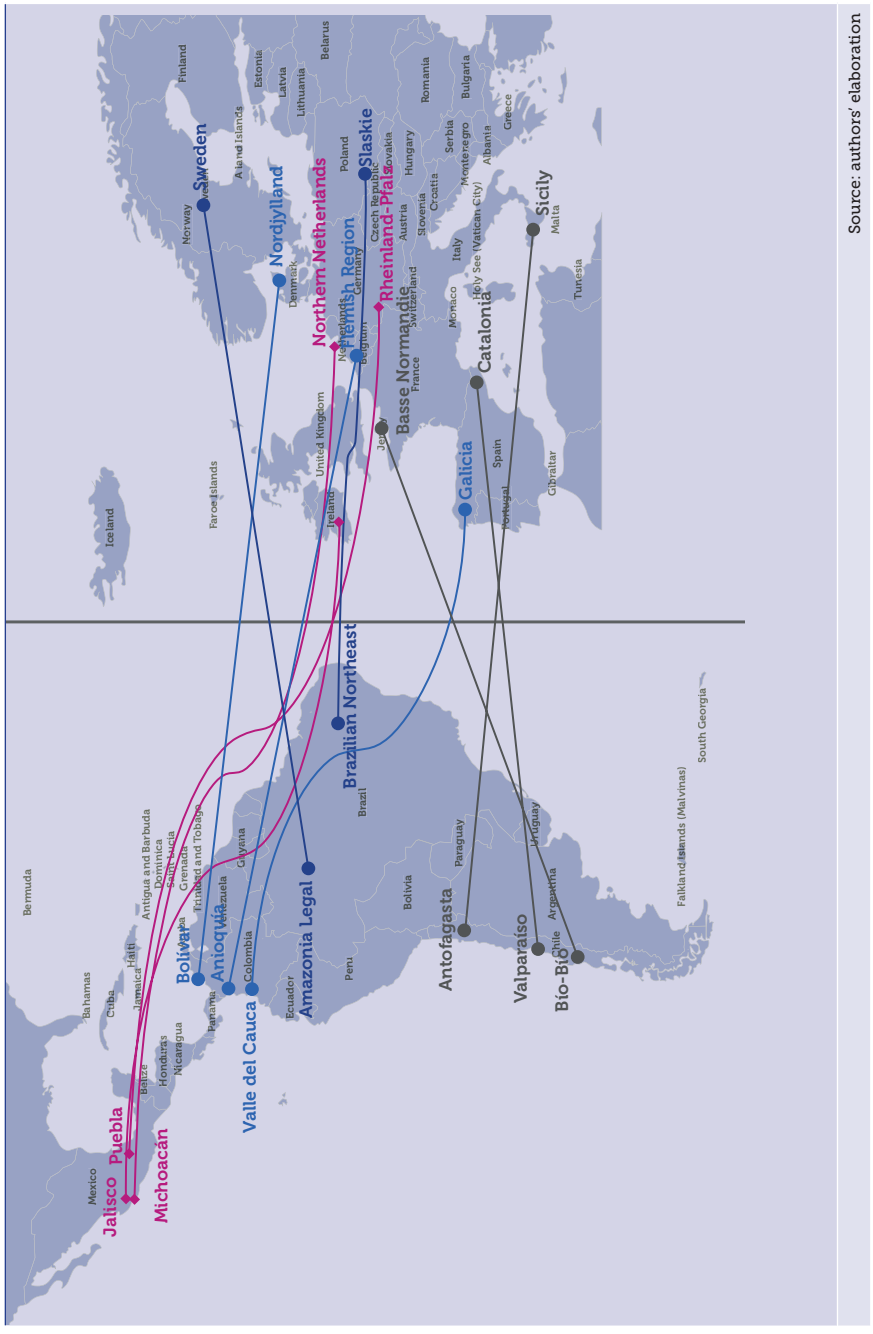


Figure 6: Map of selected bi-regional cooperation opportunities

The next sections characterise the proposed bilateral cooperation opportunities.

5.2.2 Brazil

5.2.2.1 Amazonia Legal-Sweden

Opportunity	Regional Information LATAM	
Amazonia Legal - Sweden	Regional GDP	€ 128.131.680.120
	% of National GDP	7,85 %

This opportunity is defined by a common interest in the bio industry and on mining operations.

Global Leadership	LATAM	EUROPE
	CONFAP-NORTE	Vinnova - National Agency of Innovation Systems

Common Sectors

- Manufacturing & industry, with subsector descriptions such as Synthetic biology, Biomimetics, Bioprospecting, New bio based materials, products and services.
- Mining & quarrying, with sectors such as Rare Earth, Limestone, Phosphate, Sand, Gravel, Iron.

5.2.2.2 Brazilian Northeast- Slaskie

Opportunity	Regional Information LATAM	
Nordeste Braileiro - Slaskie	Regional GDP	€ 389.383.878.617
	% of National GDP	23,85 %

This opportunity is defined by a common interest in energy sustainable and innovative energy production and distribution, bio and pharma industry, ICT and human health.

Global Leadership	LATAM	EUROPE
	Confap-Nordeste	National Centre for Research and Development (NCRD)

Common Sectors

- Energy production & distribution, with subsector descriptions such as Bioenergy, Wind, Solar, Tidal energy, Energy: Advanced manufacturing systems (Energy distribution), ICT: Cleaner environment & efficient energy networks (e.g. smart grids) power generation/renewable sources. Energy: Advanced materials (Energy distribution).
- Manufacturing & industry, with subsector descriptions such as Biotechnology, Basic pharmaceutical products & pharmaceutical preparations, Pharmaceutical chemicals
- Information & communication technologies (ICT), with subsector descriptions such as Information service activities.
- Human health & social work activities, with subsector descriptions such as Serum, Toxins, Vaccines, Production of recombinant proteins, Medicine: Ageing societies (Residential care activities), Medicine: Public health & well-being (Human health activities (medical services).

5.2.3 Chile

5.2.3.1 Antofagasta-Sicily

Opportunity	Regional Information LATAM	
Antofagasta-Sicily	Regional GDP	€ 16.531.834.413
	% of National GDP	10,50%
This opportunity is defined by a common interest in fishing and aquaculture, agriculture in a dry environment, sustainable energy and tourism.		
Global Leadership	LATAM	EUROPE
	InnovaChile	REGIONE SICILIANA Dipartimento regionale della Programmazione
Common Sectors - Agriculture, forestry & fishing, with subsector descriptions such as Fishing, Aquaculture, Desert agriculture, Sea (bio-resources and nautical technologies). - Energy production & distribution, with sector descriptions such as Non-conventional renewable energy, Sustainable energy systems. - Tourism, restaurants & recreation.		

5.2.3.2 Bio-Bío-Basse Normandie

Opportunity	Regional Information LATAM	
Bio-Bío - Basse Normandie	Regional GDP	€ 12.522.308.422
	% of National GDP	7,95%
This opportunity is defined by a common interest in fishing and aquaculture, food industry and food health, renewable energies and ICT.		
Global Leadership	LATAM	EUROPE
	InnovaBioBío	Agence régionale d'innovation Basse-Normandie MIRIADE
Common Sectors - Agriculture, forestry & fishing, with subsector descriptions such as Oyster, sustainable methods of aquaculture, re-use of waste such as empty shells and their transformation in building material, culture of Algae, preservation of marine ecosystems, Milk and meat production with R&D linked to production and conservation aspects such as microb ecosystems, probiotic cultures, packaging, equipment hygiene, Wheat, Vineyard, Forestry, Fishing. - Energy production & distribution, with sector descriptions such as Renewable marine energy generation, non-conventional renewable energy. - ICT, with fields such as Digital society – 1. secure electronic transactions (fixed & wireless, digital identity, contactless transactions), 2. scanning, digitalisation of documents, 3 virtual reality.		

5.2.4 Colombia

5.2.4.1 Antioquia, Flemish Region

Opportunity	Regional Information LATAM	
Antioquía – Flemish Region	Regional GDP	37.396.000
	% of National GDP	13,1%

This opportunity is defined by a common interest in energy efficiency, distribution and production, ICT, agroindustry and food biotechnology and advanced materials.

Global Leadership	LATAM	EUROPE
	Departamento Administrativo de Ciencia, Tecnología e Innovacion - COLCIENCIAS	Flemish Ministry for Work, Economy, Innovation and Sport

Common Sectors

- Energy and energy efficiency, with subsector descriptions such as Eco renovation of buildings, Smart grids, Energetic eco-efficiency and alternative fuels, Transformation and development of energetic materials, Bioenergies, Sustainable energy technologies with focus on hydrogen, wind energy and electrical vehicle.
- ICT, with sector descriptions such as Smart grids and last mile telecommunications, Content and applications for mobile devices for health, safety, tele-health and tele-education, Last-mile telecommunications, E-health applications, ICT research and development.
- Agroindustry and food biotechnology, with fields such as Bioingredients (for agricultural, livestock and human application), Biofoods, Healthy food and sustainable food production and processing.
- Advanced materials industry, with sectors such as Structural materials, nano-materials, self-healing materials, recyclable materials and materials for energy and light. Advanced production technologies and additive manufacturing. Transformation and development of construction materials, pigments, composites, Recycling, Polymers, Transformation and development of precious materials and ceramic materials.

5.2.4.2 Bolivar-Nordjylland

Opportunity	Regional Information LATAM	
Bolivar-Nordjylland	Regional GDP	11.405.000
	% of National GDP	4%

This opportunity is defined by a common interest in the naval industry, logistics and transportation and tourism.

Global Leadership	LATAM	EUROPE
	Departamento Administrativo de Ciencia, Tecnología e Innovacion - COLCIENCIAS	North Denmark Region (Growth Forum)

Common Sectors

- Transporting and storage: with sector descriptions such as intelligent transport (including logistics), Logistics for commerce.
- Tourism: with sector descriptions such as Tourism and experience economies

Common Sectors · Heavy industry (naval): with sector descriptions such as Design, naval construction and repair of naval vessels Agroindustry and food biotechnology, with fields such as Bioingredients (for agricultural, livestock and human application), Biofoods, Healthy food and sustainable food production and processing. · Advanced materials industry, with sectors such as Structural materials, nano-materials, self-healing materials, recyclable materials and materials for energy and light. Advanced production technologies and additive manufacturing. Transformation and development of construction materials, pigments, composites, Recycling, Polymers, Transformation and development of precious materials and ceramic materials.

5.2.4.3 Valle del Cauca - Galicia

Opportunity	Regional Information LATAM	
Valle del Cauca - Galicia	Regional GDP	26.459.000
	% of National GDP	9,3%
This opportunity is defined by a common interest in a wide range of shared sectors in the primary, secondary and tertiary sectors.		
Global Leadership	LATAM	EUROPE
	Sistema Nacional de Competitividad e Innovación – SNCeI (Comisión Regional Competitividad del Valle del Cauca)	Xunta de Galicia – Consellería de Economía e Industria – Axencia Galega de Innovación (GAIN)
Common Sectors - Meat production and the wider food industry - Fishing and aquaculture - Biomass / biofuels - Human health - Software and ICTs - Textiles - Automotive industry - Tourism		

5.2.5 Mexico

5.2.5.1 Jalisco-Ireland

Opportunity	Regional Information LATAM	
Jalisco-Ireland	Regional GDP	81.442.832.000
	% of National GDP	9,98%

This opportunity is defined by a common interest in agriculture and the food industry, in human health and the pharma industry, in ICT and in the Creative industries.

Global Leadership	LATAM	EUROPE
	Dirección Adjunta de Desarrollo Regional de Conacyt	Science Foundation Ireland - SFI

Common Sectors

- Agriculture, Livestock and Food Industry, with sector descriptions such as Organic Food, Functional food and Sustainable food and processing.
- Health and Pharmaceutical Industry, with sector descriptions such as Connected Health and Independent living, Diagnostics, Chronic degenerative diseases, Regenerative medicine and Oncology.
- ICT Technologies and Creative Industries, with sector descriptions such as Data Analytics, Management, Security and Privacy, Digital Platform, Contents and Applications, Gaming, Digital animation, Big Data, Cloud Computing Systems and Internet of Things.

5.2.5.2 Michoacan-Northern Netherlands

Opportunity	Regional Information LATAM	
Michoacan-Northern Netherlands	Regional GDP	20.456.349.000
	% of National GDP	2,51%

This opportunity is defined by a common interest in the agroo and food industry, and in a wide range of renewable energies.

Global Leadership	LATAM	EUROPE
	Dirección Adjunta de Desarrollo Regional de Conacyt	NOM (Investment and Development Agency for the Northern Netherlands)

Common Sectors

- Agroindustry, with sector descriptions such as Active ingredient extraction, Fruit pulp processing, Flavouring extraction and Agrofood.
- Renewable energies, with sector descriptions such as Geothermic, Hydraulic, Biomass, Solar and Energy.

5.2.5.3 Puebla-Rheinland-Pfalz

Opportunity	Regional Information LATAM	
Puebla-Rheinland-Pfalz	Regional GDP	28.728.613.000
	% of National GDP	3,52%
This opportunity is defined by a common interest in advanced manufacturing in capital goods and the car industry, in textile industry and in chemical industry.		
Global Leadership	LATAM	EUROPE
	Dirección Adjunta de Desarrollo Regional de Conacyt	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (Federal Ministry for Economic Cooperation and Development)
Common Sectors - Advanced Manufacturing (Heavy and Automotive industry), with sector descriptions such as Automotives & commercial vehicles industry, Manufacture and assemble of automobiles and vans, Brake systems, Dies and die-stamping Intelligence maintenance, Automation, Nanotechnology. - Textiles - Chemical, with sector descriptions such as new materials, design and recycling, compound materials.		

5.3 REGIONS WITHOUT RIS

5.3.1 Argentina

Argentina presents diverse opportunities for EU-LAC cooperation:

- **Clusters Policy**:

Argentina has a programme called “Local Productive Systems” to promote clusters and productive networks. This programme, created by the Subministry of the Small and Medium Enterprises and Regional Development, was launched in 2006. The programme works supporting the formation and development of new clusters and by providing non-refundable funds for activities and projects in already formed ones. This experience can create a two-way collaboration in the strengthening of the Argentine Programme through capturing best practices from European experiences and/or the use of the Argentine example to apply it in European Regions with similar environments and sectors.

- **National Specialization sectors**

The national prioritized sectors presented in the National Science, Technology and Productive Innovation plan also present areas in which collaboration is possible. The following are the sectors and subsectors identified as most relevant in Argentina until 2020:

- **Agroindustry**: Improvement in crops and seed production, Food processing, Bio refineries: bioenergy, polymers and chemical compounds, Agricultural and food processing machinery, traditional animal production, Non-traditional animal production, Production and processing of fruits and vegetables, Production and processing of forest products, Production and processing of oceanic products
- **Environment and sustainable development**: Capture, storage and availability of environmental data systems; Water resources, Restoration of degraded environments; Reduction of greenhouse effect gas emissions, Recycling, Climate change adaptation in urban areas, Economic valuation, measurement and evaluation of ecosystem services.
- **Social development**: Social economy and local development for inclusive innovation; habitat; Technologies for disabilities.
- **Energy**: Use of solar energy; Distributed generation of electricity (smart grids); Alternative energy farming and processes for the production of second generation biofuels; Rational and efficient use of energy; Technologies for oil and gas.
- **Industry**: Autoparts; transformation of natural resources in high added-value industrial products; Electronic components; Medical equipment; Technologies for logistics and transport.
- **Health**: Biosimilars; Infectious diseases; Cronic, complex illnesses with multigenetic components and associated to adulthood; Tussie bioengineering or regenerative medicine; phytomedicine; Technological platforms; nanomedicine.

- **Regionally managed initiatives:** In Argentina there already are innovation-related initiatives at a regional level in some provinces. Cordoba and Santa Fe have their own innovation promotion agencies. This type of initiative could be replicated in other regions. This does not necessarily imply RIS per se; they could be different type of initiatives that spring from and are executed by local governments. A platform for collaboration could be useful to promote these initiatives, as well as projects and programmes themselves.

- **Development of RIS in regions with a strong innovative ecosystem**

In Argentina, there are provinces that already have a strong innovative ecosystem where a next step could be taken, developing regional innovation strategies. The Provinces that spend the most in R&D and Science and Technology activities are Buenos Aires, Cordoba, Santa Fe and Mendoza.[12] This could be an opportunity to collaborate in the creation of the framework of these strategies, given the vast experience in Europe.

12 See: http://indicadorescti.mincyt.gob.ar/MAP/Maps.swf?prefix=ract&n=0

- **Regional specialization areas**

Even though there are no RIS in the provinces of Argentina, many have strengths in specific sectors. This can become a sectorial collaboration opportunity at a bilateral or multilateral level. Two examples of these specializations are the Automotive sector in Cordoba and Biotechnology in Santa Fe.

5.3.2 Costa Rica

In regards to the development policies, the Government of Costa Rica has published a four-year-plan, PND 2015-2018, in which they identified several areas to focus on in order to achieve a balanced national development.

Costa Rica led a prospective study called RUTA 2021 that identified five impact areas in which the application of science, technology and innovation would lead to achieve a knowledge-based economy.

Strategic areas:

- **Energy:** Solar energy, natural gas, biomass, hydrogen, tidal energy, wind energy.
- **Food production:** food security, climate change, sustainable agriculture, genetic improvement, soil loss.
- **Education:** personalized education, mathematics teaching, social appropriation of science and technology, development of talents and vocations, development of higher cognitive skills, recognition of studies between universities and digital platforms, entrepreneurial culture.
- **Water-Environment:** Water resources, climate change, waste and waste water treatments, biodiversity, bioprospecting
- **Health:** telemedicine, personalized medicine, integration and standardization of digital health systems.

As a result, the country has issued a National Plan for Science, Technology and Innovation for the next seven years, PNCTI 2015-2021 which includes the following items:

Impact areas identified:

- The first three impact areas are aimed at the strengthening of the **national educational system**.
- **Energy:** such as smart grids for urban areas, improve efficiency of industrial use, reduction of energy waste in transport by using of digital services in public administrations instead, renewable energies (including use of biomass). The Plan also foresees two pilot projects to develop smart cities.

- **Production of food and food processing**, mainly the areas of food security, development of added-value food products, functional food products and sustainable agriculture, climate change adaptation.

Technologies:

- **ICTs,** related to Data Analysis, knowledge society and digital technologies.
- **Biosciences,** related to health such as biomaterials and information systems.
- **Nanotechnologies,** in areas related to nano medicine, nano biotechnology, nano-microelectronics, nanotechnology and the environment, use of agro and marine residues to obtain new materials or their improvement, development of nano and micro sensors, bio refinery, nanocomposites, nano catalysts, energy and alternative sources of energy.

Although Costa Rica has not developed any regional innovation strategy, the government has shown the firm intention to achieve a better administrative decentralisation. For instance, there is a Programme for Innovation and Human Capital for Competitiveness that foresees productivity growth by supporting innovation activities and training in strategic areas, as defined in PNCTI (see section 4.1.5). The programme also envisages the 40% of financial support has to contribute to the development of areas with lower social development index, mainly located out of the Greater Metropolitan Area of San José.

As regards to achieving a better competitiveness, SMEs can access the PROPYME Fund, a financial tool to support their technological and scientific development. Moreover, the Regional Competitiveness Councils intends to achieve regional development by strengthening regional institutions for a better decentralisation.

5.3.3 Ecuador

Ecuador is in the process of changing its production matrix to reduce its dependence on the primary and extraction sectors. The following are the strategic production chains to be strengthened and industries identified as priorities. Development in these sectors can turn into collaboration options, especially at a private sector level:

Agroindustrial production chain:

- Cocoa products
- Mariculture

Manufacturing chains articulated with basic industries:

- Metal mechanic industry
- Pharmaceuticals

Knowledge intensive service and sectors production chain

- Sustainable tourism based on nature and culture
- Software and ICT services
- Integral management of solid residues- Recycling

Basic industries:

- Petrochemical
- Iron and steel industry
- Copper
- Aluminium
- Shipyards
- Wood Pulp

In reference to their **innovation ecosystem development**, Ecuador has recognized some challenges, described hereinafter, that may become collaboration opportunities with European entities fostering innovative ecosystems or regions with good practices in these topics. They have identified the need to grow the academic offer in science, technology fields to be able to meet the needs for innovation and scientific and technologic development in the country. In addition, they have the challenge of bringing this education throughout the whole country and adapting it to the special needs of each territory and to comply with the new productive matrix. In addition, they are betting for a better connection between the generation of knowledge and the production sector to achieve added value.

Finally, another opportunity is the **promotion of an innovative ecosystem in all regions**, enabling local participation in order to create a critical mass of innovation agents who can strengthen the quadruple helix in each region, taking them one step closer to developing regional innovation strategies.

5.3.4 Uruguay

As stated before in this document, Uruguay is making efforts in order to promote innovation through the whole country. This presents various opportunities at different angles:

- **Regionalisation of innovation:** One of the greatest challenges that Uruguay faces right now is to be able to create critical mass of companies in regions (other than Montevideo) who participate in innovation initiatives and programmes. This, according to authorities, requires the creation of capacities in these regions at different levels: Local administrations, private sector, universities, research, technology and training centres. This goal has been marked as a priority in their National Science, Technology and Innovation Plan. It can represent an opportunity for collaboration, for example, by bringing the experience of European regions or countries who have faced this situation and have been successful.

- **National Science, Technology and Innovation Plan priorities**: In their National Science, Technology and Innovation Plan, Uruguay sets different priorities, which can be subject to collaboration given its importance to national interests. These areas are the following:

- **Prioritised technologies**:
  - ICTs
  - Biotechnology
  - Other emerging sectors with great impact potential, such as nanotechnology

- **Prioritised Production sectors:**
  - Software, Information Systems and other audio-visual production.
  - Human and animal health, including pharmaceuticals.
  - Agriculture and Livestock and agro industrial production
  - Environment and environmental services
  - Energy
  - Education and social development
  - Logistics and transport
  - Tourism

- **Advanced human resources**: Uruguay has realized that incorporating highly prepared professionals raises the applications for national support for innovative activities, which is an objective they have. Bringing prepared professionals from Europe or forming local professionals in Europe to advance them in their academic background can also become a form of collaboration between the

public sectors, universities and/or the private sector.

- Uruguay has also recognized an opportunity in the innovative core formed by **ICTs and the Bioeconomy applied to the primary, agroindustry and service sector**, which could lead to collaborations between them and Europe between related entities.

5.3.5 Brazil

The Government of Brazil with the support of the Inter-American Development Bank conducted in 2011 the study of pilot projects in the development of sub-national innovation systems[13]. This can be seen as one of the series of national initiatives to reinforce the priority sectors in each state. Under this umbrella the following examples can be found:

- **Cluster practice:** Most Brazilian clusters have developed spontaneously and not by initiatives of government agencies. In 2012 the Ministry of Development, Industry and Foreign Trade (MDIC) launched the Observatório Brasileiro de Arranjos Produtivos Locais (APLs). The APLs are equivalent to the clusters in Europe. The lack of proper governance and international presence are common challenges for Brazilian clusters and APLs. Best practices and knowledge exchange clusters can be organised between EU-LAC clusters and specialised agencies in order to improve performance. This cooperation may result in value chain collaboration, knowledge transfer in the private sector and bilateral investment.

- **National industrial prioritisation:** The Ministry of Science, Technology and Innovation published a the 3-year strategy (2012-2015) that prioritised actions within the set programmes in ICT, Pharmacy Health Industry, Oil and Gas and Aerospace industry. The Strategy also includes Biotechnology and Nanotechnology as frontier transversal tools for innovation. Fostering Green Economy and R&D+I for Social Development are also considered relevant sectors in the Strategy[14].

- **Specialised innovation centres in Brazilian states:** As consequence of these priority programmes, states such as Santa Catarina are already working in drafting methodologies to strengthening the construction of Innovation Centres: e.g. Cardiology Institute of Santa Catarina or the Centre for Science, Technology

13 Los sistemas regionales de innovación en América Latina, © Banco Interamericano de Desarrollo, 2011. Juan José Llisterri y Carlo Pietrobelli con la colaboración de Mikael Larsson

14 Estratégia Nacional de Ciência, Tecnologia e Inovação 2012 – 2015 Balanço das Atividades Estruturantes 2011, © Ministério da Ciência, Tecnologia e Inovação (MCTI)

and Innovation on Milk and Dairies at UdeSC campus. Santa Catarina has also entered into two agreements with European innovation agencies to share experiences.

- **Sao Paulo specialised sectors**: Sao Paulo region is a global powerhouse. It concentrates the highest proportion of medium and high technology manufacturing, and the highest percentage of companies involved in innovation activities. It also hosts the largest infrastructure and activity in science and technology in Brazil. The government of the state of Sao Paulo has identified the following priority sectors: Agrobusiness, industry (automotive, pharma, aeronautics, oil&gas, capital goods), environment and renewable energy, education and training and tourism and culture. Although this list is not the result of a participation process of a RIS strategy, it can lead to bilateral and topic-based EU-LAC cooperation.

5.3.6 Peru

The regionalization of Peru is scarcely a ten-year-old process, which has had obstacles in its effective conditions of regulation and control. Some outstanding barriers have aroused, such as the shortage of human capital capable of assuming the transfers of power, poor financial controls or a highly centralized bureaucracy. However, some Government initiatives linked to regional specialization have been recently developed. The following are a few examples: The following are a few examples:

- **Industrial parks in the framework of the Plan Nacional de Diversificación Productiva**. The Ministry of Industry, PRODUCE, is currently progressing in the definition of a National System of Industrial Parks of Peru. The Government has the ambition to not only generate space for the location of businesses but to move forward in strengthening regional innovation systems. There is room for EU-LAC cooperation in the design and deployment of these parks.

- **Science and Technology parks.** Most R&D institutions and universities in Latin America are heavily centralized in the capital or top regions. Any development of regional ecosystems demands an initial investment in building up public R&D capacities in the regions. In the race to strengthen regional innovation systems PRODUCE is fostering the creation of strategic elements such as CITES, (Technological Innovation Centres). The Technological Institute of Production decides its location and specialization with the objective to establish a network of national centres. There is room for EU-LAC cooperation in the

design and deployment of a regionalization process of R&D capacities, which should be linked to regional specialization and challenges, connect with the existing economic environment (both large companies and SMEs) and with local universities and promote the development of horizontal capabilities on talent and lifelong learning, innovation, ICT, entrepreneurship and internationalization.

- **Technological Innovation Agendas (AIT).** To date, in Peru there is no record of any specific policy or action to facilitate the development of clusters. Nevertheless, the current Government, through the Fund for Innovation, Science and Technology, FINCYT, has recently launched the Technological Innovation Agendas. To halt an existing climate where companies were reticent to cooperate among them, this new instrument offers business clusters the chance to access counselling, business diagnostic, technology prospect or visits to international fairs.[15] There is room for EU-LAC cooperation in cluster management training.

5.4 SHARED PRIORITIES BETWEEN POLOS COUNTRIES AND THE EU

5.4.1 Overview

After reviewing the set of specialisation sectors in the POLOS regions with RIS, it is evident that some topics concentrate the interest of a large number of regions. It can be expected that in regions or countries without formalised RIS strategies, these topics are also relevant.

The following table lists the sectors and topics most usually selected in Latin American regional innovation strategies (Figure 7):

There is wide interest in the agriculture and food value chain, energy (particularly renewables), tourism human health, biotech, mining and raw materials and ICT. Some industrial specialisations (the automotive industry, textiles or pharma) are also specialisation topics of interest in Latin America.

Most of these topics are also priority areas for the European Union as a whole and for national and regional administrations across Europe. The European Commission has defined a set of priorities, within the central vision of Europe 2020. These priorities are advanced through a variety of policy tools, and have an impact on regional policy and RIS3, Horizon 2020, support to SMEs, the Digital Agenda, external relations or regulation

15 http://www.fincyt.gob.pe/site/1-innovacionint/703-agendas-de-innovacion-tecnologica

Figure 7: Most selected sectors in Latin American RIS

Top 20 specialisation sectors	Number of regions
Crop & animal production, hunting & related service activities	101
Power generation / renewable sources	50
Food, beverage & tobacco products	40
Tourism, restaurants & recreation	38
Fishing & aquaculture	23
Human health activities (medical service)	23
Biotechnology	20
Mining of metal ores	19
Motor vehicle & other transport equipments	19
Textiles, wearing apparel & lether & related products	17
Information service activities	16
Water collection, treatment & supply	14
Other manufacturing	13
Basic pharmaceutical products & pharmaceutical preparations	12
Forestry & logging	11
Chemicals & chemical products	10
Computer programming, consultancy & related activities	9
Machinery & equipment n.e.c.	9
Other mining and quarrying	0
Other sectors	126
TOTAL	579

and legislation, amongst other elements. From this set of priorities, and according to the nomenclature in the regional specialisation database, the following topics, which were very present in Latin American RIS, have been explored:

1. Modernisation of the agrofood industry
2. Fishing and Aquaculture
3. Mining and raw materials
4. Forestry
5. Energy production, distribution and efficiency
6. Waste and water management
7. Sustainable and energy-efficient construction
8. Logistics
9. KET – Biotechnology
10. ICT

11. Tourism
12. Cultural and creative industries

After reviewing the particular specialisation topics as defined by Latin American and European regions in their RIS or RIS3, and considering the nature of the policy tools and initiatives developed in Europe, the following cooperation opportunities have been detailed in the next section:

1. Technification of the agrofood industry
2. Fishing and Aquaculture
3. Mining and raw materials
4. ICT

Nevertheless, this selection of opportunities is just a proposal, and some other priorities offer promising opportunities for cooperation too, particularly the following:

1. Forestry
2. Energy production, distribution and efficiency
3. Waste and water management
4. KET – Biotechnology
5. Several industrial sectors

These topic-based opportunities, characterised by a significant interest in many POLOS regions, can be addressed by building multinational and multilevel cooperation networks, where specialised knowledge exchange and bilateral projects can develop within a common framework.

1 // Shared priorities between POLOS countries and the EU

Modernisation and added value in Agriculture and the Food Industry

Discription

Agriculture and the food industry are a central and structuralising part of any economy, both in Latin America and Europe. They also have over-reaching impacts on other relevant fields such as health, land-use, biodiversity, tourism, energy production, etc., and spread through wide multinational value chains that touch a multiplicity of adjacent and supplying sectors. The food and drink industry is the EU's biggest manufacturing sector in terms of jobs and value added. Agriculture has been one of the main policy topics of the European Union since its creation, and it is at the core of all nation-level development plans in Latin America and present in many POLOS regions as a selected specialisation sector.

Agriculture is present in 53 European RIS strategies and in 38 Latin American regions (almost all of them). The Food Industry is a prioritized sector in 84 European regions and 24 regions in Chile, Colombia, Mexico and Brazil. There are also some regions that specialise in biofuels or green biotechnology.

The aggregation of Agriculture and the Food Industry is the most ubiquitous sector/value chain in European and Latin American regional innovation strategies.

The opportunities for knowledge exchange, technology transfer, trade, investment and innovation between Europe and the POLOS counties are uncountable.

Some of the topics selected by Latin American and European regions are: several product value chains (dairy, meat, wheat, soy, beverages, canning, etc), product processing, sustainable agriculture, added-value product development, supplements, healthy and functional food, ready-to-eat, food industry machinery, quality, gastronomy, KETs in food production, traceability and supply chain, amongst others.

Ongoing European Commission programmes and initiatives

Agriculture and the food industry are top priorities of the EC.

Agriculture and Rural development are treated through a diversity of policy means and instruments, amongst which the two most important are the Common Agricultural Policy (CAP) and the EARDF (European Agricultural Rural Development Fund). The food industry is a prioritized sector in the Growth priority of Europe 2020, and leads on policy measures to aid the competitiveness of the European Food Industry and to combat unfair trade practices. Both are important topics in Horizon 2020.

The EARDF is a very good reference and best practice library for regional development in Latin America, for its impact on the technification and added-value of the agricultural sector and for the results on diversification in rural areas.

There is also the EIP (European Innovation Partnership) on Agricultural Sustainability and Productivity which contributes to ensuring a steady supply of food, feed and biomaterials, developing its work in harmony with the essential natural resources on which farming depends.

In 2016 a KIC (Knowledge Innovation Community) on the food industry will be designated by the European Institute of Technology.

2 // Shared priorities between POLOS countries and the EU

Fishing and Aquaculture

Discription

The European Union is the largest seafood market in the world, and presents some of the largest national fishing fleets. In Latin America, fishing and aquaculture are important sectors both for local consumption and for export. Several Latin American regions have industrial-size fishing operations, and up to 17 have selected fishing and/or aquaculture as target markets for their innovative specialisation.

Some of the topics selected by Latin American and European regions are: Blue growth (support sustainable growth in the marine and maritime sectors as a whole), technology applied to aquaculture, sustainable fishing & aquaculture, very high quality sea products, reduction of waste and re-use of by-products, aquaculture health, seafood industry and supply-chain, transformation of fish farm products, amongst other.

Ongoing European Commission programmes and initiatives

The Directorate-General for Maritime Affairs and Fisheries manages the common fisheries policy, which, apart from the fisheries management and control, includes also aquaculture and international policy.

Aquaculture is one of the five pillars of the "Blue Growth" EU initiative (see: http://ec.europa.eu/maritimeaffairs/policy/blue_growth/)

The EMFF is the fund for the EU's maritime and fisheries policies for 2014-2020.
It is one of the five European Structural and Investment (ESI), used by regions to advanced their Europe 2020 objectives, particularly in RIS3.

3 // Shared priorities between POLOS countries and the EU

Mining and raw materials

Discription

Securing a sustainable supply of raw materials is a key priority for the EU. Raw materials, such as metals and minerals or forest-based materials, have become increasingly important to the EU's economy, growth, and competitiveness. More than 30 million jobs in the EU and many key economic sectors such as automotive, aerospace, and renewable energy are dependent on a sustainable supply of raw materials.[17]

Several of the POLOS countries included in the report have leading mining sectors both in metal and non-metal resources, and in some cases are global leading suppliers. 17 Latin American regions have identified mining as a specialisation sector in their RIS strategy, and in countries without RIS in place, mining is also of national or local importance. Chile (4th), Mexico (5th), Brazil (6th), Peru (7th), Colombia (11th) and Argentina (20th) are in the top-20 world ranking by investment attractiveness in the mining sector in 2014.[18]

Therefore, there are clear synergies for the public and private sector in tightening cooperation and enriching value chains in the mining and raw materials sector.

Some of the topics selected by Latin American and European regions in the mining sector are: sustainable management of natural resources, minerals, technology and materials for mining, transformation and development of precious and ceramic metals, industrialization of mineral resources and a long list of actual minerals (copper, aluminium, rare earths, coal, etc.).

Furthermore, many European regions have selected topics in waste management that can provide complementary cooperation opportunities with Latin America.

Ongoing European Commission programmes and initiatives

Within the Internal Market, Industry, Entrepreneurship and SMEs section of the EU GROWTH priority, several initiatives tackle the mining and raw materials sectors. In 2008, the Commission adopted the Raw Materials Initiative which set out a strategy for tackling the issue of access to raw materials in the EU. This strategy has three pillars which aim to ensure:

– Fair and sustainable supply of raw materials from global markets;
– Sustainable supply of raw materials within the EU;
– Resource efficiency and supply of "secondary raw materials" through recycling.

The main initiative is the European Innovation Partnership on Raw Materials. Raw materials are also a focus topic in Horizon 2020, and the EC has a policy on Critical Raw Materials (CRM) and European Rare Earths Competency Network (ERECON). The whole topic benefits from the advice of a Commission expert group, the Raw Materials Supply Group.

There is also a European Innovation Partnership (EIT) Knowledge and Innovation Community (KIC) on Raw materials which mission is to boost the competitiveness, growth and attractiveness of the European raw materials sector via radical innovation and entrepreneurship.

Because of its strategic importance, the EC also implements a Raw Materials Diplomacy and particular Trade policies. The EC has developed relations in this topic with Argentina, Brazil, Chile, Colombia, Peru and Uruguay, 6 out of 9 of the POLOS countries treated on the current report.

17 See EC - Raw materials, metals, minerals and forest-based industries http://ec.europa.eu/growth/sectors/raw-materials/index_en.htm
18 Behre-Dolbear. 2014 Ranking of Countries for Mining Investment:"Where Not to Invest"

4 // Shared priorities between POLOS countries and the EU

ICT and the digital Economy

Discription

The use and development of ICT and the digitalisation of economic sectors and key societal functions can dramatically contribute to innovation, growth and jobs. The Digital Agenda is one of Europe 2020's flagship initiatives and touches almost all policy elements, including R&D, SME innovation, digital entrepreneurship, infrastructure and accessibility, skills and training, government and administration, competitiveness, etc.

As in Europe, ICT and digitalisation are a necessity and a pervasive path for growth and efficiency in Latin America, with three main topics of interest:
– Growth of the ICT sector.
– Digitalisation of economic sectors.
– Infrastructure building, accessibility and digital divide reduction.

The interest for ICT is present also at the regional level with at least 110 European regions and 21 Latin American regions selecting topics within ICT and electronics.

Therefore, there are clear elements of trans-continental cooperation and economic opportunities at several levels: business-to-business, government-government, business-government and also with the implication of R&D institutions and universities, which in Latin America are strongly advancing in creating ICT and entrepreneurship skills.

Some of the topics selected by Latin American and European regions in the ICT sector are: digital society, e-health, ICT for tourism, cybersecurity, big data, smart cities, digital creation, software development, gaming and digital animation, cloud computing, ambient intelligence and Internet of things, electronics and semiconductors, embedded systems, satellite communications and radiofrequency, mechatronics and automatisation, navigation systems, amongst others.

Ongoing European Commission programmes and initiatives

The Digital Agenda for Europe covers the following topics:
– Digital society
– Digital economy
– Access and connectivity
– Research and innovation

Within the list of subtopics for these topics, some of the most interesting for Latin America can be: digitalisation of public services, broadband, e-health, digital start-ups, innovation, components and systems. Several POLOS regions have selected some of these topics.

The European Innovation Partnership on Smart Cities and Communities is a leading European initiative that can cooperate with Latin American regions and cities. Smart cities is a hot topic in Latin America also.

Also of interest for POLOS countries and regions are the European efforts for bringing ICT and digital innovation to SMEs, an effort implemented through different mechanisms, such as ERDF (European Regional Development Fund), ESF (European Social Fund), Horizon2020 or the SME Initiative.

6 METHODOLOGY TO DRAFT A TENTATIVE ROADMAP FOR EU-LAC COOPERATION IN REGIONAL INNOVATION

6.1 OVERVIEW

In the previous section three typologies of cooperation opportunities have been identified, each of them leads to different roadmaps for the concretion of the cooperation.

In the previous section three typologies of cooperation opportunities have been identified, each of them leads to different roadmaps for the concretion of the cooperation.

1. **POLOS regions with a RIS strategy**: As established in the opportunity factsheets in section 5.2 for Latin American regions with a RIS strategy in place, partner regions in Europe have been selected in order to build wide cooperation programmes that tackle shared value chains and priorities within an umbrella relation. All this allows for focused or decentralised collaboration in the quad-helix and between public administrations. This cooperation framework will be best led and managed by transversal public bodies or agencies responsible for industry, innovation and/or R&D policy at a regional level. This typology of cooperation opportunity is the most focused and detailed amongst the three presented, since it is formed by regions identified as complementary by the automated process, and later analysed and selected manually. Leading and participating stakeholders in the public and private sector have been selected and proposed in order to build the taskforce for the development of the collaboration (See Annex 4).

2. **POLOS regions or countries without a RIS strategy**: In such countries or regions, it is not so evident to define cooperation opportunities according to

regional priorities, since they have not been formally agreed upon and detailed. Therefore, these opportunities are identified according to informal or qualitative knowledge about regional and national challenges and priorities. As established in section 5.3, there are basically two kinds of opportunities in countries or regions where no formal RIS has been established:

a. **Horizontal national or regional priorities: (Policies affecting all sectors and/or the innovation ecosystem).** In the current report, and in the bibliography, some clear horizontal priorities have been established in sections 4.1 and 5.3 of the document. These opportunities are frequently based on public sector policies, challenges and instruments, and can be object of state-level or regional-level cooperation, advice and knowledge exchange with the EU, European states, European regions or European consulting firms and expert agencies.

b. **Vertical (Sectorial) regional priorities**: **(Priorities applying to one or more sectors**). When there is no RIS strategy in place, some opportunities have been characterised in prominent regions, which are significant because of their contribution to national GDP or because of the liveliness of their innovative ecosystem. The priorities identified in these regions have not been formalised in a RIS strategy, so the level of confidence on their pertinence is low.

   Following the insights of section 5.3, these priorities can be addressed in two ways:

   - **Building regional bilateral cooperation programmes** between Latin America and Europe, as in section 5.2 (for regions with a RIS).[19]
   - **Defining ad-hoc programmes with a thematic focus,** managed at the most adequate governance level for each opportunity. For instance, if a mining region has a challenge with waste water management, this can be addressed by the most suitable partners in the region and country, and in Europe.

3. **Shared priorities between Latin American regions and the EU**: The opportunities established in section 5.4 are characterised by addressing continental challenges, and thus have to be governed and developed at the highest strategic and administration levels. From the European part, they would require collaboration between several EC directorates and can be of interest for

19 An example of that case would be the cooperation between Cordoba (Argentina) and Emilia-Romagna (Italy) or Santa Catarina (Brazil) and Baden-Wurttemberg (Germany).

multiple states and regions. In Latin America, they can be advanced through multinational networks at national and regional levels, and by quad-helix stakeholders (government, academia and knowledge institutions, enterprises, and civil society). Operationally, a wide and deep due diligence process has to be performed, in order to build on (and not conflict with) previous international and national policies, treaties, platforms and initiatives.

6.2 ROADMAP FOR COOPERATION

6.2.1 Roadmap for bilateral cooperation between POLOS regions with a RIS strategy and European regions

Objectives and description	The objective of establishing bilateral cooperation between POLOS regions with a RIS strategy and European regions is to build an umbrella structure for focused and decentralized cooperation amongst all kind of agents in the public and private sector, strengthening or generating knowledge exchange, investment and shared value-chains in priority sectors and in horizontal challenges and policy instruments. Between regions that share several sectorial priorities, the relevance and potential impact and added-value of collaboration at all levels is higher and thus participation and sustainability is expected to be better.
Action plan	A first action plan proposal is presented below: 1. DG Regio and EULAC Foundation analyse the bilateral cooperation opportunity and validate it or propose alternatives. 2. Further analysis, including bilateral conversations with selected stakeholders in both regions is performed, in order to measure interest, motivation and resources to start formal conversations. 3. A detailed cooperation proposal is drafted: This includes the cooperation topics (both vertical and horizontal), the first actions to be developed, a first set of leaders and participants and a calendar and budget. 4. A framework agreement can be signed and communicated to stakeholders and groups of interest, using the capillarities and formal and informal channels of the regional innovation ecosystem. 5. Definition of an operative planning of the activities proposed, according to the practical items in section 6.2.6

Action plan	6. Cooperation activities are developed, amongst them: a. Knowledge exchange workshops b. Common and bilateral research and reports on the participating regional innovation ecosystems c. Sectorial projects based on challenges and opportunities d. Exchange programmes between similar or complementary clusters e. Technology transfer programmes for businesses from the knowledge sector f. Promotion and management programmes regarding innovation in businesses g. Internationalization programmes h. Entrepreneurship programmes i. Training and talent programmes for entrepreneurs, public servants and policy makers j. International R&D projects k. International investment and cooperation projects l. Bilateral Agreements at an institutional level (for example, between universities, Chambers of Commerce, Technology centres, Regional administrations or agencies.) m. Staff exchanges from the public/ private sector n. Cross dissemination of opportunities (creating awareness of opportunities presented either in the EU or Latin America in order to present joint proposals) 7. The whole framework programme, and particular cooperation initiatives are followed-up on and evaluated

6.2.2 Roadmap for cooperation in horizontal national or regional priorities in regions without RIS

Objectives and description	The objective of building cooperation initiatives in horizontal national or regional priorities in regions without RIS is to address common transversal challenges or opportunities in POLOS regions' innovative ecosystems. These challenges and opportunities are usually related to R&D and innovation capacity building, fostering private innovation in peripheral regions or tackling decentralisation and governance bottle-necks.
Action plan	1. DG Regio and EULAC Foundation analyse the opportunities that have arisen as a result of this current prospective study and validate them or propose alternatives.

Action plan	2. Assessment of the need of a more in-depth analysis of the region decision-makers and quad-helix stakeholders and deciding whether initial bilateral conversations is worth developing. 3. If moving forward, then the pursuit of a top-down approach would be recommendable in order to measure the relevant authorities' current interest and resources. 4. A detailed document defining a roadmap for cooperation is recommended, including the list of possible partner EU regions, institutions or experts that could contribute expertise. 5. Using the boost of the EU-LAC Working Group in Cluster Competitiveness and Internationalisation formed by the EU-LAC Foundation to disseminate the regions horizontal challenges and priorities and exchange good practices via network and events is also a beneficial step 6. Composing Action Plans parallel to the exchange of good practises, within the following possibilities is also recommended: a. Knowledge exchange workshops b. Common and bilateral research and reports on the participating regional innovation ecosystems c. Policy development or improvement programmes d. Promotion and management programmes regarding innovation in businesses e. Internationalization programmes f. Entrepreneurship programmes g. Training and talent programmes for entrepreneurs, public servants and policy makers h. Staff exchanges from the public/ private sector

6.2.3 Roadmap for cooperation in vertical priorities in regions without RIS, building regional bilateral cooperation programmes

Objectives and description	The objective of this roadmap is akin to the one in 6.2.1, which is to build an umbrella structure for focused and decentralized cooperation amongst all kind of agents in the public and private sector, strengthening or generating knowledge exchange, investment and shared value-chains in priority sectors and in horizontal challenges and policy instruments. Although in this case the POLOS regions have not defined a formal RIS, there is room for bilateral cooperation if the innovative ecosystem is rich and the Latin American region has defined some sectorial or horizontal priorities in a relevant forum or policy or have historically strong sectors they work in.

Action plan

A first action plan proposal is presented below:

1. Partner regions for selected POLOS regions are proposed. The process would be similar to the matching between Cordoba and Emilia Romagna or Santa Catarina and Baden-Wurttemberg.
2. DG Regio and EULAC Foundation analyse the bilateral cooperation opportunities and validate them or propose alternatives.
3. Further analysis, including bilateral conversations with selected stakeholders in both regions is performed, in order to measure interest, motivation and resources to start formal conversations.
4. A detailed cooperation proposal is drafted: This includes the cooperation topics (both vertical and horizontal), the first actions to be developed, a first set of leaders and participants and a calendar and budget.
5. A framework agreement can be signed and communicated to stakeholders and groups of interest, using the capillarities and formal and informal channels of the regional innovation ecosystem.
6. Definition of an operative planning of the activities proposed, according to the practical items in section 6.2.6
7. Cooperation activities are developed, amongst them:
    a. Knowledge exchange workshops
    b. Common and bilateral research and reports on the participating regional innovation ecosystems
    c. Sectorial projects based on challenges and opportunities
    d. Exchange programmes between similar or complementary clusters
    e. Technology transfer programmes for businesses from the knowledge sector
    f. Training and talent programmes for entrepreneurs, public servants and policy makers
    g. International R&D projects
    h. International investment and cooperation projects
    i. Bilateral Agreements at an institutional level (for example, between universities, Chambers of Commerce, Technology centres, Regional administrations or agencies.)
    j. Staff exchanges from the public/ private sector
    k. Cross dissemination of opportunities (creating awareness of opportunities presented either in the EU or Latin America in order to present joint proposals)

The whole framework programme, and particular cooperation initiatives are followed-up on and evaluated

6.2.4 Roadmap for cooperation in singular vertical priorities in regions without RIS, defining ad-hoc programmes with a thematic focus

Objectives and description	The objective of building ad-hoc programmes with a thematic focus, in response to singular vertical priorities in regions without RIS is to address specific challenges or opportunities with great potential for positive impact or growth. These opportunities respond to relevant elements specific to the regional economy, public policy or innovative ecosystem. Some examples of such approach are presented in the following list: Sharing experiences for a sustainable management of land Actions to support to tackle the challenge of waste water management in mining regions Development of common strategies for a sustainable tourism Strengthen the social capacities for the use of eHealth technologies
Action plan	A first action plan proposal is presented below: 1. DG Regio and EULAC Foundation analyse the cooperation opportunity and validate it or propose alternatives. 2. Further analysis, including conversations with selected stakeholders and expert institutions, is performed, in order to measure interest, motivation and resources to start formal conversations. 3. A cooperation proposal is drafted, which addresses a specific topic and the projects the actions devised to tackle it, with a first set of leaders and participants and a calendar and budget. 4. The cooperation proposal is validated by the public sector, relevant stakeholders, European and international institutions (if applies) and expert institutions. 5. Definition of an operative planning of the activities proposed, according to the practical items in section 6.2.6 6. Cooperation activities are developed The whole framework programme, and particular cooperation initiatives are followed-up on and evaluated

6.2.5 Roadmap for multilateral and multilevel cooperation in shared priorities between Latin American regions and the EU

Objectives and description	The objective of a multilateral and multilevel cooperation is to promote network-based cooperation that addresses specific shared priorities (sectors, challenges, opportunities) of interest to Latin American and European stakeholders. It allows for wide international knowledge-exchange networks, and for local initiatives with top-notch international expertise in very hot topics, guaranteeing quality and consensus in very relevant challenges such as mining, forestry or fishing. These cooperation opportunities have to be governed and developed at the highest strategic and administration levels.
Action plan	A first action plan proposal is presented below: 1. DG Regio and EULAC Foundation analyse the cooperation opportunity and validate it or propose alternatives. 2. A deep analysis of the topic is performed, including, amongst others: a. Current situation and trends b. Policy at national and international level, international treaties c. Existing networks, projects and initiatives d. Best practices e. Reference bibliography 3. Informal conversations with public administrations, selected stakeholders and expert institutions, are performed, in order to measure interest, motivation and resources to start formal conversations. 4. An international forum is organised, inviting selected national and regional administrations and stakeholders. By consensus, a cooperation proposal is drafted. It must address a specific topic and the projects the actions devised to tackle it, with a first set of leaders and participants and a calendar and budget. 5. The cooperation proposal is validated by the public sector, relevant stakeholders, European and international institutions (if applies) and expert institutions. 6. Definition of an operative planning of the activities proposed, according to the practical items in section 6.2.6

Action plan

7. Cooperation activities are developed, amongst others:
    a. Knowledge-exchange programmes and forums
    b. International stakeholder platforms
    c. Best-practice definition
    d. Multinational research projects
    e. Communication and awareness programmes
    f. Norms and certification settings
8. Specific projects are developed in regions, with local governance, project management and autonomous economic and financial models
9. The whole framework programme, and particular cooperation initiatives are followed-up on and evaluated

6.2.6 Practical elements in all cooperation roadmaps

The following practical elements and functions are necessary for a good development of the cooperation roadmaps defined in the previous section.

Leadership	An initial selection of leading agents has been presented in the cooperation opportunity factsheets (section 5). These have to be validated by DG Regio and EULAC and contrasted by regional and national stakeholders in the POLOS countries. Obviously, these leaders must have the intention and resources to lead the whole cooperation framework, or, at a lower level, to lead cooperation initiatives in sector or policy topics.
Participants and stakeholders	1. An initial selection of stakeholders has been presented in the cooperation opportunity in section 5 or in annex 4. Before, or as soon as the cooperation is formalised, they should determine their level of participation and the corresponding objectives and resources allocated. An extra effort must be made to assure participation from diverse stakeholders from the quadruple-helix. The participants can come from the following groups: Promotion and management administrations and public/private organizations in the fields of science, innovation, competitiveness, internationalization, entrepreneurship, etc. 2. Clusters 3. Leading companies, whether they participate or not in clusters 4. Relevant SMEs, whether they participate or not in clusters 5. Research and Technology centres 6. Universities and other higher education centres 7. Intermediate organizations related to innovation and entrepreneurship. 8. Individuals of interest 9. Civil society, associations and users
Budget and economic model	The framework of bilateral cooperation, and the singular initiatives and projects within it have to be budgeted, and its cost distributed between sponsors and participants. The economic model can incorporate income from: · local, regional and national administrations · the European Commission or EULAC Foundation · international institutions · foundations and social agents · corporate sponsors, · from universities, R&D institutions, clusters, industrial associations and other intermediate institutions (in many cases as in-kind) Other International Finance Institutions such as the World Bank, the Inter-American Development Bank or CAF

Governance of the cooperation	An adequate governance of the cooperation programme has to be defined and built, and at least, it should be shaped by the following governance levels: Leadership Group with key institutions and individuals Broad participation body(ies) of stakeholders and beneficiaries Coordination, management and technical implementation unit This minimal governance structure can be replicated at a lower level for the particular cooperation initiatives and projects developed under the bilateral cooperation framework.
Follow-up and evaluation system	Follow-up and evaluation systems are fundamental to guarantee the sustainability of the cooperation, according to the following elements: 1. To improve and optimize the development of programmes and actions 2. To ensure the relevance of the actions in accordance with the strategic objectives of the cooperation 3. To Identify new actions and developments that would advance the objectives efficiently and define the basis for its implementation To communicate the results and impact to relevant stakeholders, and specifically in fund-raising activities In order to define the evaluation system, the process is: 1. Defining Goals 2. Analysing stakeholders and data/information sources 3. Measuring results 4. Verifying and assessing impact 5. Monitoring and reporting 6. Evaluating and steering Evaluation can be performed within the governance of the cooperation, and presented to sponsors and financiers in the public and private sector.

7 FURTHER DEVELOPMENTS IN THE IDENTIFICATION OF COOPERATION OPPORTUNITIES

7.1 DEVELOPMENT AND FURTHER USE OF THE POLOS RIS DATABASE

The database of Latin American regional specialisations compiled during the current project for Brazil, Chile, Colombia and Mexico is a powerful tool capable of identifying new and more complex cooperation opportunities.

The database can also be extended to regions without RIS, with useful proxies such as R&D policy plans or wider regional development plans, extending it to new POLOS countries. Also, other regions in Chile, Mexico or Brazil are defining their RIS, and would be registered into the database.

With some further work, the database could be used to:

1. Identify bilateral or multilateral cooperation opportunities **between Latin American regions, building cross-border cooperation or topic-based cooperation**

2. Identify cooperation opportunities **according to keywords and key concepts, for instance, e-health or ICT for tourism.**

3. Identify cooperation opportunities **according to semantic analysis of the database text corpus**, which consists basically of prioritised sectors and horizontal approaches, **finding the hottest topics in Latin America**, or very specialised topics prioritised by a few regions

4. Identify cooperation opportunities **according to sector complementarities**, such as the potential for synergies between the oil and chemical industry, between ICT and Creative and cultural industries or between mining and heavy machinery. **A complementarity analysis would provide complex cooperation opportunities in global value chains**.

7.2 MULTILATERAL COOPERATION BETWEEN GROUPS OF REGIONS (CLUSTERS OF REGIONS) THAT SHARE A SIMILAR REGIONAL SPECIALIZATION

We can expect that there will be some relation between the diverse sectorial specializations that different regions select in their RIS. Coastal regions may select more frequently specializations such as fishery or tourism; regions with strong mining operations may select related sectors, such as heavy machinery or water treatment; there may be a positive correlation between ICT and some advanced services.

These complex non-linear relationships are very hard to find and characterize, but can emerge naturally with an automated region clustering process.

If the clustering is successful, we could expect to have a limited number of region clusters that contain a manageable number of regions that share interesting features, and thus could develop multilateral cooperation networks.

Figure 8: Stylised example of region clustering

Cluster #	Characteristics	Label
Cluster 1	Mainly agriculture	Rural
Cluster 2	Agriculture, mining, heavy industry	Extractive economy
Cluster 3	Industry and services	Mixed industrial economy
Cluster 4	Services, Creative industries, ICT, Tourism	Advanced services hub
Cluster 5	Services, Construction, Public Administration, Transporting	Emerging capital

Source: Innopro

Very specific knowledge exchange and development projects could be defined for a group of regions with similar interests and challenges, defining the most adequate roadmap and individual or regional partners in Europe.

Some tests have already been performed on the current database, and although the results in the middle are a bit difficult to interpret, clusters at the extremes (that is, regions focused on agriculture on one side, and service-based regional economies in the other) have been clearly identified. After some development of the database, the process could improve and provide also interesting results for mixed and industry-based economies.

7.3 ANALYSIS OF THE SOPHISTICATION OF REGIONAL INNOVATION SYSTEMS

During the current project, in parallel with the work on the RIS database, another data experiment was developed. Taking Peru as a basis, 328 different documents related to innovation (regional and individual strategic plans, policy documentation, relevant websites, academic reports and thesis, press releases, etc.) have been semantically analysed.

It is very interesting to note that the text corpus related to regional innovation is growing very fast, and that, as it could be expected, regions with a larger economy and innovative ecosystem tend to produce (or be cited) in more documents.

Figure 9. Number of innovation related documents in the regions of Peru

Region (Peru)	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Lima			1	3	5	3	12	6	19	13	22	25	25	50	44	57	9	299
Cajamarca	1	1		1	2	1	6	6	10	9	14	20	14	35	21	25	8	175
Arequipa				1	1		7	5	6	7	12	23	14	29	20	36	5	168
Cuzco							6	6	10	6	10	8	11	34	26	30	4	153
San Martín				1		1	6	4	12	5	13	9	18	27	22	19	2	139
Piura						1	6	8	9	7	9	12	9	24	20	24	5	135
Huánuco						2	3	2	12	6	14	14	11	21	12	20	4	121
Loreto		1				1	7	5	10	5	11	11	11	22	12	16	2	115
Áncash					1	1	6	6	6	5	12	7	9	15	15	24	3	110
Junín				2	1	2	6	1	5	6	8	10	8	18	18	19	3	107
Puno					1	1	6	2	4	8	12	7	9	23	12	16	3	106
Ica							7		8	4	8	16	8	19	11	18	1	101
Ayacucho						1	3	3	4	7	8	9	8	19	13	20	3	99

Figure 9. Number of innovation related documents in the regions of Peru

Region (Peru)	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Lambayeque							6	4	6	6	7	8	10	17	17	14	4	99
Apurímac						1	3		6	5	9	11	9	15	10	22	4	97
La Libertad					1		6	4	6	4	7	10	8	14	13	20	4	97
Callao				1	2		5	4	4	8	10	8	11	13	14	13	2	96
Tacna							3	1	3	4	8	14	7	9	13	19	5	87
Huancavelica				1			3		4	7	7	11	5	19	11	15	2	85
Amazonas						1	3	7	6	2	8	4	9	14	13	11	2	80
Madre de Dios				1	1	1	4		8	2	9	5	5	14	7	18	1	78
Moquegua							2		3	5	5	6	5	10	10	17	4	70
Pasco							4		4	3	6	9	5	7	14	14	3	69
Tumbes				1	1		6	2	1	2	5	8	6	15	10	9	2	68
Ucayali							4	2	2	2	6	5	6	9	2	8		47
Total	1	2	1	12	16	17	130	78	168	138	240	270	241	492	380	504	85	2801

Source: Universitat Politècnica de València (UPV)

The next step is to explore different semantic analysis, finding the hottest topics or the adherence to pre-defined key words. An example of this second course of action can be found in the following table, which lists keywords in the text corpus of different regions.

From these automated analyses, mature or more sophisticated regions in the POLOS countries can be pinpointed, and then specific roadmaps developed. For instance:

- more sophisticated regions may demand the definition of a formalised RIS, built in wide bottom-up consensus processes,
- less sophisticated regions may demand a thematic approach directed at particular opportunities or challenges.

Figure 10: Presence of key words in the text corpus of Peruvian regions

	sistema regional de innovacion	estrategia regional de desarrollo	estrategia regional de innovacion	politica regional de innovacion	fomento productivo	triple helice	cuadruple helice	universidad-empresa-empresa	Total
Lima	41	52	50	36	41	40	8	31	299
Cajamarca	28	29	29	24	21	19	4	21	175
Arequipa	31	29	31	21	18	16	4	18	168
Cuzco	30	28	29	20	17	15	4	10	153
San Martín	26	26	20	13	18	18	3	15	139
Piura	22	24	21	14	16	19	3	16	135
Huánuco	20	28	20	11	13	12	3	14	121
Loreto	23	24	22	10	14	14	3	5	115
Áncash	20	16	22	11	19	10	5	7	110
Junín	19	25	20	10	15	10	4	4	107
Puno	18	20	19	10	16	12	4	7	106
Ica	22	14	22	14	11	10	3	5	101
Ayacucho	20	18	18	9	16	7	4	7	99
Lambayeque	19	21	13	9	15	12	3	7	99
Apurímac	18	19	19	11	14	7	4	5	97
La Libertad	16	17	18	9	15	12	3	7	97
Callao	16	19	14	5	16	14	6	6	96
Tacna	19	14	15	10	11	8	3	7	87
Huancavelica	13	17	17	12	15	6	3	2	85
Amazonas	14	21	13	5	14	9	1	3	80
Madre de Dios	16	18	15	6	11	6	2	4	78
Moquegua	17	9	14	9	10	6	1	4	70
Pasco	10	17	11	8	9	9	3	2	69
Tumbes	11	14	11	6	11	8	2	5	68
Ucayali	12	10	6	2	5	8	2	2	47
Total	501	529	489	295	381	307	85	214	2801

Source: Universitat Politècnica de València (UPV)

8 CONCLUSIONS AND NEXT STEPS

1. The concept of regional innovation strategies, and more generally, the management and growth of regional innovation systems is pervasive in Latin American regional policy and documentation.

2. Four POLOS countries have regional innovation strategies in place (Brazil, Chile, Colombia and Mexico). In the case of Chile, Colombia and Mexico, they respond to national agendas and are therefore present in most regions. In Brazil, the definition of RIS has been promoted by certain regions (bottom up); some of the Brazilian states with largest economies and richest innovation ecosystems do not have RIS.

   Multiple vertical and horizontal opportunities can be identified between these POLOS and EU regions and national systems. With the information compiled from Latin American and EU RIS strategies, smart bi-regional partnerships between regions with a shared specialisation can be identified. It is also possible to gauge widespread topics and challenges of interest that can lead to multilateral network-based collaboration platforms.

   A very rich database of regional specialisation - as defined in Brazil, Chile, Colombia and Mexico's regional innovation strategies - has been built, following the format and content of the Eye@RIS3 database of European RIS3. In its current state, this database contains 1309 specialisation sectors in 219 European regions (the original information compiled by the S3Platform and 579 specialisation sectors in 49 Latin American regions or macro-regions, compiled during the current works).

3. Five POLOS countries do not have regional strategies in place, or they have not been found or clearly identified (Argentina, Costa Rica, Ecuador, Peru and Uruguay). None of these countries is, at the current moment, engaged in national or regional programmes to generate RIS strategies. Nevertheless, they clearly assess the importanceof strengthening regional innovation systems and of decentralising public policy and private investment in R&D&I. The efforts in this direction vary in strategy, intensity and success.

   There is a large pool of potential of EU-LAC cooperation opportunities, vertical and horizontal priorities, which can be established at all levels between the corresponding authorities and quadruple-helixes.

4. In countries with little fiscal and administrative authority and in regions were capacity for innovation is low, the best way to address existing challenges and opportunities is by means of focused horizontal and vertical policy, investment and cooperation initiatives. Therefore, regional innovation ecosystems can benefit enormously from focused projects and cooperation without the need (at this moment) of developing formal regional innovation strategies.

5. 46 particular opportunities for EU-LAC cooperation have been identified and characterised in the current document. These are mere proposals and have to be further analysed and be found of interest to all stakeholders involved. Of those:
   - **a.** 11 correspond to bi-regional cooperation between POLOS and EU regions which have RIS strategies in place. These opportunities have been selected according to the similarity in their specialisation vision and efforts, as defined in their RIS.
   - **b.** 31 correspond to vertical or horizontal challenges, opportunities and policy trends in countries and regions with no RIS strategies in place.
   - **c.** 4 correspond to potential multinational collaboration platforms addressing priority topics for the POLOS countries and for the EU. They are:
     - **i.** Modernisation and added value in Agriculture and the Food Industry
     - **ii.** Fishing and Aquaculture
     - **iii.** Mining and raw materials
     - **iv.** ICT and the digital Economy

   During the process by which these particular opportunities have been selected, hundreds of alternative opportunities hav been identified and characterised in varying degrees. This corpus of alternatives can be utilised in the future to expand or refocus EU-LAC cooperation.

6. A tentative roadmap for the development of the cooperation opportunities, adapted to the different cooperation typologies has been proposed. It covers the following elements: Objectives and description of the cooperation opportunity, Action plan, Leadership, Participants and stakeholders, Budget and economic model, Governance of the cooperation, Follow-up and evaluation system.

7. Several further developments, leading to the identification of new and more diverse cooperation opportunities are proposed, they would advance in the following directions:
    - **a.** Development and further use of the POLOS RIS database (cooperation between POLOS regions, cooperation opportunities according to keywords and key concepts, according to semanticanalysis of the database text corpus or according to sector complementarities)
    - **b.** Multilateral cooperation between groups of regions (clusters of regions) that share a similar regional specialization
    - **c.** Analysis of the sophistication of regional innovation systems by semantically analysing the corpus of policy documents, reports, websites, etc., published in Latin American regions

8. The current study, and particularly i) the large amount of information gathered and analysed, ii) the RIS database compiled for POLOS countries and iii) the automated process developed, configure a powerful platform and tool to identify and assess bi-regional, multilateral and thematic cooperation opportunities, and can guide future developments in EU-LAC cooperation in RIS, innovation policy, competitiveness and shared value chains.

9. The definition of RIS strategies in POLOS regions contribute to improving sustainable territorial competitiveness in Latin America and establish innumerable de velopment, innovation and collaboratio opportunities that can be made the most by establishing multilevel cooperation between public administrations, value chains and quadruple helixes in all concerned countries and regions.

innopro
CONSULTING

www.innoproconsulting.com

Ronda Universitat, 33 1r-1a-B 08007 BCN
93 302 87 27 – info@innoproconsulting.com

aliasgroup
Founder member of: TORRE inn

EU-LAC

EU-LAC FOUNDATION 2015