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Innovation and Regional Specialisation in Latin America

Identifying conceptual relations with the EU Smart Specialisation approach.

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Innovation and Regional Specialisation in Latin America

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Abstract

The Smart Specialisation concept, currently implemented in the European Union, is being widely considered by several countries and regions of Latin-America. The interest towards this approach, highly based on the enhancement of regional innovation capacities, is motivating territorial dialogues, participatory processes and collective vision related to the innovation perspectives of Latin-American regions. This article highlights how policy makers of Mexico, Brazil, Colombia, Peru, Chile and Argentina are considering the smart specialisation concept as an inspirational driver of regional innovation and specialisation. Understanding the socio-economic and contextual differences between EU and Latin-America, this working paper does not seek to elaborate value judgements on the way in which smart specialisation is being (or should be) adapted beyond the EU. Instead, the analysis seeks to emphasise the common tendencies of the concept implementation as a way to frame cooperation between regions of the EU and Latin-America.

Keywords: Smart Specialisation, Regional Innovation, Cooperation, European Union, Latin America.

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Executive summary

The smart specialisation concept is characterised among others by attributing fundamental relevance to collaboration and synergies. These opportunities appear at different policy cycle steps (e.g. design, implementation, evaluation) and include, among others, learning processes and exchange of experiences, innovative dynamics for the incorporation of added value, establishment of production relationships between countries or regions to position themselves within the global value chains.

The knowledge and capacities developed around innovation and regional specialisation policies in Latin America and the European Union provide a concrete collaborative framework oriented to approach regional economies specialised in common and/or complementary strategic domains. In this context the current study analyse how policy makers and other territorial actors in Latin America are adapting and implementing the smart specialisation concept, currently applied in the European Union. Understanding contextual differences, socio-economic variations and territorial approaches, the aim of this document is far from elaborating a comparative analysis between the European Union and Latin America.

Key conclusions

- The smart specialisation concept developed in the European Union is being greatly considered as a driver of regional innovation initiatives in Latin America. Although in most of the analysed countries, innovation and research policies are governed at central level, there exist reflection and related interventions to experience the role of regions towards the identification of their innovation potential from and with their own local resources.

- Currently, several regions of Latin America are conducting pilot activities aiming at testing the adaptation of the smart specialisation approach according to their own territorial characteristics and socio-economic contexts. In a more advanced stage, other regions count on a motivated political and institutional support to deploy structured specialisation including allocation of resources, elaboration of strategic planning and integration of inclusiveness in the selection of priorities.

- Collaborative frameworks between the European Union and Latin America have increased in the issue of smart specialisation allowing stakeholders of both continents to speak a similar regional-innovation language. The novelty of the smart specialisation concept in the EU as well as its adaptation in the Latin-American context is evidencing common framework for cooperation aiming at connecting policy makers and positioning specialisations in global value chains.

- Business opportunities for regional economies are directly linked to the smart specialisation approach and similar related initiatives. The participation of all sectors of society, including enterprises, research and academy as well as civil society is a fundamental step to strengthen regional innovation and specialisation.

1. Introduction

The exploration of competitive advantages through innovation is a fundamental tool by which emerging economies are able to overcome competitiveness trends at an international scale. With the so-called "lost decade" of the Latin American debt crisis experienced in the eighties, the majority of the countries in the region understand the importance of launching a productive transformation based on attributing more relevance to technologic progress, sustainable development and higher interaction between private and public players (ECLAC, 1996).

Aiming to reach the productive transformation, which implicitly associates the technology gap reduction, most Latin American countries are allocating resources strategically. The design and implementation of science and innovation policies and strategies are reflecting this tendency which also calls for a broad participation of public and private actors. However, these processes still lack exhaustive analysis which allow for the understanding of weaknesses and strengths of subnational territorial units as interventions that are predominantly designed and governed from national levels.

In the European Union, the territorial cohesion and regional development policies have progressively been oriented in this direction. The experience of the Regional Technology Programs, followed by the Regional Innovation Strategies (RIS and RIS+), up to the definition of the Regional Innovation Strategies of Smart Specialisation Strategies (RIS3) reveal the importance of regional dynamics, expertise and capacities as strategic input of innovation, also associated with the effective management of European strategic investment funding.

The development of RIS3 strategies requires that political representatives as well as key stakeholders have the capacity and willingness to explore cooperation opportunities. These opportunities appear at different policy cycle steps (e.g. design, implementation, evaluation) and include, among others, learning processes and exchanges of experiences, innovative dynamics for the incorporation of added value, establishment of production relationships between countries or regions to position themselves within the global value chains.

Accordingly, cooperation can also be applied to trans-continental frameworks with substantial contribution from regional experiences. The knowledge and capacities developed around innovation and territorial innovation policies in Latin America and the European Union may provide a concrete collaborative framework oriented to approach regional economies specialised (or willing to specialise) in common and/or complementary strategic domains. Figure 1 summarises the interests EU-LAC around territorial development and innovation.

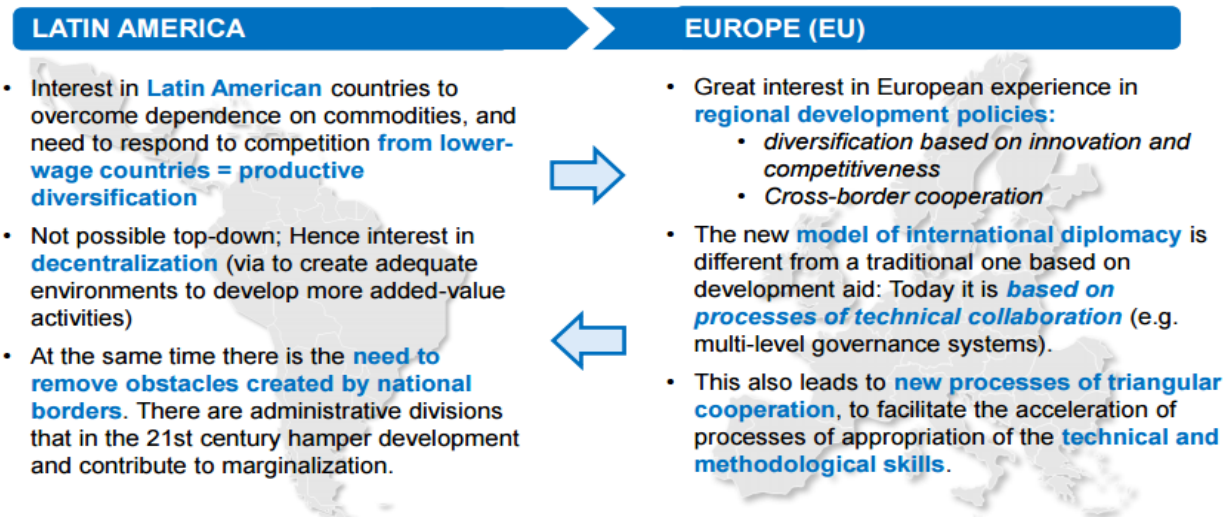

Figure 1: EU-LAC interest on common territorial development (Castillo & Paton, 2016)

The context of the EU-CELAC dialogue represents a solid opportunity to contribute to the strengthening of the regional policies in both sides of the Atlantic sea. The mutual interest of Latin America and EU policymakers for territorial development provides the framework conditions for the establishment of collaboration and mutual benefit. Smart specialisation appears as a driving instrument to facilitate synergies between regional innovation systems in both continents.

1.1. Objective

The objective of this article is to analyse how policy makers and other territorial actors in Latin America are adapting and implementing the smart specialisation concept, currently applied in the European Union.

Understanding contextual differences, socio-economic variations and territorial approaches, the aim of this document is far from elaborating a comparative analysis between the European Union and Latin America. Instead, the report focuses on identifying smart specialisation conceptual areas which represent a common ground for joint understanding of innovation leading to the strengthening of trans-continental cooperation.

1.2. Scope and methodology

The analysis focuses on six Latin American countries, namely: Mexico, Colombia, Brazil, Peru, Chile and Argentina. The selection of these countries constitutes a representative sample in terms of policy interventions and/or interest towards the concept of smart specialisation that has emerged

over the last years. These six countries represent 80% of the territory, 75% of the population and 85% of the GDP of Latin America and the Caribbean community[1].

Conceiving regional[2] dimension as the key territorial scope of smart specialisation, the study takes into account some regional examples of smart specialisation as a way to back the analysis. However, particular attention is paid to capturing insights from the country level according to two principal reasons: First, although expected to impact at a regional level, most policy interventions addressing smart specialisation, or similar undertakings, are designed from ministerial bodies in the framework of national research and innovation programmes. The second reason is because concrete studies and reports have deeply analysed several Latin-American regions of the targeted countries in the way of regional innovation strategies (European Commission, 2016).

The methodology applied to this analysis integrates desk research, an online survey and semi-structured interviews. These steps were designed in order to obtain necessary inputs to conduct approximated assessments aimed at identifying the weight of core smart specialisation areas in Latin-America.

Desk research was based on a literature review including policy reports, academic articles and documented experiences framed around innovation policies, smart specialisation, regional impact, global value chains and interregional linkages for cooperation. Previous analysis of the European Commission, particularly those carried out by the DG REGIO, were extensively taken into account, particularly the studies under EU-Latin America cooperation on regional innovation strategies in the framework of regional policy (European Commission, 2011b).

The online survey includes eighteen questions distributed in the six domains of reference according to the smart specialisation approach, currently implemented in the European Union. Specifically, these domains put emphasis on the territorial context, the governance process, issues related to the selection of priorities, the instruments and policies which support the strategies and aspects about monitoring & evaluation. The survey answered by managers of research and development policies and innovation programs in the analysed countries.

Semi-structured interviews were carried out via face-to-face or videoconferences. This exercise was designed to obtain complementary information in the six domains of reference but differed in what was addressed in the survey, for example, in aspects related to the efficient and effective coordination of regional R&D and innovation, the improvement of competitiveness in priority sectors and in relation to the definition of sectorial policies for specialisation, international competitiveness and added value products. The profile of interviewed stakeholders was similar to the survey's respondents and covered a total of eight interviews.

[1] 2015 data, CepalStat.

[2] Regional dimension here refers to subnational administrative units: NUTS2 in EU or federal states, departments and/or regions in Latin America.

2. Contextualising Latin-America and EU cooperation, the regional innovation scenario

Over the last 20 years, the European Union and Latin American relations have been developed through the regular EU-LAC dialogue. In the first years of this formal relation, concretely between 1999 and 2010, a total of six Summits of Heads of State and Government of the European Union and Latin America and the Caribbean countries were held. As a result of these dialogues, a wide range of cooperation areas have been established around key issues such as social cohesion (EURO-sociAL), climate change (Euro-CLIMA), promotion of SMEs and development of private sector (AL-INVEST IV), higher education (ALFA III and ALBAN), support for local authorities (URB-AL), information society (@lis), investments (LAIF), water management (RALCEA), migrations and anti-drug policies (COPOLAD).

The identification and implementation of strategic action areas however did not sufficiently respond to the structural changes that were taking place, particularly in Latin American countries, both in the socio-political context as well as in economic aspects. Accordingly, more decisive action was required in order to identify the structural factors that condition the transformations currently in progress. This structural change was formulated to generate a proactive evaluation process, capable of discovering beyond the terms of treaties and agreements, the social dynamisms strengthening the mutual benefits of the inter-regional collaboration policies.

2.1. The EU-CELAC cooperation framework and structured dialogue

This change of approach begins to be evident in 2010 with the VI EU-LAC Summit, held in Madrid under the motto: *"Towards a new stage in the bi-regional partnership: innovation and technology for sustainable development and social inclusion"*[3]. The Madrid Action Plan 2010-2012 identified knowledge management policies as fundamental step in the configuration of structural change.

From 2012, CELAC[4] is officially recognised as the Latin American counterpart of the European Union for the bi-regional partnership process. Since then, EU-LAC and EU-CELAC summits have been integrated in a single event which delivers strategic action plans for the subsequent two years. Accordingly, Table 1 shows how the priorities of these plans have increased over time and reveals that science, research, innovation and technology have been, from the beginning, a strategic area of cooperation.

[3] http://eeas.europa.eu/archives/docs/la/summits/docs/madrid_action_plan_en.pdf

[4] CELAC stands for *Comunidad de Estados Latinoamericanos y Caribeños.*

Table 1: Priorities of the EU-CELAC Action Plans

2010-2012	2013-2015	2015-2017
Science, research, innovation and technology	Science, research, innovation and technology	Science, research, innovation and technology
Sustainable development, environment, climate change, biodiversity and energy	Sustainable development, environment, climate change, biodiversity and energy	Sustainable development, environment, climate change, biodiversity and energy
Regional integration and interconnectivity to promote social inclusion and cohesion.	Regional integration and interconnectivity to promote social inclusion and cohesion.	Regional integration and interconnectivity to promote social inclusion and cohesion.
Migrations	Migration	Migration
Education and employment to promote social inclusion and cohesion.	Education and employment to promote social inclusion and cohesion	Education and employment to promote social inclusion and cohesion
The world drug problem.	The world drug problem	The world drug problem
	Gender	Gender-related issues
	Investments and entrepreneurship for sustainable development	Investments and entrepreneurial spirit for the purposes of sustainable development
		Higher education
		Citizen Security

Source: Action Plans of the EU-CELAC Summits

2.2. A common research and innovation area

At the second EU-CELAC/8th EU-LAC summit (Brussels, June 2015), political leaders highlighted the value of EU-CELAC cooperation in the field of science, technology and innovation and called for a strengthened cooperation moving towards an EU-CELAC common research area. The objective of this common area was to concretise cooperation through five strategic areas[5], namely: (i) Improving cooperation in research and innovation; (ii) Strengthening scientific and technological capacities and infrastructures; (iii) Enabling sustainable research, innovation and knowledge; (iv) Boosting the use of new and existing technologies and (v) Fostering cooperation between both regions in regards to the digital-economy.

This common research area integrates the work of the existing Joint Initiative for Research and Innovation (JIRI) initiated with the Madrid EU-LAC 2010 Summit. The JIRI mechanism operates through the Senior Officials Meetings (SOM) with representatives of the EU, Latin America and the Caribbean who conduct the bi-regional dialogue regarding Research and Innovation (R&I). Within the foregoing context, four working groups were created in relation to the priority areas of energy,

[5] Action Plan II EU-CELAC Summit: http://www.consilium.europa.eu/es/press/press-releases/2015/06/11-eu-celac-summit-brussels-declaration/

biodiversity and climate change, information and communications technology (ICT) and bio-economy[6].

The II EU-CELAC Summit ratified in its action plan the importance of the «*EU-LAC Joint Initiative of Research and Innovation*» for enhanced cooperation in science, technology and innovation. This EU-CELAC Summit also proposed that a "roadmap" shall be drafted and periodically updated in order to define specific objectives and corresponding result indicators for the application of the Joint Initiative.

2.3. Taking stock of cooperation on regional innovation systems

The international dimension of the EU regional policy has been the main cooperation driver between the EU and Latin America in terms of regional innovation. With the experience obtained through the evolution of different EU regional innovation programmes (e.g. RIS, RIS+, RIS3), the DG REGIO has promoted activities of knowledge transfer towards cross-border territories and countries of other continents, particularly Latin America.

Currently, there are regional policy dialogues formalized through written agreements with six CELAC countries: Brazil, Chile, Colombia, Mexico, Peru and Argentina. These regional dialogues include the exchange of experiences between regional authorities in the elaboration, implementation and management of urban and regional policies.

Table 2: Principal activities of regional policy dialogues

DATE	COUNTRY	DESCRIPTION
2007	Brazil	The EU-Brazil regional policy dialogue focuses on: • Policies for territorial cohesion and the reduction of social and regional inequalities; • Policies that contribute to economic growth, competitiveness and employment; • **Experiences** in the establishment and application of regional policies and for the organisation of territorial development strategies; Questions regarding **governance and association**, as well as planning and assessment procedures and methods.
2010	Chile	The main areas of cooperation for the work programme of the EU-Chile Dialogue on regional policy are: • **Multi-level governance/decentralisation**, capable of context-sensitive interventions while moving towards an integrated territorial development approach in Chile; • **Cross-border cooperation** taking into account European experience; **Regional innovation strategies**, namely in the framework of the project RED, co-funded by the EU.

[6] The EU-CELAC S&T Policy Dialogue. http://www.alcuenet.eu/policy.php

DATE	COUNTRY	DESCRIPTION
2013	Peru	The dialogue relates to the exchange of information and good practices, including: • Policies for the promotion of economic, social and territorial **cohesion, innovation and technological development;** • Cross-border, transnational and inter-regional cooperation; • To establish and apply regional policies, development and **cross-border integration** policies, including the creation of capacity, particularly at a regional and local level; • Questions regarding **governance** and decentralisation at several levels; **Sustainable** economic development and corporate social responsibility of companies at a territorial level.
2014	Mexico	In 2014 a dialogue was established regarding cooperation in terms of regional and urban policy. The main objectives of the dialogue are: • To cooperate and exchange information regarding **geographic policies** and other pertinent policies that contribute to growth, competitiveness, employment and towards a better territorial balance; • To exchange information regarding experiences in the establishment and application of regional and **urban** policies, with special emphasis in the methods of promoting the development of disadvantaged regions and zones, including urban, rural and cross-border zones; To exchange **opinions and good practices** regarding the organisation of forms of multilevel governance and regarding the development of regional strategies.
2015	Colombia	A new international cooperation agreement between the EU and Colombia regarding regional and urban policy for the exchange of experiences and good practices in policies related to: • Promoting economic, social and territorial cohesion, of significant importance for the situation subsequent to the conflicts in Colombia. • Policies in the area of innovation and technological development; • Cross-border transnational and inter-regional cooperation; • Development policies in **post-conflict** situations; • Establishing and applying **regional and cross-border development and integration** policies, including the strengthening of administrative capacity, in particular at a regional and local level; • Questions regarding **decentralisation** and multilevel **governance**; Questions regarding sustainable economic development and **corporate social responsibility** at a territorial level.
2016	Argentina	The dialogue is based upon previous cooperation activities. The dialogue relates to, among other aspects, the exchange of information and practices regarding economic, social and territorial cohesion policies, that include: • The promotion of **drivers of economic growth** such as regional innovation and cross-border cooperation; • The establishment and application of regional policies, including the **multiannual planning methodologies** and the organisation of territorial development strategies; • Questions regarding multilevel **governance and association**; • Planning and **assessment** procedures and methods. The main areas of cooperation are the regional innovation systems and cross-border cooperation.

Source: DG REGIO

Collaborative bridges between the elaboration and implementation processes of the RIS3 strategies in the EU regions and the design of regional innovation systems in Latin America have taken place through the following initiatives:

- **RED Project, connecting the innovation in regions**

  As a result of the EU-Chile cooperation in regional innovation systems, the experience of the RIS3 in EU was shared and promoted throughout the RED project. The DG Devco

elaborated a technical support programme oriented to define regional innovation strategies between 2011-2013 in 7 Chilean regions (Arica y Parinacota, Tarapacá, Antofagasta, Coquimbo, Metropolitana, O'Higgins and Biobío). With additional support of the Chilean Government, in 2013 another 4 regions were benefited from this initiative (Araucanía, Aysén, Los Lagos and Valparaíso).[7] After that, within the framework of the Regional Policy Dialogues the DG Regio supported the implementation of regional strategies through a technical cooperation program with visits to Europe, seminars and expert support.

- **Cooperation on Regional Innovation Systems EU-Peru**

  The DG Regio has supported the transfer of RIS methodologies in Perú in two diferent phases until now. The first one focused on a global diagnosis of regional innovation systems with two pilot regions Tacna and Cusco in 2013 (Granda, 2015). Later, in 2015 supported the analysis of regional strategies in other Cusco and Puno (European Commission, 2016) focusing in value chain approaches associated to the sectors coffee and textile. Activities such as technical visits, workshops and tutorials enabled the definition of the challenges of both chains and the possible mechanisms for competitive improvement.

- **Inter-regional cross-border cooperation**

  Based on the experience of the European Territorial Cooperation instrument, also known as Interreg, the EU regional policy has contributed to the promotion of cross-border cooperation in third countries. This initiative has integrated activities related to the promotion of regional innovation, particularly through projects like the "EU-Latin American Cross-Border Cooperation (CBC)" and "EU-Latin America cooperation on Cross-border Regional Innovation Systems" (Chile-Peru and Brazil–Peru) (European Commission, 2011b) (European Commission, 2013) (European Commission, 2015).

- **Innovation and territorial linkages city-region**

  More recently, the International Urban Cooperation (IUC) project was kicked off on 1st December 2016 and expects to contribute in increasing sustainability in cities and innovation in various regions. The smart specialisation approach has been included as a driver of cooperation in the three work-packages covered by the project: inter-cities cooperation in sustainable development, actions at a subnational level within the framework of the Global Covenant of Majors initiative and inter-regional cooperation regarding innovation for local and regional development.[8]

These cooperation exercises have contributed to reaching several conclusions and learning key lessons, applicable to other similar forms of collaboration (European Commission, 2014). The RED initiative has demonstrated the relevance of establishing medium-term cooperation (4-5 years)

[7] http://www.subdere.gov.cl/programas/divisi%C3%B3n-desarrollo-regional/proyecto-red-conectando-la-innovaci%C3%B3n-en-regiones
[8] http://ec.europa.eu/regional_policy/en/policy/cooperation/international/urban/

between the EU and Latin America as it would contribute to the enhancement of policies' stability beyond the political-electoral cycles. Improving the configuration of the regional and national strategies as well as linking them within a single process of strategic programming, have in certain ways contributed to effective financial execution and investments.

Complementary, it is necessary to consider new activities and projects with a clear capacity to take stock of previous initiatives and generate positive effects on a continuous basis. Pilot actions and good practices which scale up towards adaptation processes and bankable projects will certainly contribute to stimulate the production sector and generate business opportunities. In addition, such approach will result in avoiding both the dispersion of efforts as well as the "fatigue" of stakeholders (European Commission, 2011b).

Box 1: Specialisation in cross-border areas, clusters and multi-governance

The EULAC-REGIO project CBRIS: ***EU-Latin America cooperation on Cross-border Regional Innovation Systems (Brazil and Peru)*** identified a specialised cluster in aquaculture in the Amazonian border zone between Colombia, Peru and Brazil.

The **Cross-Border Cluster on Aquaculture was identified as a good example of specialisation** as it counted on the participation of non-profit, private or public/private entities. Based on the EU experience in the promotion and implementation of interregional cooperation; strategic objectives of cooperation, innovation, growth and internationalisation were identified as key drivers of implementation. Also, a governance proposal was included for the formal structure.

In general terms, the evidence indicates that an economic activity with enormous potential, known and accepted by the communities and public authorities reflect the way in which cross-border activity and cooperation can play a fundamental role, specifically when the experience is harboured, albeit informally (European Commission, 2015). An outstanding task may rely in linking the identified areas of specialisation with the current participation of researchers of these regions or countries in the European R&D activities and programmes (e.g. H2020).

2.4. Key aspects for EU-Latin America collaboration in regional innovation

Aggregated experiences provide the framework conditions for the establishment of a new stage in the collaboration between the EU and Latin America in terms of regional innovation and specialisation. Cooperation potential and pre-identified roadmaps have been already identified in the framework of regional policy providing thematic approaches according to specialisation levels in both continents (Barcelo, et al., 2015). Further collaboration should in general capitalise on previous experiences, lessons, results and outputs. Specifically, the following issues are identified as the main elements of this capitalisation:

- A collaboration network training base exists, in relation to both geographic as well as sectorial networks, above all in the field of science. Latin American universities have taken significant advantage of the opportunities of the European R&D programs, although collaboration also exists in said programs with companies, technology centres and governmental agencies.

- From the DG REGIO an inter-regional and international dialogue has been established with countries and regions of Latin America, which has allowed for the identification of regional stakeholders interested in progressing in the definition of smart specialisation strategies, also through regional cross-border cooperation. Collaborative projects in areas of interest in several Latin American regions have been implemented, enabling actions toward innovative and added value sectorial specialisation.

- The existence of the S3 Platform (and its thematic platforms) represents a potential contribution of the EU in terms of specialised technical support in the configuration of a regional policy based upon smart specialisation and in collaboration between regions of both continents in key technological fields.

Accordingly, the conditions exist in order to translate said practical experiences into collaborative actions based upon smart specialisation.

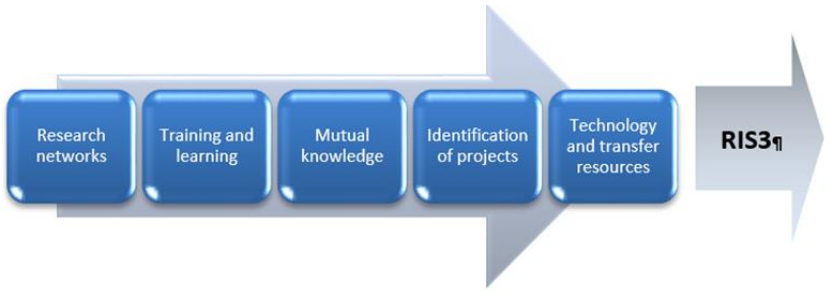

Figure 2. Methodological approach of EU smart specialisation platforms

However, structural, social and political barriers and difficulties continue to exist. Certainly, they may limit or condition the application of regional innovation strategies (RIS) and/or regional strategies of specialisation in Latin America. The main factors explaining these limitation are:

- Political will of regional and national authorities to progress toward decentralised development strategies, particularly in the fields of research and innovation.

- The technical capacities available and the institutional configuration. These aspects are evident not only in the availability of resources and human capital, but also in the relevance of centralisation which conditions the regional level of intervention.

- The limited financial resources to carry out the production transformation process necessary to assure added value in each of the production segments.

- The limited capacity to mobilise regional and local agents, including civil society against the observed high degree of motivation shown by these actors in pilot experiences related to regional specialisation.

Figure 3. Key aspects to progress of smart specialisation

3. The smart specialisation approach in the EU

From the deep reflection that took place after the end of the Lisbon Strategy, a territorial development model has become the subject of widespread application. This model responds to the new competitive context determined by globalisation and the differentiation regarding added value through the search for specialised diversification of different regions.

The model, also known as smart specialisation, is characterised by pursuing a participatory process leading to identify the unique characteristics and assets of each country and region, highlighting each territory´s competitive advantages, and rallying regional stakeholders and resources around an excellence-driven vision of their future (European Commission, 2010) (European Commission, 2011a). This vision has acquired significant importance in current principles of European Regional Policy and has become, through the smart specialisation strategies, an *ex ante* condition for a significant share of the European structural funding for the years 2014 to 2020 (European Commission, 2011c).

3.1. The smart specialisation conceptual model

The concept of smart specialisation comes from the strategic reflexion carried out between 2006 and 2009 by a panel of experts at a European level, supported by the DG Research called "Knowledge for Growth" (K4G)" (Pontikakis, Kyriakou, & Van Bavel, 2009). The mission of this group was to study the growing gap between the R&D efforts (in terms of monetary and human resources) and the effects thereof in terms of economic growth for the purposes of the establishment of recommendations for the Europe 2020 Strategy. It was concluded that, in light of the imperfections of the labour market, the different composition of the economic structure

(medium and low technological sectors in Europe compared with medium and high technological sectors in the United States), together with a problem of the scale and integration of economic activities at a regional level, limited the capacity of Europe to compete at an international level (Pontikakis, Kyriakou, & Van Bavel, 2009) (Knowledge for Growth, 2008).

In response to this situation, the Expert Group emphasised the concept of smart specialisation based upon the idea that regions must identify a series of technological and knowledge domains, through a process of entrepreneurial discovery, as potential sources of competitive advantages, and to orientate their policies towards the promotion of innovation in said domains (Forey, David, & Hall, 2009).

Thus, much of the conceptual body of smart specialisation comes from experts advising the European Commission and the European Commission itself (Foray & Van Ark, 2007) (David, Foray, & Hall, 2011) (McCann & Ortega-Argilés, 2011). According to the foregoing authors and the pertinent documents of the Commission (Barca, 2009) (European Commission, 2010) some authors (Del Castillo, Paton, & Barroeta, 2012) (Castillo, Paton, & Barroeta, 2015) summarize the concept of smart specialisation as "*a prioritization that takes place, at a territorial level, in economic activities, scientific areas and technological domains that are potentially competitive and generators of new market opportunities in a global context versus the prioritizing that other territories carry out*".

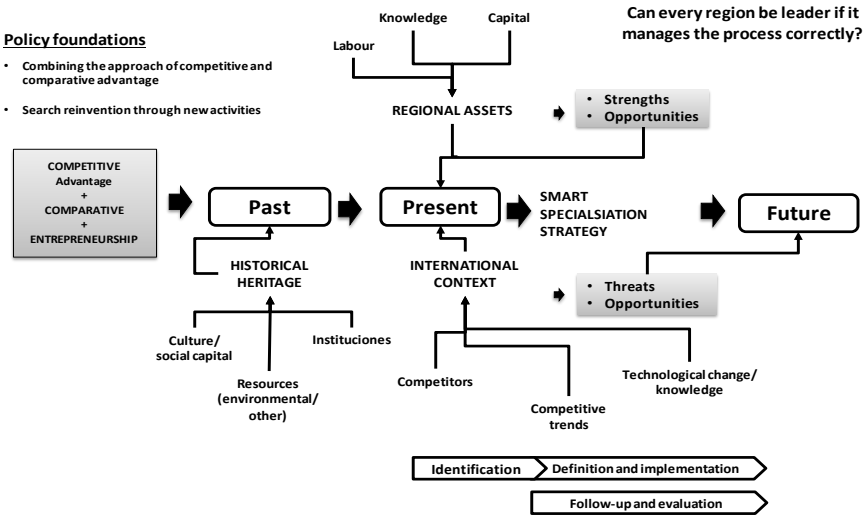

Figure 4. Conceptual logic of smart specialisation models in the framework of regional strategy definition
(Castillo & Paton, 2016)

Smart specialisation is interpreted not as the search of a pure specialisation in relation to the location economies within a territory, but, rather, as a diversified specialisation in relation to the opportunities derived from the related variety present in said territory (McCann & Ortega-Argilés, 2011) (Landabaso, 2011). Moreover, the foregoing principles have their roots in a dynamic logical framework that takes into account the assets of the territory (tangible and intangible) in relation to a global environment in which a solid good governance base, formalised by means of a smart specialisation strategy, could contribute to the establishment of competitive and comparative

advantages; thus reinventing and taking advantage of the opportunities of the territory in the different “waves of innovation” (Castillo & Paton, 2016).

3.2. Regional Strategies for Smart specialisation (RIS3)

In policy terms, the importance gained by smart specialisation approaches made the European Commission promote regions and countries to develop smart specialisation reflections in the form of regional strategies for smart specialisation (RIS3). The objective was to seek a diversified portfolio of related activities, with a balance between sufficient degrees of specialisation so as to be competitive, but without frustrating any potential diversification opportunities and, therefore, exposing the territory to the risks of changes in the market conditions or other external and unforeseeable situations (European Commission, 2010).

The smart specialization concept must be based on governance and a strategic process capable of securing competitiveness and competitive advantages from the territory's assets (tangible and intangible) in a global context. This process is intended to support the change and transformation of territorial economies through time (Castillo, Paton, & Barroeta, 2015).

According to (McCann, “Notes on the Major Practical Elements of Commencing the Design of an Integrated and Territorial Place-Based Approach to Cohesion Policy”, 2011), the smart specialisation strategy would operate as a type of policy related to the territory (a place-based policy), in light of the fact that, for the definition thereof, it is necessary to consider what the productive assets and knowledge bases of the territory are (the economic and knowledge specialisation patterns (Castillo, Paton, & Barroeta, "Etapas para elaborar una Estrategia RIS3", 2013) in which competitive advantages are also comparative advantages, from which to establish a series of place-based supporting instruments over time.

In term of regional policy, the process proposed by the Commission for the period 2014-2020 is not new but an updated and improved rethinking of the methodology used in the development of Regional Innovation Strategies in the previous period. This rethinking tries to face the difficulties and bottlenecks encountered in previous strategic processes, and especially to the new challenges included in the Europe 2020 Strategy (Landabaso, 2011).

This new approach includes the features of the smart specialization model (specialization, economic change and globalization) in order to maximize the development potential of each region. One of the new elements is the fact that these strategies must include some minimum elements regarding the ex-ante conditions to access European regional funding for R&D, namely: a SWOT analysis based on smart specialisation model, the definition of priorities and actions from a participatory consensus, identifying resources, and the monitoring and evaluation of the strategy (European Commission, 2010) (European Commission, 2011a).

To help regions and countries in the process of RIS3 definition, the European Commission launched the S3 Platform[9] as an initiative to "*provide information, methodologies, expertise and advice to national and regional policy makers, as well as promote mutual learning, trans-national co-operation and contribute to academic debates around the concept of smart specialisation*"[10]. As the main methodological reference, the S3 Platform, elaborated with the support of European level experts, serves as the Guide on Research and Innovation Strategies for Smart Specialisation (JRC - S3 Platform, 2012). The Guide sets out the concept and provides orientations on how to develop research and innovation strategies for smart specialisation (RIS3). Guidance is structured around six practical steps: 1) analysing the innovation potential, 2) setting out the RIS3 process and governance, 3) developing a shared vision, 4) identifying priorities, 5) defining an action plan with a coherent policy mix, and 6) monitoring and evaluation.

In addition to the Guide, the S3 Platform has also developed an instrument to support the process of definition by regional and national authorities. This instrument, known as the RIS3 assessment wheel includes all the six steps mentioned previously and is intended to help authorities fulfilling all the components a strategy must have: "*once the assessment is complete, the final result would appear in a form of "spider graph" where the strongest and weakest positioning would be easily highlighted*"[11]

Figure 5. RIS3 assessment wheel based on the 6 steps to RIS3 definition (JRC - S3 Platform, 2012)

One of the most innovative elements regarding previous periods and strategic processes in the 90s and 2000s was the guidance and homogenization of concepts and methodologies facilitated by the

[9] The S3 Platform is hosted by the Directorate B Growth and Innovation of the Joint Research Centre in Seville

[10] http://s3platform.jrc.ec.europa.eu/s3-platform

[11] http://s3platform.jrc.ec.europa.eu/ris3-assessment-wheel

S3 Platform. This allowed not only accelerating the exercises carried out by national and regional authorities, but the beginning of a collaborative process and transfer of knowledge and experiences thanks to some instruments; such as the peer reviews[12] and case studies (Ortega-Arguilés, 2012).

The key elements that appear when dealing with the definition of Smart Specialisation Strategies that every policymaker and agent participating in the process must take into account, are: a) it is a process guided from participation of all sectors of society, b) establishing links with the regional potentialities and expertise is needed as the basis for the strategy, c) a clear prioritization of actions and measures, d) complementary resources to support the proposed actions, and e) a monitoring system to regularly update the strategy. These elements characterize, in general, a process of smart specialisation definition.

The smart specialisation concept and the regional innovation strategies of smart specialisation (RIS3) implemented in the EU, appear as a result of several years of experiments, lessons learnt and mistakes experienced in previous programming periods. Logically, pretending to implement similar regional approaches in contexts different to the European Union would not contribute to enhance regional innovation. Instead, the insights and lessons of the EU experience with smart specialisation can be extensively considered for instance by emphasizing the relevance of cooperation and synergies, actors' engagement, skills and principles (McCann & Ortega-Argiles, 2016) . In the case of Latin-America many of these aspects are already being considered and adapted to the specific socio-economic and institutional contexts.

4. Institutional framework for innovation and regional specialisation in Latin America

The interest for innovation and competitiveness has increased over the last years in Latin America. After the so-called "lost decade" of the debt crisis in Latin America, many countries initiated the 21st century with significant economic and political dynamism including the definition of technological and innovation policies. More recently, the smart specialisation process experienced in the European Union[13] is attracting the attention of Latin American policy makers and motivating changes in innovation policies.

The heterogeneity of political organisations as well as the differences between Latin-American countries reflects the way and the degree in which this smart specialisation approach is being considered. On the other hand, these countries share certain structural identities and culture that facilitate the identification of common challenges in the continent. One of these challenges is the technological gap detected in most of the production sectors and associated firms.

[12] http://s3platform.jrc.ec.europa.eu/peer-reviews-cases

[13] As described in previous chapter, the smart specialisation concept applies legally in the framework of the EU cohesion policy for the period 2014-2020 as ex-ante conditionality for investments related to research and innovation.

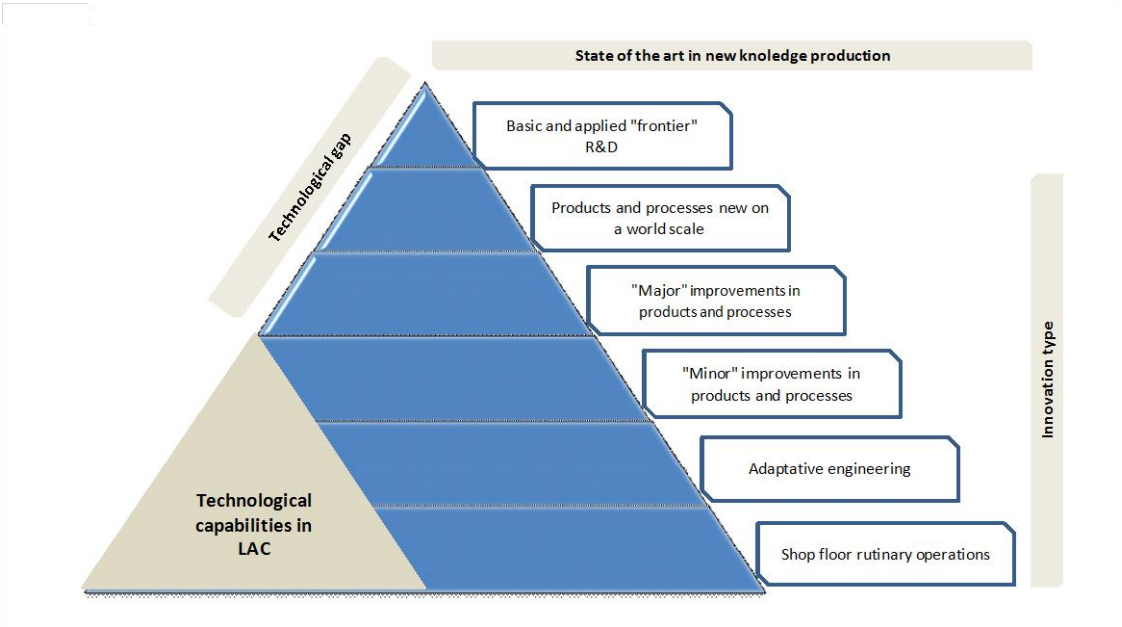

Figure 6. Innovation type and technological gap in Latin American firms (UNESCO, 2010)

The analyses of the technological capacities in Latin America reveal that, in many countries, serious deficiencies in the regional infrastructures exist. These weaknesses can be seen, for instance, in public technology institutes that have evidenced deterioration of their capacities without any clear established vision and mission, resulting in a lack of focus and relevance in the innovation systems (Bitran Colordo & González Urrutia, 2012). Also, with the exception of rare examples, scientific and technologic parks reveal a scarce impact in innovation systems both at a local and aggregated level (Rodriguez-Pose, 2012) .

Framing this scenario in the context of the global economy, strategic action from public authorities and significant mobilisation of private and public resources are needed. Latin American countries are lagging behind with an unchanged participation in the global exports of goods and services. The share of the exchanges of high technology goods and modern services has denoted reduction. Moreover, although Latin American participation has increased in the worldwide flows of direct foreign investment, specialisation has been strengthened in activities of low technological content (ECLAC, 2013). In the following sub-sections, we identify the main elements to understand how policy makers and institutional frameworks are reacting in order to face this innovation challenge.

4.1. Strategic decentralisation of innovation in Chile

In consideration of the complexity of the process of decentralization of some functions and powers from the central to the regional level, the President Michelle Bachelet instructed in September 2014 a ministerial committee to analyse and implement certain competencies that could be transferred through administrative measures to the law, to prepare the regional institutions and train the authorities and regional teams to face this challenge (Gómez Prieto & Dos Santos, 2017).

The innovation system of Chile is institutionally managed by the National Council for Innovation for Competitiveness (CNIC). Approved by the President of the Republic, the Council proposes long-term general guidelines for the development of a National Innovation Strategy. The promotion and execution of innovation polices falls under the responsibility of the Chilean Economic Development Agency (CORFO) which operates through four strategic units: Corporate Innovation, Entrepreneurship, Technology Transfer and Innovation Environment.

Chile is a country that shows good progress in the decentralisation and regionalisation processes related to the definition of regional development and innovation strategies. Although the institutional decentralisation is currently in a premature stage (Aroca & Atienza, 2016), the new legislation is facilitating a new regional institutional structure with enhanced powers. Currently, a decentralisation pilot plan is being implemented in the regions of Biobío, Antofagasta and Los Ríos. This exercise is based on establishing Regional Production Development Committees with the mission of creating incentives for business innovation.

With specific funding allocation enabled by the Innovation Fund for Competitiveness (FIC), a total of 25 strategic specialisation programs have been implemented. Territorially, these programmes are distributed at national, meso-regional and regional levels and respond to 7 strategic sectors (Mining; Healthy Food; Sustainable Tourism; Sustainable Construction; Health Technologies; Fishing and Aquaculture and Creative Economy) with the support of 4 technology platforms (Health, Logistics, Energy and (in certain niches) Advanced Manufacturing).

Despite the fact that strategies were configured with a regional specialised character, they pre-select the domains of specialisation from a national level. Accordingly, homogenisation may arise as a conflictive factor against the different critical masses and degrees of sectorial specialisation in the targeted regions. Additional difficulties have been detected, namely, in the financing of the roadmaps to deploy the strategies at a regional level, which are not always guaranteed. On the other hand, a positive aspect can be attributed to the meso-regional framework which has enabled highly relevant dimensions and needs to be identified where different regions may collaborate in new sectors such as the logistics sector.

The experience of the Strategic Programs has allowed policy makers to learn at least three fundamental lessons for the future. Firstly, in the institutional implementation stage, the process should receive both the public and private endorsement of regional players, something which, in occasions is not consistent with the mandate of the whole programme defined at national level. Secondly, when a roadmap is drafted, expectations that differ from reality may take place and thirdly, if the roadmaps lack of a management process, expected outputs may frustrate the commitments and deteriorate motivation.

Positive outputs of this process can also be seen in the regional dynamics and response of local actors. As an illustrative example, with the collective vision of stakeholders, the region of Biobío defined its regional strategy of specialisation with a clear orientation to support the traditional industry associated to the sectors of wood and furniture, mining, agro-industry or advanced production technologies, able to generate new production chains. The region of Libertador O'Higgins also defined its strategy as a learning process allowing the identification of non-represented bodies (no universities existed that had research centres, for example), as well as the importance of

establishing key sub-sectorial priorities (e.g. fruit, beekeeping and winery) and generate collaborative processes.

Box 2: Policy learning dialogue, smart specialisation in EU and Chile, common challenges and opportunities

The design and implementation of regional innovation agendas has motivated a fruitful exchange between stakeholders of Chile and the European Union. The Smart Specialisation Platform organised the ***Policy learning dialogue: Smart Specialisation in EU and Chile, common challenges and opportunities*** with the objective to learn from the experiences and debate the challenges associated to the elaboration and progress of the smart specialisation strategies in the European Union and similar initiatives in Chile. Smart Specialisation Platform staff and Chilean officials representing Corfo, Conycit, and Regional Authorities of Tarapacá, Atacama, Biobio and O'Higgins concluded that, although there exist differentiated conditions and contextual factors to implement the Smart Specialisation concept in the EU and Chile (e.g. regulation, funding, decentralisation vs. centralisation); common aspects appearing in both processes are: (1) bottom-up dialogues among actors of innovation eco-systems leading to identify priorities of specialisation, (2) targeted investments and (3) deep concern on the relevance of good governance and cooperation within and outside a region. (European Commission).

Brazil is the Latin American country that most invests in R&D and the only one that invests more than 1% of its GDP in R&D. It has an extensive network of bodies and institutions responsible for the design, promotion and execution of scientific and technology policy. The national government also controls the main bodies in charge of R&D policies. Some of these institutions are the National Council of Science and Technology, Ministry of Science, Technology and Innovation (MCTIC), National Council of Scientific and Technologic Development (CNPq) and the Coordination Bureau for the Improvement of Higher Level Personnel (CAPES).

The National Bank for Economic and Social Development (BNDES) reports to the Ministry of Development, Industry and Foreign Trade and is the main long-term financial instrument for technological development. Innovation, local and regional development and social and environmental development are, as of 2009, part of the BNDES strategic promotion.

The Research and Innovation Fund (FINEP) finances venture capital projects in priority sectors such as the agricultural and agro-industrial chain; energy, oil and gas; health; aerospace, naval and defence; ICTs and environmental sustainability. FINEP also executes programs to promote three types of networks: a) Networks of Innovation Centres; b) Technology Services Network and c) Extension Technology Network for the promotion of technical support for innovation within states, as well as subsidy programs for business innovation.

From the territorial perspective, the Brazilian regions (or states) count on Secretariats of Science, Technology and Innovation that meet together at the National Council of Secretariats for Science,

Technology and Innovation (CONSECTI). This Council has a non-profit private entity statute and exercises advisory services to national bodies. Similarly to other Latin American countries, only a few States in Brazil have a regional innovation policy supported with bodies in the definition, promotion and execution of technological development. One of these few cases is the State of São Paulo, which counts with the Research Foundation of São Paolo (FAPESP) as a strategic body to support research and innovation actions in the region.

The definition of strategic priorities is carried out from a federal level and described in the National Strategy of Science, Technology and Innovation. 2016-2019. This Innovation strategy defines eleven action areas such as aerospace and defence, water, food, biomass and bio-economy, economy and digital society, energy and enabling technologies, among others. The strategy acknowledges the need to strengthen capacities of regional stakeholders in charge of science and innovation. However, related action is not configured from the development of regional strategies but, rather, from the adoption of coordinated federal initiatives in order to optimise the results of the sectorial investments and through the planning and execution of joint actions between CONSECTI and other key actors (Ministerio da Ciencia, Tecnologia e Innovaçao, 2016).

Likewise, the innovation strategy is configured as a way to face future challenges related to the definition of more coherent and consistent policies. Analysing the availability of infrastructure and human resources as well as the progress in the consolidation of the local innovation ecosystems through the response to specific demands is also part of the strategy. Regional contribution to the success of large national investments and the promotion of international cooperation are also considered as relevant aspects within the global value chain approach.

The states of Pernambuco and Goiás, as well as the metropolitan area of Brasilia represent three initiatives which address the smart specialisation concept. The first was initiated in the framework of the sectorial dialogues EU-Brazil as a pilot project aiming at designing a RIS3 for the State of Pernambuco. Supported by the European Commission, through the DG REGIO, this pilot is currently scaling up towards the design of a real strategy which would become the first of its nature in the country. The second is a pilot project designed to take advantage of the decision of the multinational Chrysler to install an automotive production plant for exportation in order to promote the establishment of a business incubator in relation to the automotive pole. The third initiative corresponds to the metropolitan area of Brasilia, where the Brazilian Institute for Information on Science and Technology (IBICT) has led a process based on the EU concept of smart specialisation and adapted to the metropolitan area of Brasilia[14].

The experience to date shows that, while in Pernambuco the participation of the textile companies has been considered massive and highly satisfactory; the case of Goiás denotes a certain lack of enthusiasm from among the automotive sector companies. The degree of financing and institutional support are probably the driving factors of these different scenarios.

[14] Brasilia 2060 project, http://brasilia2060.ibict.br/

Box 3: Regional Innovation System in Pernambuco, a project supported by the EU

The Sectorial Dialogue European Union-Brazil financed the project: *Bases for the Implementation of a Regional Innovation System in Pernambuco state* - identified by the Ministry of National Integration (MI) as a pilot territorial action for the introduction and adaptation of the smart specialisation approach into the development model of the Brazilian Regional Policy.

This pilot project aims at **applying the concept of Smart Specialisation in the state of Pernambuco** in economic sectors related to garments (region Caruaru) and high-tech-automotive components (Goiás and Recife). The S3 Platform has supported Brazilian authorities (Ministries of National Integration and Science and Technology) by providing expertise and methodology advice leading to establishing an inclusive participatory process, defining regional context of innovation and drafting of the Smart Specialisation Strategy. This project counts also on the support of the Directorate General of the European Commission (European Commission, 2017).

4.3. Local innovation poles in Colombia

The programmes and activities of science and technology are targeted at a national level with certain coordination at a regional scale. The Administrative Department of Science, Technology and Innovation (COLCIENCIAS) presides the Joint Technical Committee for Innovation (CTM), which is part of the National System for Competitiveness and Innovation (SNCI) and includes the main public and private entities involved in technology and innovation policy. From 2013, the specific mission is to establish the institutional and territorial configuration between the regions and the national level, for the efficient use of the resources of the CTI within the country.

In light of scarce public financing for innovation, Colombia is a country in which private initiatives are of significant importance. From 2012, regional programs and projects for Science, Technology and Innovation receive, by constitutional mandate, 10% of the resources derived from exploitation of non-renewable natural resources. This financial scheme is integrated in the General System of Royalties (SGR) where the financial decisions are agreed upon among the regional governments, representatives of various universities and the national Administration and Decision Committee (OCAD). Although Colombia has other financing instruments, such as the National Financing Fund for Science, Technology and Innovation Francisco José de Caldas, the financial capacity is relatively reduced.

The national programme for the regional productive transformation gives relevance to clusters and identifies 6 production chains which together group over 28.000 companies; generate 1,2 million jobs and represent 60% of the exports of the country (Ministerio de Comercio Industria y Turismo). These clusters are more or less active depending on the regional strengths and focus on Chemical Industry, Fashion System, Metalworking, Agro-Food 4.0 Industries (Software and Information Technologies).

At a regional level, the productive programme includes the establishment of Regional Production Development Pacts. These Regional pacts include the elaboration of roadmaps aimed at enhancing the productivity and adding value to the products and services.[15] Additionally, Colombia is one of the few Latin American countries which count on regional Science and Technology Observatories which were established as a result of participative processes in order to identify opportunities and projects. Another key aspect of regional innovation is the existence of the Strategic Departmental Science, Technology and Innovation Plans (PADCTI) (INNOPRO/ALIAS, 2015)

In other cases, the existence of regional specialisation initiatives has allowed for the promotion of clustering projects. The departments of Bolivar and Cauca are advancing in this direction with the support of COLCIENCIAS through the Program for the Strengthening of the Regional Capacity of Science and Technology. This Program, focuses on the economic and social development of the cities by means of the generation and application of knowledge in sectors such as the automotive, textile, meat, fishing and aquaculture, biomass, health and ICT industries. This specialisation approach is analysed as an opportunity to establish alliances and corporate networks with European regions (European Commission, 2014).

Other specialisation exercises based on strengthening innovation also exist at urban and metropolitan levels. The specialisation of the Bogotá region is an initiative managed by the Chamber of Commerce of Bogota and inspired in the smart specialisation concept developed in the EU. This specialisation process has been built based on a joint participatory process engaging more than 140 actors, strategic dialogues with quadruple helix actors, public-private governance and an entrepreneurial forum. The clusters support is part of this agenda which gives priority to creative industry, bio-economy, advanced knowledge and sustainability.

Box 4: Public-Private alliances and metropolitan specialisation[16]

"Ruta N" is a consortium created by the Local Council of Medellin, the telecommunications company UNE and the municipal company of public water, sewage and energy services EPM. This Public-private initiative promotes the inclusive and sustainable economic development of the city based on businesses related to science, technology and innovation.

The main objective of Ruta N is to **develop a creative ecosystem based upon the areas of health and biotechnology, energy and advanced public services/ICT**, by attracting high value added companies and by promoting a new generation of digital entrepreneurs.

As a result, cooperation agreements have been signed with Spain, France, the Netherlands and the United Kingdom and 163 international companies have been established in the territory. In contrast, the lack of joint projects is established as an important limitation.

[15] http://www.mincit.gov.co/publicaciones.php?id=36775

[16] http://www.rutanmedellin.org/es/

4.4. Regional dynamism and specialisation in Mexico

In Mexico the initiatives conducted to support science and technology are determined at a central (federal) and regional level (states). The federal level is responsible to the main bodies for the drafting management and coordination of research and innovation policies. The most important bodies include the General Council for Scientific Research and Technological Development and the National Council for Science and Technology (CONACYT).

The federal government defines a national sectorial strategy which integrates 19 priority sectors divided into four categories: (1) Competitive sectors (e.g. manufacturing of transport, machinery, electric and electronic equipment, mining, business services, food industry, health services and tourism); (2) Development of the internal market, highly based on trade, housing and financial services; (3) New companies and entrepreneurship (e.g. agriculture of vegetables and fruits, software, R&D services, architecture, engineering and creative industries); (4) Sectors that constitute development platforms (infrastructures, telecommunications, education services).

At a state level, the governments are responsible for the promotion and coordination of the scientific and technological activities within their territory. In comparison to other analysed countries, the science and technology policies in Mexico are highly focused on activities oriented to support research and innovation developments coming from the higher education sector. Other attempts at a regional decentralisation of innovation policies are evident in the territorial development plans, the state innovation committees and the territorial innovation programs which aim at inserting local visions in the national strategy.

Funding allocation for the decentralisation of research and innovation is possible through the instruments FOMIX and FORDECYT. These bodies work in a coordinated way with CONACYT and are linked to regional innovation programmes. Although there is a contribution to support R&I action at a subnational level, the allocated budget from central government is not normally sufficient to finance projects of scientific and technological development oriented to the social and economic needs of the region (Bernaraz, 2015)

Between 2014 and 2015 CONACYT carried out a regional program for the definition of the 32 State Innovation Agendas and the 3 macro Regional Innovation Agendas (Central-North, South-Southeast and North)[17]. This initiative takes stock of the smart specialisation concept developed in the EU, particularly considering the Regional Innovation Smart Specialisation Strategies (RIS3). One of the final results has been the proposal for 495 strategic projects, many of them still on the shelve as not specific funding was allocated (European Commission, 2014). On the other hand, the Agendas have served as a strategic regional reference to identify key projects to be executed at a state and federal level (CONACYT, 2015).

[17] http://www.agendasinnovacion.mx

Box 5: The federal innovation agendas, an example of international coordination

The CONACYT, through the Directorate of Regional Development, was responsible for promoting the state and regional innovation agendas in Mexico. In order to facilitate the creation processes of the Agendas, the smart specialisation approach of the EU was highly considered. Particular relevance was given, for instance, to **regional leadership, interaction between regions and central government, identification and definition of priorities, participatory process of regional actors and establishment of a governance model**.

As a result, the process engaged a fruitful participatory process of 3.310 stakeholders, 1651 public and private institutions and 1245 working meetings. Management committees as well as consultancy groups were created in a multi-governance model (CONACYT).

4.5. Towards the implementation of RIS3 in Peru

In Peru, the actions of the State in terms of science and technology are principally located at a national level, through the National Council of Science, Technology and Technological Innovation (CONCYTEC). Regional governments also have corresponding bodies charged with promoting research activities as they are legally required to designate 20% of the total funds received for levies charged to universities.

Accordingly, the public sector is the principal implementer of R&D activities, which are mostly conducted by universities and, to a lesser extent, measured with the support of specific technological centres such as the National Aerospace Research and Development Commission (CONIDA); the Geophysics Institute of Peru (IGP); the Research Institute of the Peruvian Amazon (IIAP); the Peruvian Institute of Nuclear Energy (IPEN); the Peruvian Ocean Institute (IMARPE); and the National Health Institute (INS) and the National Institute of Agricultural Innovation (INIA). With the exception of the latter two, these structures hold an institutional profile which corresponds more to scientific centres, rather than knowledge transfer and innovation institutions.

At a national level, Peru has defined scientific-technical specialisation areas and elaborated specific programs of intervention to be implemented over the 2016-2021 period[18]. Biodiversity, Science and Technology of Materials, Environmental Science and Technology, Biotechnology, Basic Transversal Sciences and Information and Communication Technologies are the relevant areas of this initiative, which scarcely considers the role of regions.

The financial instrument "Innóvate Perú" is, as of 2008, the principal contributor to public investments in research and innovation. The support to research and innovation is provided through four specific instruments: FINCyT, FIDECOM, FOMITEC and MIPYME which target specific

[18] https://portal.concytec.gob.pe/index.php/publicaciones/programas-nacionales

interventions in the areas of ICT, SMEs, science and technology and communication, among others (SELA, 2016).

The interactions between the principal agents of the knowledge generation process and transfer is particularly weak. This can be partly explained as a consequence of the weaknesses of the business sector itself as well as the scarce openness towards innovation. The Peruvian business sector, taken as a whole, is highly heterogeneous and has a low propensity to invest in R&D and innovation. More than 90% of the Peruvian business structure made up of microenterprises and only a small number of companies (approximately 2%) carry out R&D and innovation activities which are highly concentrated within a limited number of sectors (Granda, 2015).

Box 6: Universities as key agent in the regional specialisation of Piura

The project: **Regional Agenda for sustained growth, strategy of smart specialisation for research and innovation in the region of Piura** finds its origin in the activities conducted by the University of Piura oriented to analyse innovation dynamics and policies in other countries (European Commission). Based on the smart specialisation approach, the project proposal was presented and approved by CONCYTEC in 2016. The main objective is to design the specialisation agenda of Piura for the following 5 years and includes key activities such as territorial diagnostic, strengths analysis, action plan and engagement of quadruple helix actors.

The project is expected to serve as a pilot model for other regions of Peru. Currently, only the regions of Piura and Arequipa are benefiting from initiatives leading to analysing and facilitating regional innovation capacities. As for the case of Piura, political support has also accompanied the process.

The Regional Innovation Agendas will establish a future and consensual perspective based on the scientific and technological knowledge of R&D and innovation. They will contribute to ***achieving transformation of the regional economy towards a more competitive and sustainable one in the long term****, Reynaldo Hilbck, governor of Piura* (Region Piura).

Concrete examples and analysis aimed at exploring the smart specialisation concept have taken place in the regions of Piura, Arequipa, Cusco and Tacna. The first two regions have developed pilot actions leading to elaborate regional specialisation strategies based on the smart specialisation concept implemented in the European Union. With an active participation of universities as principal agents of research and knowledge provision, these pilots are currently conducting analysis of the territories and engaging other key regional actors in a pure exercise of entrepreneurial discovery processes.[19] The regions of Tacna and Cusco have been the object of an exhaustive analysis conducted by the University of the Pacific leading to the analysis of regional characteristics in terms of innovation and the potential of conducting regional specialisations based on the RIS3 experience of the European Union. The analysis concludes that, although there exist several

[19] http://agendainnovacionarequipa.com

financial limitations at a regional level to support R&D action as well as the scarce interaction between innovation actors, progress does exist in relation to the interinstitutional communication and interest to strengthening the regional governance of innovation policies (Granda, 2015).

4.6. Argentina: National strategy and spatial concentration

In Argentina the National Government manage the main bodies in charge of design, management and coordination of science, research and innovation policies. The National Council for Scientific and Technical Research (CONICET) who depends on the Ministry of Science, Technology and Production Innovation (MINCYT) integrates more than 100 research institutions. CONICET is the main official body involved in the promotion of science and technology in the country and mostly focuses on basic research conducted from a number of universities.

Other key actors of the national innovation system provide support in terms of advisory services, interrelations, instruments and human capital[20]. The Production Sector Support Office (ASEP), advices companies in issues related to financing mechanisms for innovation. The network of Technology Relationship and Transfer Offices (OVTT) facilitates the interaction between science and technology institutions, companies and other stakeholders. The Technology Requests and Transfer Platform (PDTT) is a freely accessible tool to support technological innovation demands from national production sectors. Finally, the Technology Demands Relief Support Program (PAR) is a mechanism for the contracting of highly specialised human resources with the aim of supporting the Technology Requests and Transfer Platform.

Over recent years Argentina has applied institutional reforms in the national innovation system, which include funding. The reform of the National Agency of Scientific and Technological Promotion (ANPCYT) follows a strategic line based on technological and innovation research projects with generation of new knowledge and capacities. This initiative is supported by the fund for Scientific and Technological Research (FonCyT). Other strategic reform lies on the promotion of entrepreneurship and innovation which is facilitated by the Technological Fund (FONTAR). Innovation in specific sectors is financed in general with the Argentinian Sectorial Fund (FONARSEC) and in particular through targeted funding such as the Trust Fund of software (FONSOFT) which supports actions in the digital Industry.

The definition of priority domains also constitutes part of the structured reform of the innovation system. The innovation strategy counts on 10 Technological Platforms and identifies 12 strategic areas of intervention as a response to the innovation challenges of the country. Some of these priority areas are aquaculture, urbanisation of vulnerable zones, renewable energy, food, precision agriculture, new technologies for education and smart materials.[21] [22]

[20] http://www.innovacionargentina.gob.ar/apoyo/apoyo

[21] *Plan En Acción: Argentina Innovadora 2020*. Available at: http://www.argentinainnovadora2020.mincyt.gob.ar/wp-content/uploads/2015/11/plan-en-acción_web.pdf .

From a territorial point of view, the innovation strategy proposes a decentralisation exercise based on a deconcentrating process of activities and infrastructures from the metropolitan centre to the rest of the country. At a regional level, most industrial activity is concentrated in a few regions, potentially those more interested in the configuration of a sectorial specialisation program. At a provincial level, only local governments where the national production activities exist, have institutions for the development of science and innovation policy. That is the case of the Ministry of Science and Technology in the Province of Cordoba and the Commission of Scientific Research for the Province of Buenos Aires.

The future perspective is to establish sectorial technology centres at a regional level. The current reality is that attempts of smart specialisation are focused on the development of the software sector in the territories of Buenos Aires, Cordoba, La Plata and Rosario. This specialisation process relies on the formation of clusters, poles and technology districts and counts on the support of local governments. The software sector is a highly dynamic sector with highly proactive companies, with a significant share on both turnover and employment regarding the total regional.

5. SWOT analysis of regional specialisation, the vision of institutional agents

Over the recent years, several Latin American countries have carried out increasing efforts to encourage productivity changes and innovation. The transformation of existent institutions and the creation of new public departments addressing innovation policies constitutes a clear evidence of this tendency. The empowerment of sub-national territorial units (e.g. regions, departments, federal states) towards the design of innovation policies also reveals a step forward in the legitimization of regional strengths and consequent interventions. These practices have provided significant inputs towards the identification of regional potentialities and priorities, engagement of territorial players and coordination between national and local policies.

This section describes the main findings derived from the analysis of regional specialisation in Latin America, specifically in Mexico, Brazil, Colombia, Chile, Peru and Argentina. We use the term regional specialisation as a way to describe how the concept of smart specialisation, currently implemented in the EU, is being taken into account in the observed countries. Understanding the socio-economic and policy background differences, we emphasize on similar aspects between the processes of regional specialisation (Latin America) and smart specialisation (European Union) aiming at identifying common ground for transcontinental cooperation. According to the methodological approach of this study, the following results integrate inputs obtained from literature review, semi-structured interviews and an online survey.

[22] http://www.mincyt.gob.ar/noticias/macri-baranao-y-vidal-presentaron-proyectos-estrategicos-de-cooperacion-en-el-sector-publico-12339

Table 3: General assessment

Country	Documents follow the RIS/RIS3 methodology	Main barriers/ obstacles for the implementation of a RIS3 strategy	Identified aspects of success	State of play	Aspects to emphasise for the implementation of a RIS3
ARGENTINA	No	The concentration of activities in the metropolitan zone of Buenos Aires and the Buenos Aires-Cordoba axis	-	The RIS do not form part of the strategy	Regionalise the national innovation strategy
BRAZIL	Yes, for the national and regional strategy they are similar to the metropolitan strategies of Brasilia or Pernambuco	The significant differences regarding development, production specialisation and business structure between states	The regional specialisation poles related to large companies	Significant diversity of situations between states	Coordinate all of the actions between states
CHILE	Yes	Financing is centralised	The regional strategies in several regions have defined the sectorial priorities	Phase of implementation of strategies	Define the regional financing system of the RIS3, the configuration of the Smart Specialisation Strategic Programs supported by CORFO.
COLOMBIA	Formally speaking, yes.	The political difficulties limit the state coordination field of the strategies of the territories	"Route N" in Medellin	Definition and consultation phase	Designate further public resources and enhance the governance system
MEXICO	Yes, the Regional Innovation Agencies	The configuration of the state strategies and the federal authorities is highly deficient	The aeronautical cluster of Querétaro	Situation very different per states in relation to the application of the strategies	Defined by the Central Government, they must be supported by the states
PERU	2 Pilot projects supported by the national government	Limited resources and little experience with the innovation policies.	-	Pilot RIS	Define national and regional sectorial priorities and scale-up pilot experiences. Enhance financing for innovation.

Source: Authors

Regional specialisation appears as the key approach for innovation in countries such as Chile, Colombia and/or Peru. However, only Chile has set up regional strategies with a selection of priorities and specific allocation of resources. The role of Chilean regions in the participation of innovation policies is widely acknowledged and positively perceived. Exploratory pilots of decentralisation leading to provide more autonomy to the regions in these policies, are taking place[23]

In Brazil and Mexico, despite the fact that institutional coordination systems exist between the states and the federal government, the innovation policy is predominantly defined at a central level. In Mexico, the Federal Innovation Agendas[24] have resulted from the initiative of the national

[23] http://s3platform.jrc.ec.europa.eu/documents/20182/194883/ppt+Pasantia+19.11.2016.pdf/919d9806-2051-4e08-8169-12b2f7ef9812

[24] In spanish: Agendas Estatales de Innovación

government through CONYCET. The Mexican regions, however, decide on how to implement the financial and management instruments of their regional innovation strategies. The existence of leading companies in the territory, particularly large public or multinational companies, play a relevant role in the existence of clusters and models of this specialisation.

Similarly, Colombia attributes particular importance to clusters as a driver of regional specialisation. In some cases, this regional specialisation is restricted to pre-identified sectors (e.g. Information and communication technologies) selected from a national perspective[25]. Territorial concentration of resources and technological capacities are particularly evident in two metropolitan areas (Bogotá and Medellin) where the smart specialisation approach is highly referenced.

Argentina, with a strong economic and demographic concentration in the territorial axis formed by the cities of Buenos Aires-Rosario-Cordoba (or the provinces of Buenos Aires, Santa Fe and Cordoba), reveal a marked spatial concentration of scientific and technological capacities where innovation policies are defined by the federal government.

Almost all of the countries have identified a group of priority sectors to be promoted through their innovation policies. However, with the exception of Brazil and Argentina, where the priorities are identified from a national perspective, and Chile, with more empowerment to the role of regional governments no clear adequacy exists between the sectorial objectives and the development of territorial specialisation.

These differences create a varied Latin American panorama of regional specialisation. The variety of stakeholders and territorial players, including national authorities, development agencies, regional and local governments, research centres or multinational companies, also determines a differentiated relevance in the definition of the policies and the sectorial priorities for territorial specialisation.

However, the general trend of specialisation reveals a growing importance of the territorial dimension in the configuration of viable strategies for competitiveness and innovation. With different milestones, and with specific peculiarities in each country case, the definition of priority sectors and related activities tend to be configured on delimited territorial areas (e.g. inter-urban corridors, regions, departments, metropolis and provinces). In a certain way, this territorial delimitation favours policy interventions that tend to be coordinated with national policies.

Centralisation of budget is also a persistent characteristic of regional specialisation. Although some of the analysed countries have federal-type administrative structures (e.g. Mexico, Brazil or Argentina), their institutional structure is not always accompanied by budgetary decentralisation, meaning innovation policies are managed at a national level. In contrast, countries such as Chile and Colombia are legitimizing regional competencies in the management of funds.

Another key finding lies on the fact that regional specialisation in Latin America is perceived as part of “secondary policies”. Technological and innovation policies occupy, for example, less relevance in

[25] http://www.colciencias.gov.co/convocatorias/innovacion/convocatoria-especializacion-inteligente-la-industria-ti

comparison to science and higher education policies, which count with more institutional and financial support. The limited financial support to innovation constitutes the main limitation for the implementation of regional specialisation in Latin America. Moreover, the trend towards the concentration of economic and business activities is accentuated in countries such as Chile, Argentina or Brazil.

International cooperation experiences engaging the participation of Latin American countries with the EU and the United States have brought important contribution, mainly in the field of scientific collaboration. To a lesser extent, international cooperation has contributed to the development of regional specialisation. As referred in chapter 2, cross-border cooperation initiatives and regional innovation programs constitute the more relevant contributions.

Summing-up, observations reveal that, although in different ways, the six Latin American countries are supporting regional specialisation and innovation. The smart specialisation approach, as it is currently implemented in the EU, is considered as a model of reference by some of them (e.g. Chile and Colombia). We identified the main forces that act in relation to the development of regional specialisation in Latin America as is set out in the following SWOT matrix (table 3).

Table 4. SWOT analysis of regional specialisation in Latin-America

STRENGTHS	OPPORTUNITIES
• National development policies focused on innovation exist. • Several countries are facilitating regional specialisation (pilot, demonstration effect). • Extensive knowledge of the European RIS3 strategies among the persons responsible for innovation policy. • Significant number of companies and capacities in sectors related to creative industries and the ICTs. • Extensive democratic and participatory cultures.	• Existence of National research systems • Specialisation sectors have been identified at a national or regional level • Traditional industries with reconversion potential towards new sectors. • New policies for the decentralisation of resources and their applicability of the RIS for all of the regional and local development policies. • Existence of large companies as a tractor effect of global value chains with potential local impact
WEAKNESSES	**THREATS**
• Highly centralised systems • Limited financial resources oriented to support related action. • Little interaction between universities, research centres and companies. • Limited evaluation systems and indicators applied on a regional scale. • Persistent technology gaps and limited business innovation. • Little inter-regional cooperation in technology. • Lack of technological centres operating at a Latin American scale	• The weakness of the tax system and the global crisis reduce the incentives to execute innovation strategies. • Conformism with specialisation applied exclusively to extractive and agricultural sectors. • High territorial concentration of resources and capacities (e.g. metropolitan zones and/or logistic corridors) • The weakening of the new regional integration processes

Source: Authors

5.1. Strengths and weaknesses for the definition of RIS3 by institutional agents

The smart specialisation concept is being considered as a methodological model in different countries of Latin America. However, the concept is not necessarily an instrument for the definition of regional or national strategies. In general, the strategies have a strong national definition in their approach and, only in certain cases, very recently has decentralisation been opted for (Chile, Colombia). In other cases, it is the existence of strong corporate and production dynamism *in situ* that determines the existence of clusters or regional groupings for the structuring of regional strategies (Brazil, Mexico).

One of the recent studies of the Regional Innovation Systems (RIS) in Latin America ((IDB, 2011)) summarises the main problems detected in the continent:

- The weakness of the institutions and the governance of the RIS has negative repercussions for the still insufficient stability and management capacity of the government bodies related to science and technology.

- The regional innovation policies are, in many cases, diluted with other instruments such as the policies for the promotion of exports and direct foreign investments or the policies responsible for promoting the development of employment capacities and of human capital.

- In general, Latin American regions have a fragile knowledge infrastructure that often does not reach the critical mass or the level of development necessary in order to be configured with centres of international excellence, and when said knowledge infrastructure does exist, it is usually orientated, above all, to higher education and basic research rather than technology transfer.

- The innovative private sector has scarce relationships with other fundamental stakeholders of the RIS, namely universities and the R&D centres and, in many cases, trust is not palced in the management capacity of public authorities in terms of innovation policies.

- The financing of the RIS is, in general, insufficient in order to sustain a complex program of instruments and policies.

- The information regarding the results and impacts of the national innovation systems is scarce, and is even more scarce in relation to the RIS, which hinders the design of reform procedures or extension instruments.

Following sections (5.2 and 5.3) set out points of view based upon a survey that has been carried out in relation to different institutional agents and entities and persons responsible for R&D policies in order to obtain a representative image of the state of the strategic regional innovation processes (see Annex 1).

This selection of countries and regions has been carried out taking into account, on the one hand, the importance and visibility of said countries and regions within the ambit of the processes for the strategic definition of innovation policies over recent years and, on the other hand, the strategic position thereof not only within the Latin American continent but rather, in many cases, at an international level.

5.2. Territorial context

The regional dimension has an unequal weight in the smart specialization strategies in the countries analysed. Chile has focused its innovation and smart specialization policies on the regions. Peru and Colombia, both in the design and during the pilot experiences, also seem to opt for regional strategies, although in the case of Colombia, the most successful experiences are located at the local or municipal level. In Mexico, despite having developed its state (regional) agendas, effective leadership corresponds to the business sector, which ends up establishing specialized hubs at local and regional level. Here, the business sector is also involved with other actors in the innovation process.

On the other side, Argentina and Brazil are probably the countries with national strategies of sectorial specialization that have more resources. In Argentina, the territorial dimension derives from the existence of a strong spatial concentration of economic activity. In Brazil, the regions adapt to the strategy of sectorial specialization, seeking to establish in their territories sectoral nodes driven and supported by the federal government.

Table 5. Context analysis and identification of priorities

Country	DRIVER	PRIORITIES
ARGENTINA	-	Biotechnologies, Nanotechnologies. ICT Creative economy
BRAZIL	Technological clusters	Aerospace and Defence, Water, Food, Biomass and Bioeconomy, Sciences and Social Technologies, Climate, Economy and Digital Society, Energy, Nuclear, Health, Converging and Enabling Technologies (Nanotechnologies, Biotechnologies, ICT and Cognitive Sciences-neurosciences)
CHILE	Regional specialisation	Mining; Healthy Food; Sustainable Tourism; Sustainable Construction; Health Technologies; Fishing and Aquaculture, Creative Economy, Smart Industries, Renewable Energies
COLOMBIA	Metropolitan specialisation and clusters	Chemical Industry, Fashion System, Metalworking, Agro-Food, 4.0 Industries (Software and IT and BPO), Tourism
MEXICO	Regional clusters	Transport equipment manufacturing, Manufacturing of machinery and equipment, Manufacturing of electrical and electronic equipment, Mining, Business Services, Food Industry, Health and Tourism Services, Agriculture of vegetables and fruits, Hardware and software, R&D Services, Architecture, engineering and design services, and Creative Industries (music, cinema, radio and television).
PERU	Traditional sectors in pilot experiences	No clear prioritisation exists at a national level. In the regions that are progressing in the definition of their RIS, the traditional sectors are prioritised: Agriculture and Fishing, Aquaculture, Coffee, Textile and Tourism.

Source: Authors

The sectoral priorities defined in the national or regional strategies show some similarities: all of them are committed to raising the added value of traditional sectors, especially food and tourism, and claim for greater use of new technologies, in particular ICTs. This context is a result of the

necessity for increasing competition between regions, but also opens the possibility to develop interregional strategies of specialization on the basis of achieving better economies of scale with collaborative strategies.

5.3. Governance

National differences in territorial and sectoral strategies for smart specialization result in a notable diversity of governance schemes and institutional landscapes. The decentralization achieved in some countries during the definition processes of territorial strategies (Chile, Peru, Mexico) is, however, not accompanied by a similar decentralization of public funding sources, which continue in all countries under the national or federal governments.

The participation of the components of the territorial "helix" during the definition and implementation processes (private sector, universities, research centers, civil society, etc.) does not depend either on the particular centralized/decentralized institutional scheme but in the peculiarities of local management authorities and policies, and overall coordination capacity within the territorial system.

In all the countries analysed there is a core institution that play a central role during the initial planning phase. This has ambivalent consequences: in some cases, this institution manages the decentralized processes of definition of regional strategies, either by own decision (Chile, Peru) or by the own institutional structure that allows coordination with the local authorities (Brazil). In other cases, institutional centralization can sometimes make this process more difficult. In general, there is a concentration of R&D resources in public research organizations, which absorb most of the economic and technical resources of governance. In some cases, (Argentina, Mexico) this may hinder the integration of companies and other agents in the process of strategic definition.

Table 6. Governance

Country	Stakeholders	Administrative levels	Integration of the main components	Governance	Cooperation
ARGENTINA	Public federal	Federal, Provincial and Municipal (in certain cases)	Strong at a federal level, limited or nonexistent at a state level.	CONICET	In regional/international science
BRAZIL	Public federal, state and private	Federal and state	Strong integration in the states with defined strategies and the federal level. Significant inequality between states.	MCTI / CONSECTI	In science and technology at an international level Cross-border cooperation
CHILE	Public and private	Central and regional	Coordination of the regional processes from development institutions.	CORFO / SUBDERE	Regional cross-border cooperation
COLOMBIA	Public and private business. Municipal	Local	Scarce coordination.	COLCIENCIAS	
MEXICO	Private, accompanied by public state stakeholders	State	Formal coordination.	CONACYT	

PERU	Public	Regional	The national level encourages and promotes ad hoc strategies of the regions.	CONCYTEC	Regional cross-border cooperation

Source: Authors

Access to adequate funding appears in almost all cases as a major constraint in the development of successful strategies for smart specialization. In Chile, for example, it is the centralization of public resources which may imply a difficulty in the advancement of regional strategies. In other cases, dependence on innovation strategies of international funds (Colombia, Peru) or private funds (Mexico) are also a constraint, since they limit the continuity and further development of regional strategies, thus presenting a potential problem for consolidation in the long term.

Table 7. Aspects related to planning

Country	National vs. Regional Approximation	Type of analysis	Level of integration with other policies	Key processes	Financing sources
ARGENTINA	National	National Innovation Strategy		Concentrated high technology node	Budgetary financing
BRAZIL	National/state	National Innovation Strategy	With the sectorial development policy defined at a federal level	State specialisation	Development bank (BNDES) and specialised funds exist. Public companies
CHILE	National in process of decentralisation	National and regional strategic programs. Regional Innovation Strategies	Integration with the regional development policies and development policies	Decentralisation	The public budget of CORFO is the main financing source
COLOMBIA	National/Local	Clusters policy		Consultation between public-private stakeholders	Scarce budgetary financing. As the case may be, financing from public and private companies
MEXICO	National with state participation	State Innovation Agendas	Integration with the R&D policy	Global value chains	Budgetary and private financing.
PERU	National, with scarce weighting of the regions	Production diversification plans		Demonstration of RIS3 processes	Scarce budgetary financing. International cooperation plays an important role

Source: Authors

In general terms, Mexico and Colombia seem to be subject to significant difficulties for the development of strategies based upon smart specialisation. In both countries, the identification capacity for sectorial priorities is similar to that of countries with more structured regional innovation systems. However, the governance of the process, the combination of policies and instruments, and the monitoring and evaluation systems still require considerable development in order to meet said levels.

In Colombia, specific weaknesses are also detected in relation to territorial analysis. In Mexico in relation to the capacity to generate visions shared between all of the stakeholders of the regional/state area.

Brazil presents the best results in relation to the shared vision and the combination of policies, however, Brazil has significant limitations in the definition of regional analyses for smart specialisation.

In Chile, to the contrary, the strengths include the drafting of territorial analyses and the identification of priorities. However, the most significant weaknesses are situated in the governance system and the evaluation and supervision of the actions and strategies.

The responses in Peru are completely opposite. They reveal the limited development of instruments for the definition of the regional analyses or for the identification of priorities, although the foregoing situation may start to be overcome from the RIS3 pilot projects and European cooperation.

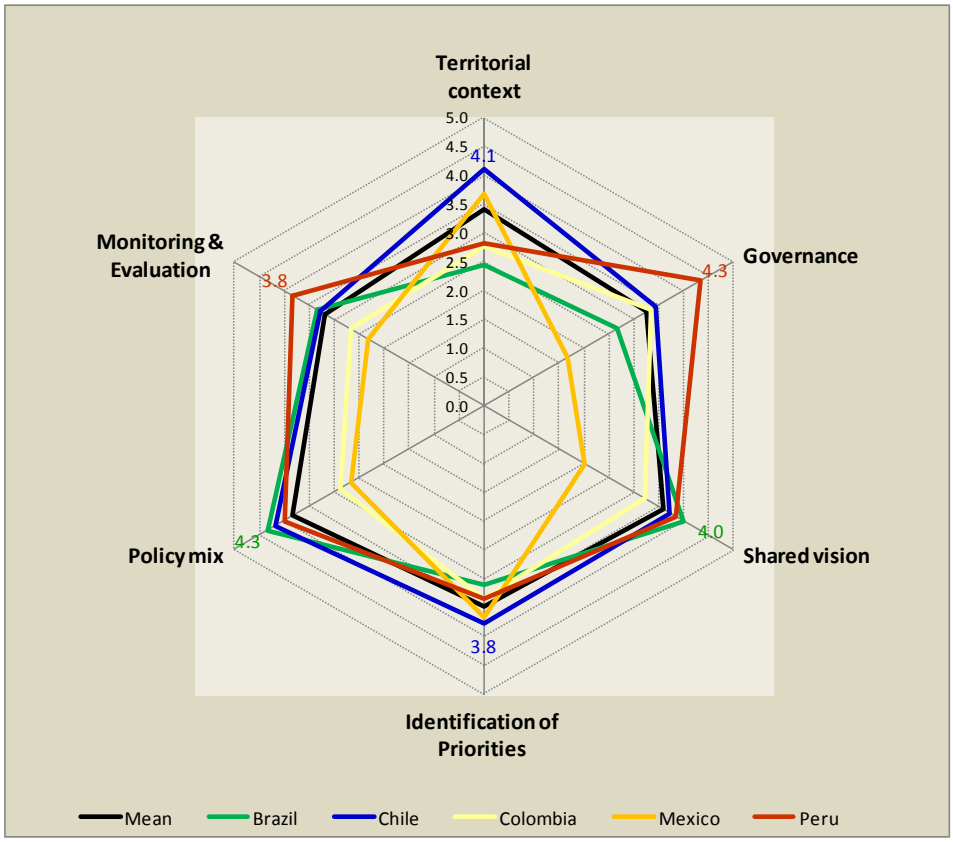

Figure 7. Self-assessments S3 all countries[26]

Source: Own calculations Valuation of steps fluctuate between 0 and 5, with 0 as the lowest value. Numerical values reflect the average for each country answers.

[26] For the Argentina case, no available information

6. Regional specialisation in the international economic and institutional contexts.

One of the ultimate goals of smart specialisation is to strengthen regional economies and position them better in the global markets. This section illustrates the relevance of regional specialisation within the global value chain dynamics and reviews how international organisations are addressing the issue of regional innovation in Latin America.

6.1. Regional specialisation and global value chains

Nowadays more than half of world trade, that is between 10 and 12 trillion USD per year, consists of intermediate products, goods and services that circulate within fragmented production processes organised on a worldwide level by large companies[27,28].

International trade organised in global production processes implies an entire network of subsidiary companies and subcontractors that form worldwide production networks until the products reach the final consumer that can also be in any part of the world (UNCTAD, 2013). The participation in global value chains may generate significant benefits in the development of the production sectors when the vertical integration in the sectors that exist in the territory is limited or when structural problems exist for the resolution of the sectorial technology gaps with the capacities and local resources available.

The inclusion within the regional and global value chains and the vertical movement within said chains, in terms of specialisation, market participation or added value, may be a powerful mechanism to promote structural change, to reduce the structural heterogeneity between companies of different sizes, to increase the productivity of the economy and to generate opportunities for production employment (ECLAC, 2014b).

Latin America has enlarged its global value chains during this century. However, it continues to be below the world average and mainly consists of the supply of raw materials for the exports of third countries. The poor digital connectivity also weakens its insertion in new dynamic sectors." (ECLAC, 2016a)

If, as is set out in the aforementioned report of the ECLAC, the potential benefit of the participation depends upon the possibility to upscale to higher added value areas, and this in turn depends to a large extent upon the capacity to introduce innovations within the product, service or respective process, the technology gap explains why Latin America has not progressed in its insertion within global value chains, and why the products and services thereof mainly relate to low added value

[27] Calculated by the author based upon UNCTADSTAT data, Merchandise trade matrix – detailed products, 1995-2015.

[28] Thus, for example, for each Euro of global exports of machinery-tools in the year 2012-2015, 33 cents of components are exported; for each Euro of global exports of computers and office equipment, 45 cents of components; for each Euro of automotive vehicles (cars, tractors and trucks), 42 cents of components.

areas, such as the textile *maquila* or electronics sectors in Mexico, Central America or the Caribbean.

In a recent ranking of the 500 largest multinational companies of Latin America that operate within the region[29], only 101 have their head offices outside the Latin American continent, and of this number, the majority are American companies (40), followed by Germany with only 9, and Spain and France (with only 8).

In relation to sectors, the most frequent sector is the Automotive Industry (19), followed by Manufacturing (9), Agro Industry (7), Mining (7) and Consumption Goods (7). Mexico and Brazil are the Latin American countries in which the operating head offices are mainly situated of the European companies that operate in Latin America, however Colombia has a significant number of said head offices in relation to the extractive sector.

The European company that operates in the greatest number of countries (22) is the German logistics company DHL. The French companies Schneider Electric (electronics) and Sanofi-Aventis (chemical company) operate in 19 countries as well as the British-Dutch company Unilever. Other industrial and services companies that operate in at least 15 countries include the German chemical companies (BASF and BAYER), the automotive companies (Renault, Bosch), the German equipment and electronics company Siemens, the petrochemical company Shell or the Spanish companies ACS (construction), Inditex (textile), and Telefónica (telecommunications)

The current existence of large European companies identifies a series of sectors in which chains of local companies either already exist, although in an embryonic phase, or that may be developed, such as the automotive, chemical-pharmaceutical, energy, construction, telecommunications or agro industry sectors. Said sectors have been identified as specialisation sectors in several regions that are implementing their RIS3 or that are committed to said implementation, such as Goiás in Brazil (automotive sector); the smart construction in the Chilean regions of Antofagasta, Maule or Valparaíso, Agro industry in the region of Biobío, and O'Higgins in Chile, Piura in Peru and Sonora in Mexico, or the software and communications sector in Buenos Aires-Cordoba in Argentina.

The participation in global value chains can improve local competitiveness if local companies manage to obtain access to technological inputs and to innovative knowledge that exist in said chains, however, that does not exist in the local regions or countries. Accordingly, the positive effect of said chains requires that the insertion of the local companies "*i) improves their international competitiveness, by means of the incorporation of the best inputs available at an international level, and also depends upon the technical knowledge and business practices that exist within the respective chain, and ii) that said knowledge and productivity is transposed to the rest of the sectors of the economy*." (ECLAC, 2014b)

An important contribution of the installed capacity in the European regions and in the institutions of the Commission that are related to the RIS3 is the contribution of this methodology in order to identify the potential of the regional Latin American economies to strengthen their sectorial

[29] America Economía, *Ranking Multilatinas 2016* http://rankings.americaeconomia.com/2016/multilatinas/globales

configuration to the global value chains and to accompany the process of progress in the value chain toward higher added value areas.

Also in Latin America, a production sector with multinationals has been developed with significant capacity to establish global production or marketing chains. The 50 most dynamic Latin American multinational companies in 2016[30] includes 5 Argentinian companies, 11 Brazilian companies and another 11 Chilean companies, 4 Colombian companies, 13 Mexican companies, 1 Panamanian company, 3 Peruvian companies and 2 Chilean-Brazilian and Colombian-Salvadoran airline companies. The diversity of countries is highly significant, contrary to the sectorial distribution, that identifies significant concentration: predominantly companies from the food and beverage sectors (9 and 7 companies, respectively), airline companies (4, plus an aerospace company, Embraer) and the basic and extractive industries: paper and forestry companies (4) cement companies (3) and iron and steel companies (3). Moreover, 3 trade companies exist, one financial company, one company from the entertainment sector (Arcos Dorados of Argentina) a company from the construction sector, a company from the energy sector and another from the mining sector. To the contrary, the manufacturing industry sector only has one chemical company (the Peruvian Belcorp Group), an automotive company (the Mexican company Nemak) the manufacturers (the Brazilian companies Metalfrío and Weg and the Chilean company Tech Pack) and three technological companies (Globant of Argentina, Sonda of Chile and Softtek of Mexico, as well as the Mexican company América Móvil), as well as two holding companies (COPEC of Chile and ALFA of Mexico).

The approach of the majority of these companies toward the region is significant, as is set out by the ECLAC: "Despite certain growth in the Latin American investments abroad, mainly in the decades of 1990 and 2000, only a few companies with their head offices in the region are important investors in the international ambit: it is noteworthy to mention the companies such as Techint, of Argentina; Vale, Gerdau, JBS and Petrobras, of Brazil, and América Móvil and CEMEX, of Mexico. The majority of the Latin American investments abroad are carried out within the region itself and relate to the maturity of the capacities developed during a prolonged activity in the internal markets." (ECLAC, 2016b).

Despite the fact that the majority of the multinationals represent traditional sectors, the Latin American multinationals also, with a preference for operations within the Latin American continent, also operate globally, even in Europe, which represents an opportunity to take into account in the RIS3 of the European regions.

[30] The ranking, Ranking Multilatinas 2016 of America Economía considers companies of Latin American origin with sales of over US$ 250 million per annum in the year 2015, with relevant operations in at least two different countries to that of the country of origin and classifies the companies according to four parameters: annual sales (25%); percentage of employees abroad (25%); geographic coverage (20%) and growth: sales, variation of the number of countries in which they operate, net margin and other variables (30%).

Box 7: Smart specialisation and regional transnational integration

An approach focused on the regional capacities and specialisation represents a new opportunity to reconsider the integration processes from a new perspective. After a decade of significant institutional innovation in integration bodies, including new continental financing institutions such as the Bank of the South or the Banco del ALBA, **progressing with smart specialisation and production chains would open the pathway to production integration.** In this case, the experience of the European cohesion policy, with the operative programs of regional cross-border cooperation and transnational territorial cooperation represent a significant quantity of knowledge to contribute to the design of new integration schemes from the regions in Latin America. A transnational approach that the ECLAC has also referred to:

"...the ECLAC has suggested the possibility of taking first steps in the design of industrial policies with certain multinational components, that is to say, that are shared by several countries. Based upon studies that **identify production sectors or activities with competitive advantages in intra-industrial trade or in multinational value chains**, it would be possible to establish through the respective companies, a series of initiatives in different critical areas. These initiatives shall depend upon the particularities of each sector and may include quality certification programs, health and phytosanitary aspects, technical rules, traceability, detection and reduction of carbon and water footprints, and training policies closely related to the production needs (ECLAC, 2014b).

In any event, the multi-territorial approach must be coordinated with the more promising sectorial approach, as it is the sectorial approach that shall enable the identification of the type of value chain that shall provide for further innovation and local competitiveness.

The most implemented form is that in which the smaller companies that do not control the chain keep a low innovative profile and do not significantly use the learning procedures, and in which the technical support received from purchasers does not generate significant innovations either in processes or in products (UNIDO, 2015).

The development of shared specialisation strategies between regions of several countries based upon the installed capacities thereof may generate synergies and economies of scale in relation to the processes. Thus, some authors (Porta, Suárez, De Angelis, Zurbriggen, & González, 2010) state the possibility of the configuration of the know-how of the Brazilian Sectorial Funds, the resources in terms of training and of Argentina and the experience of the Uruguayan National Research and Innovation Agency as an opportunity to complement capacities and to develop shared specialisation strategies in sectors such as the agro-food sector and the chemical-pharmaceutical industry.

6.2. The initiatives of multilateral bodies

The Economic Commission for Latin America (ECLAC) is probably the Latin American body that most emphasises in the dissemination of the production development policies based upon science and innovation (ECLAC, 2013) (ECLAC, 2014a) (ECLAC, 2014b) (ECLAC, 2016a) (ECLAC, 2016b).

The analysis and dissemination of activities thereof are set out in an abundant series of publications with policy recommendations and approaches, and are also carried out through the organisation of forums, meetings and courses, in general with the financial and operative cooperation of multilateral bodies (IADB, World Bank, EU) or national cooperation and development bodies (GTZ). Through the ECLAC the Science, Innovation and ICT Conference has been organised that has held two meetings, that have established the importance of the digital agenda in order to improve the technological capacities of the region, transfer as well as the importance of innovation in traditional sectors, in particular in agriculture, through the use of biotechnologies. The proposals of the II meeting include the establishment of a fund that purchases and releases relevant patents from the perspective of sustainability. The reduction of the acquisition costs of technology may have a significant effect if it operates in an integrated regional market. This initiative should be adopted by regional institutions and the implementation may receive positive inputs from the experiences of the public or private funds that acquire patents and licence said patents to their members that reduced the transaction and litigation costs." (ECLAC, 2016b)

The ECLAC identifies opportunities for Latin America in areas such as the management of smart cities, the expansion of mass transport, the processing of biodiversity, the development of biomaterials and bioeconomy, the products with environmental labels and the production of renewable energies. However, the implementation thereof in new value chains requires the strengthening of institutional capacities, the modification of regulatory frameworks of business activities, and the increase of the public and private financing of R&D. In relation to the policies, ECLAC recommends that they should be more operative targeting the business sector and incorporating the territorial dimension. Policies should also optimise technological and knowledge generation and transfer. Furthermore, the ECLAC calls on stakeholders' participation to implement actions.

From 1948, with the first Conference of Latin America scientific experts to advise on the development of science in the region held in Montevideo, and with the Declaration of Caracas of 1960, in the first seminar aimed at the organisation of scientific research in Latin America[31], UNESCO has played an important role in its mission to support the countries of the region in the drafting of their science, technology and innovation policies, and in the enhancement of the human and institutional capacities in science and technology. UNESCO participates in advisory aspects regarding the drafting of policies, the monitoring of the structural trends in the science and innovation systems and the promotion of regional and sub-regional cooperation (UNESCO, 2010).

[31] Resolutions and Declarations of the Seminar on the organisation of scientific research in Latin America, UNESCO/NS/ROU/37 Paris, 10 December 1963, WS/1263.63 NS

With an approach focused on science and technology, more than on innovation, recently UNESCO has proposed the guidelines for a regional cooperation strategy in science, technology and innovation. Based upon the Declaration of Latin America and the Caribbean on the tenth anniversary of the World Conference on Science of 2009, UNESCO promoted several different forums and workshops in order to implement the declaration, and focused the commitments toward the environmental innovation agenda.

The Inter-American Development Bank, through the Competitiveness, Technology and Innovation Division, supports Latin American countries with loans and technical support for the promotion of a reduction of the innovation deficit that characterises the region. The five priorities of the innovation policy of the IADB are (IADB, 2016): 1) the increase of the investment, 2) the access to funding for companies, 3) progress in highly qualified human capital, 4) strengthening of the technological and scientific infrastructure, and 5) improvement of the business and innovation climate. In total, the IADB has financed 334 technical cooperation projects in terms of R&D and innovation, for the amount of 71 million USD, 7 loans to the private sector for the sum of 440 million USD (365 million USD of which in the ICT sector), and 72 loans to the public sector, for the sum of 3.57 billion USD.[32]

Table 8. Financing of R&D and Innovation projects of the IADB (MUSD)

	Loans to the public sector	Loans to the private sector	Technical cooperation	TOTAL
No. of projects	72	7	334	413
IADB funding (M USD)	3,570.00	440.00	70.97	4,080.97
Break-down of the funding per area				
R&D and innovation funding	1,647.24		11.72	1,658.96
Science and technology	997.45	75.00	22.17	1,094.62
Science and technology systems	499.00		4.27	503.27
Public policy in telecommunications	298.24	365.00	9.96	673.2
ICT	101.40		7.71	109.11
Advanced human capital	24.00		0.52	24.52
Telecommunications infrastructures			10.12	10.12
R&D systems			4.27	4.27
CTI policies and institutions			3.39	3.39
Regional R&D and regulatory harmonisation			0.70	0.7
Technological dissemination			0.41	0.41

Source: Authors with data from http://www.iadb.org/en/sector/science-and-technology/overview,18349.html

[32] http://www.iadb.org/en/sector/science-and-technology/overview,18349.html

Currently, the IDB has 74 active projects in R&D activities, for an amount exceeding 645 million USD.[33] The majority of the projects are related to the development of the ICT. The two support projects for phases III and IV of the Technological Innovation Program of Argentina absorb 350 million USD, a total of 54% of the resources currently designated to these types of projects by the Inter-American Development Bank (IDB). Despite being the first multilateral institution that carried out an analysis of the regional innovation systems in Latin America (IDB, 2011), the financing provided is channelled above all to national institutions, Ministries or national science and technology bodies.

As from 2005, the World Bank has designated over 11.9 billion USD to support institutional innovation, infrastructure innovation and the production sector, with specific emphasis on agricultural innovation and telecommunications.

Previously, in Mexico (2005) Uruguay (2007) Argentina and Chile (2008) the World Bank has financed projects for a total of 456 million USD oriented towards the implementation of production innovation programs. Currently, the World Bank has 32 on-going projects, representing a total amount of 4.274 billion USD, designated, above all, to the development of infrastructures and rural development and innovation.

Currently Peru is the country the receives the most support from the World Bank in relation to sectorial specialisation and innovation. In particular, the national agricultural innovation program is quite active, with a total cost of 128.7 million USD. It has received funding from the World Bank in the sum of 40 million USD. Moreover, the World Bank expects to finance, with 40 million USD (of the total cost of 120.9 million) the national fisheries and aquaculture innovation program. Furthermore, the World Bank shall fund with 45 million USD (from a total cost of 100 million USD) a project for the strengthening of the science, technology and innovation system.

The Food and Agricultural Organisation of the United Nations (FAO) also addresses the issue of territorial specialisation. The initiative Smart Territories Platform is jointly developed with the World Bank with the purpose of providing a space for the exchange of knowledge and experiences regarding territorial development in Latin America and the Caribbean (LAC) including experiences from the European Union. This platform integrates the vision of governments, specialised agencies, and project implementation units to consider new approaches, methodologies and indicators that measure the change produced in the territories when investments are carried out in: systemic sustainability, governance, social cohesion, territorial planning, and resilience to climate change, rural-urban balance, agricultural production, rural entrepreneurship and rural innovation.

The platform presents the European model for rural and regional development policies, including the smart specialisation approach, territorial pacts, and LEADER projects. Under the different sections of the platform experiences are included of policies, programs and successful projects for the purpose of examining the utility thereof for the drafting of territorial development policies and programs in LAC.

[33] http://www.iadb.org/en/projects/project-details,1301.html?Country=&Sector=ST&Status=Implementation&query=

Box 8. Specialisation for smart rural territories, the FAO initiative[34]

With the launch of the **Smart Territories Platform** ("Plataforma de Territorios Inteligentes"), FAO offers a flexible and comprehensive tool for multi-dimensional, cross-sectoral, and tailored-made actions for sustainable development of rural areas of the Latin America & Caribbean region. Devised by the Investment Centre of FAO (TCI) with support from the World Bank, this Platform can be used to design, implement and effectively evaluate **integrated territorial investments**. It does so by including a thorough description of the new territorial approaches to agriculture, food security and rural development and its main components. The platform facilitates methodologies, tools and indicators measuring investment in the targeted territories. It also features dynamic sections such as News, Territorial Experiences, Expert collaborations and Territorial Interviews.

FAO Departments have contributed to the Platform by sharing the work they are currently carrying out, and different actors in the Region have welcomed the initiative with enthusiasm.

Inter-regional organisations such as the United Regions, Forum of Regional Governments and Global Associations of Regions[35] are also supporting action related to implementation of smart specialisation approach in Latin-America. The ORU Fogar's Development Work Group acknowledges that the smart specialisation concept, developed in the EU through the strategies RIS3, can be a supportive instrument to reinforce regional development and innovatoin in Latin-America. The support that this organisation is providing to stakeholders of Latin-America is concretised in the launching of a call for project proposals oriented to the implementation of smart specialisation pilot projects. The selected regions will receive assessment support in the implementation of the RIS3 strategies, as well as training, technical assistance and resources for travel and pooling.

[34] http://www.fao.org/in-action/territorios-inteligentes/resumen-del-proyecto/es/

[35] http://www.regionsunies-fogar.org/en

7. Conclusions and policy implications

The differences between national and regional innovation models in Latin America suggests the need to design policies differentiated at a regional level in order to strengthen the innovation processes with local stakeholders (Llisterri & Pietrobelli, 2011). Accordingly, it is precisely the specificity inherent to the smart specialisation process, the element which motivates an innovation path adapted to the singularity of a region within the diversity of the innovation models existing in Latin America and other parts of the world.

As it has been seen throughout this report, the progress in the definition of regional strategies of specialisation motivates key reflections of different nature according to the particularities of innovation ecosystems, policies, legislation and allocated budget. Hence, each analysed country may take the presented analysis to emphasise concrete aspect of the specialisation process:

- Chile is progressing towards a decentralisation system of innovation policies which is being well perceived from the regions. Designing strategic financing plans to assure the implementation of the regional programs is fundamental.

- In Brazil, the development of the horizontal coordination between states could allow important synergies in the endeavours deployed by certain states for the definition of their specialisation strategies, and to support other states that lag behind.

- Colombia and Peru may emphasise aspects related to the public resources designated to the innovation programs, the consolidation of governance systems and the definition of the regional specialisation priorities.

- Mexico may need to increase efforts in the coordination between the national level of the policy definition and the local and state initiatives of specialisation.

- In Argentina a framework that stimulates the process of regionalisation and innovation strategies, incorporating the most peripheral provinces within the central scope, would contribute to identify innovation potentialities at sub-national scale.

The collaboration frameworks between the European Union and Latin America have increased in the issue of regional specialisation allowing stakeholders of both continents to speak a similar regional-innovation language. The dialogue EU–Latin-America is providing more relevance to the role of regions as active agents for research and innovation policies. Also, European institutions have enabled the dissemination of the European smart specialisation experience and policy makers of the analysed countries are showing great interest on this way to support regional specialisation.

As stated in this document, the analysis is very far away from scoring the type of initiatives observed in Latin America or suggest which one approximates the most to the context of smart specialisation implemented in the European Union. Besides, what is important to highlight is the fact that most of the showcased examples and pilot initiatives currently conducted in Latin America, have allowed strengthening cooperation bridges between stakeholders of both continents

in the way of policy learning process, consultation process, transfer of good practices, workshops, conferences and design of strategies, among others. According to the regional specialisation tendencies in Latin-America, two differentiated stages of progress can be observed:

- Firstly, there are regions that have shown great interest towards the smart specialisation concept and are currently conducting pilot activities aiming at testing the adaptation of this approach according to their own territorial characteristics and socio-economic contexts.

- Secondly, other regions have motivated political support and are already allocating more resources to regional specialisation initiatives. These regions have, for instance, initiated joint reflections with territorial players, contributed to the definition of priorities and are exercising new multi-governance approaches.

Tacking stock of the EU contribution to some of these initiatives, additional support can be oriented according to the two degrees of progress identified in the precedent paragraph. For regions that are currently in testing phase, both institutional and technical assistance would help to implement real strategies of specialisation. These contributions would come not only from the EU but also from regions of the analysed countries, motivating also interregional collaboration. Complementary, regions that are showing a more matured progress may need to stimulate the innovation via internationalisation. The establishment of strategic alliances with EU regions oriented to develop joint projects and stimulate businesses within production chains would concretise contribution.

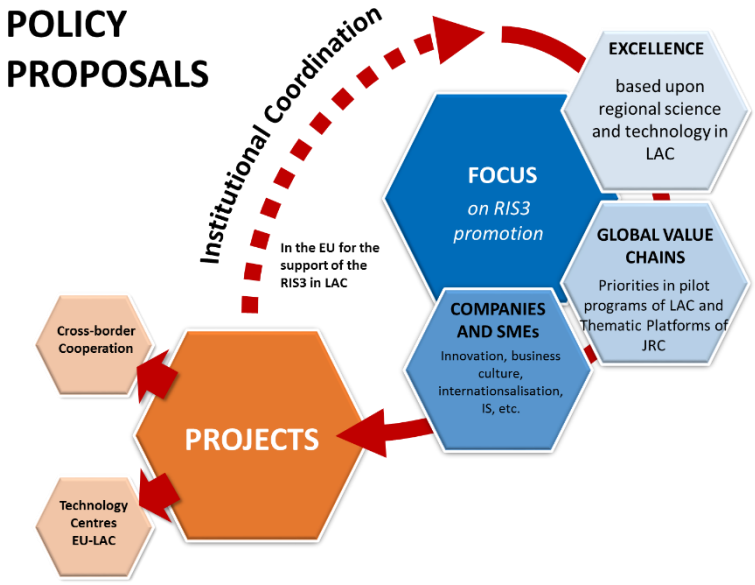

Figure 8. Policy proposals regarding future cooperation between EU-LAC

From the European Commission, DG REGIO has supported several initiatives related to regional innovation and specialisation in Latin America (European Commission, 2017). The work of DG REGIO has also engaged other DGs of the European Commission so as to provide a more integrated EU support. DG RTD, is also facilitating structured dialogue between stakeholders of EU and Latin-America around Innovation policy and regional contributions (e.g. dialogues EU-CELAC and Joint Initiative for Research and Innovation).

The DG Joint Research Centre is also contributing with additional support to the current activities and projects around regional specialisation in Latin America. This support entails the facilitation of cooperation bridges with EU regions (see for instance IUC Project) through the experience obtained within the smart specialisation platform. Thematic specialisation platforms can provide also a cooperative space with regions of Latin-America in strategic domains of specialisation such as Agri-food, energy and industrial modernisation.

The cooperation on regional smart specialisation must not lose sight of the need to support the coordination and synergies with national research and innovation partners of the observed countries. As seen in this note, these national structures largely manage research and innovation policies as well as associated funding. In most of cases, national bodies are also those who are facilitating regional programmes of specialisation and vertical dialogue with regional authorities and stakeholders. To this respect, some cooperative exercises are happening at transnational level such as the Argentinian-Brazilian Biotechnology Centre (CABBIO)[36] and the proposals for development and technological innovation business projects between companies of Argentina and Uruguay[37],

Other key aspect for progressing in the cooperation European Union and Latin America must consider the companies involved (and to be involved) in innovation. Accordingly, the process of modernisation and innovation of the economy must be adapted to the new technological structures, and in particular to the challenges of globalisation and the insertion within the information society. Business opportunities for regional economies are directly linked to the smart specialisation approach and any other related initiative. The participation of enterprises as well as their openness to innovation is fundamental.

Furthermore, communication mechanisms of European agents that promote the smart specialisation strategies (DG REGIO; JRC, etc.) must be established with the large European companies that exist in Latin America, in order to establish the necessary complicities for the promotion of the global integration of the companies of the regions in which the RIS3 are implemented. Likewise, the efforts carried out toward said RIS3 may represent an opportunity in order to promote the internationalisation of medium and large European companies toward Latin America.

The participation of the universities and research centres is also relevant for the purpose of cooperation. The case of Piura represents a concrete example of Universities' commitment towards specialisation. Similar initiatives are being analysed in the European Union, particularly in the regions of Navarre and North-East Rumania (European Commission, 2017). Interregional policy dialogues may constitute a solid instrument for integrating the participation of knowledge providers as key agents of specialisation. The participation of the Latin American research groups in the Horizon 2020 program should also be deeply considered as a cooperative framework with potential inputs for the progress of regional specialisation.

[36] http://www.mincyt.gob.ar/accion/cabbio-centro-argentino-brasileno-de-biotecnologia-6452

[37] http://www.mincyt.gob.ar/convocatoria/proyectos-empresariales-de-innovacion-tecnologica-entre-argentina-y-uruguay-11870

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9. Annexes

9.1. Annex 1. Online survey

The questionnaire contained 18 questions, in six thematic blocks: A value of 0 to 5 was requested, where 0 corresponds to the lowest value. The numeric values annex 3 set out the average values for each response per country.

https://ec.europa.eu/eusurvey/runner/S3BeyonEU-LatinAmerica (in Spanish)

1. Territorial context

[1] Has a detailed analysis been carried out of the regional/national assets that have resulted in an analysis of strengths, opportunities, weaknesses and threats (SWOT)?

[2] Has the analysis been carried out considering the implications in terms of the international context, that is to say, the integration of the regional/national sectors in global value chains, the positioning of the territory at an international level, etc.?

[3] Has the ambit of entrepreneurship been included as a key element of territorial development? in particular, for the capacity to generate employment, attract investment).

2. Governance of the process

[4] Has a more or less formal and stable governance system been implemented where the different agents of the production and innovation system have roles and responsibilities?

[5] Has extensive participation been generated, that involves the main production and innovation system agents and stakeholders, as well as the weighting thereof in order to reach consensus regarding the objective to be pursued by the policies?

[6] Have communication tools been implemented (and used) among the agents that are directly involved in the governance, as well as high range tools (telematics) in order to increase the level of transparency for citizens?)

3. Construction of a shared vision.

[7] Has a comprehensive approach to innovation been considered, not only technological and science-related innovation (for example, social innovation, organisational innovation, etc.)?

[8] Have significant current challenges been considered beyond merely production or economic challenges, such as social inclusion, environmental sustainability, sustainable economic development?

[9] Has a future contingency analysis been included for the strategy and its policies, taking into account possible threats and changes in the international context?)

4. Identification of specific priorities for targeting resources

[10] Has the identification of priorities been carried out from a dynamic-temporal point of view, that is to say, evaluating the past experiences and future possibilities?

[11] Have the selected priorities resulted (direct traceability) from the results obtained from the territorial analysis and from the SWOT (that is to say, aligned with the potentialities of the assets of the regional/national context)?

[12] Is the prioritisation characterised by a reduced number of options (that is to say, sectors, technologies, a combination of both, etc.) with the sufficient critical mass in order to justify the concentration of the efforts of the policies?

5. Definition and deployment of the policies for instruments

[13] Does the strategy include an Action Plan with milestones, instruments and pilot projects in order to carry out the effective deployment of the strategy?

[14] Does the strategy contain a balanced combination of targeted measures (in relation to a sector, type of technology, etc.) and horizontal-type measures?

[15] Are the measures and instruments in the strategy aimed at facilitating the conditions of the pertinent environment, that is to say, they support the regional/national assets that provide for the improvement of the competitiveness of companies?)

6. Monitoring and evaluation system for the strategy and its instruments

[16] Does the strategy include a limited number (or small number) of results indicators (related to the overall objectives of the strategy) and products (related to the level of execution of the instruments), that, furthermore, have base values and specific targets?

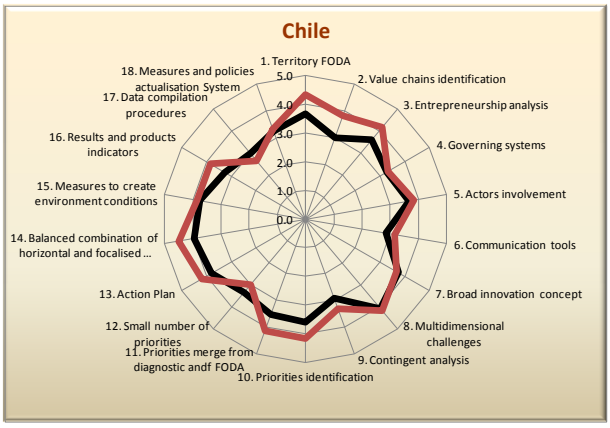
[17] Does a mechanism exist that is responsible for compiling information for the indicators, and that monitors whether the targets and the measures are being complied with in accordance with the established targets?

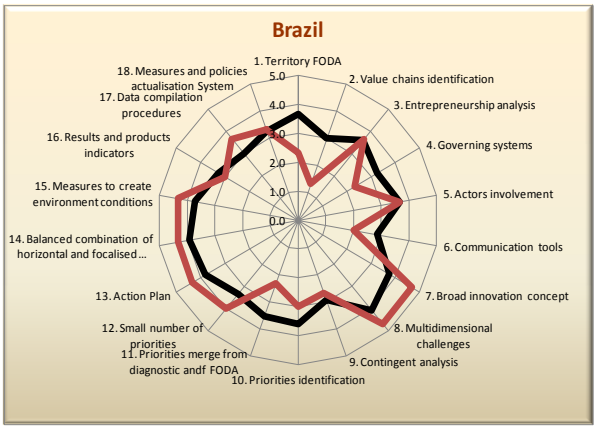
[18] Is the update/modification of the instruments and policies considered in light of the results (positive or negative) of the monitoring and evaluation activities?).

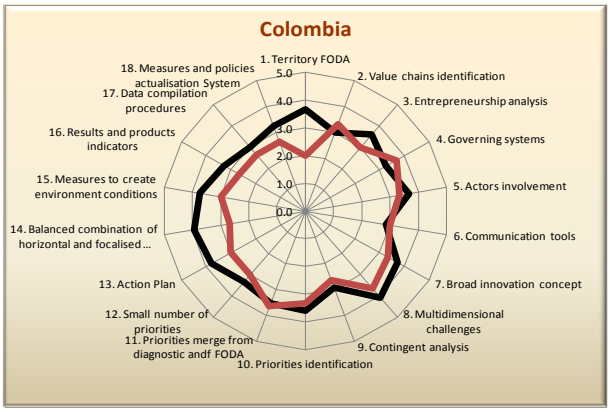
9.2. Annex 2. List of people interviewed

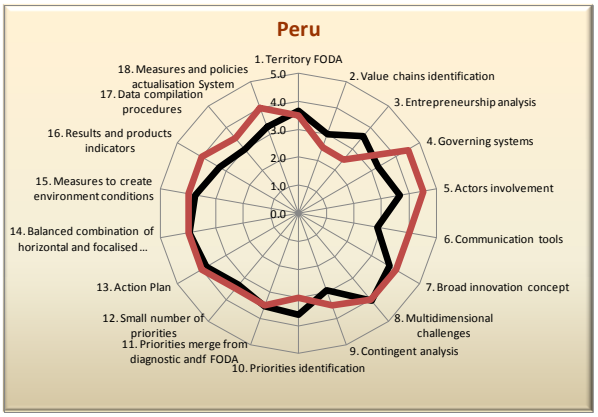
MEXICO
Santiago Macias Herrer- COMPITE, A.C.
PERU
Mauricio Meza Riquelm - Catholic University of Santa María Alfonso Guillermo Dulanto Rishing -University of Piura
CHILE
Julian Víctor Goñi Melias - Development Corporation (CORFO) Claudio Maggi Campos- Development Corporation, CORFO (public agency) Rodrigo Martínez Fernández - Regional Government of Biobío Geraldine Fuentealba Romero - Regional Government of the Region of O'Higgins Wanda García Larraguibel - CONICYT Edelmira Dote - CORFO
COLOMBIA
Marco A. Llinás Vargas - Chamber of Commerce of Bogota Julián Pontón Silva - COLCIENCIAS Clara Inés Pardo Martínez - Colombian Science and Technology Observatory
BRAZIL
Cristiano Cagnin – Centre of Strategic Studies and Management (CGEE) Paulo Cesar Goncalves Egler -Instituto Brasileiro de Informação em Ciência e Tecnologia - IBICT Paulo Pitanga do Amparo - Ministério da Integração Nacional
ARGENTINA
Gabriel Casaburi - Inter-American Development Bank. Competitiveness, Technology and Innovation Division. GustavoSuarzman - Director of the Subsecretariat of Technological and Production Services at the Ministry of Production of Argentina. Romina Gaya - Director of the Knowledge Economy Observatory.

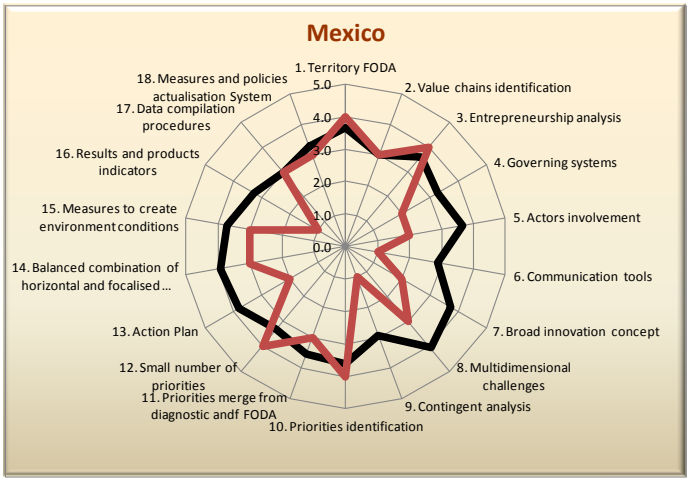
9.3. Annex 3. Self-assessment by country











List of Abbreviations

In English

CELAC	Community of Latin America and Caribbean States
CF	Cohesion Fund
CF	Cohesion Fund
CONSECTI	National Council of Secretariats for Science, Technology and Innovation
DG REGIO	European Commission's Directorate-General for Regional and Urban Policy
EARDF	European Agricultural Fund for Rural Development
ECLAC	Economic Commission for Latin America and the Caribbean
EDP	Entrepreneurial Discovery Process
ERDF	European Regional Development Funds
ESF	European Social Fund
ESIF	European Structural and Investment Funds
EU	European Union
GDP	Gross Domestic Product
GVC	Global Value Chains
HEI	Higher Education Institution
ICT	Information and Communication Technologies
IPL	Innovation Policy Labs
IPR	Intellectual Property Rights
JIRI	Joint Initiative for Research and Innovation
JRC	European Commission's Joint Research Centre
KET	Key Enabling Technologies
LAC	Latin America and the Caribbean
NGO	Non-Governmental Organisation
OP	Operational Programme
R&D	Research and Development
R&I	Research and Innovation
RDA	Regional Development Agency
RIS/RIS+	Regional Innovation Strategies
RIS3	National/Regional Research and Innovation Strategies for Smart Specialisation
RTDI	Research, Technology, Development and Innovation
RTO	Research and Technology Organisation
S3	Use for both 'Smart Specialisation' and 'Smart Specialisation Strategies'
SME	Small and Medium Enterprise
SOM	Senior Officials Meetings
YEI	Youth Employment Initiative

In Spanish

BNDES	Banco Nacional de Desarrollo Económico y Social (Brazil)
COLCIENCIAS	Departamento Administrativo de Ciencia, Tecnología e Innovación (Colombia)
CONACYT	Consejo Nacional de Ciencia y Tecnología (México)

CONCITI	Consejo Estadual de Ciencia, Tecnología e Innovación (Brasil)
CONCYTEC	Consejo Nacional de Ciencia, Tecnología e Innovación Tecnológica (Perú)
CONCYTEG	Consejo de Ciencia y Tecnología (México)
CONCYTEQ	Consejo de Ciencia y Tecnología del Estado de Querétaro (México)
CONICET	Consejo Nacional de Investigaciones Científicas y Técnicas (Argentina)
CONICYT	Comisión Nacional de Investigación Científica y Tecnológica (Chile)
COPOLAD	Programa de Cooperación entre América Latina y la Unión Europea en Políticas sobre Drogas
CORFO	Corporación de Fomento de la Producción (Chile)
FIDECOM	Fondo de Investigación y Desarrollo para la Competitividad (Perú)
FINEP	Financiadora de Estudios y Proyectos (Brazil)
FINCyT	Fondo para la Innovación, la Ciencia y la Tecnología (Perú)
FOMITEC	Fondo Marco para la Innovación, Ciencia y Tecnología (Perú)
FOMIX	Fondos Mixtos (México)
FORDECYT	Fondo Institucional de Fomento Regional para el Desarrollo Científico, Tecnológico y de Innovación (México)
MIPYME	Fondo para el Fortalecimiento del desarrollo productivo de la micro, pequeña y mediana empresa (Perú)

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