"The dimension of innovation in the framework of the EU-CELAC Joint Research Area" [1]

(Concept Note for Project ALCUE-Net)

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Introduction

The Sixth Summit Latin America and Caribbean (ALC) - European Union (UE) held in Madrid in 2010 adopted the Declaration "Towards a new phase of the bi − regional partnership in innovation and technology for sustainable development and social inclusion."It emphasized the key role of cooperation for mutual benefit in building a "Common Research Area" (ICA).The Summit defined a Joint Initiative for Research and Innovation (JIRI) and created the Senior Officials Meeting (SOM) as tool for dialogue, monitoring and evaluation of the implementation of the Declaration.

It is now recognized that the implementation of ACI has made significant progress in the joint research and technological development, but does not have enough structured actions to consolidate the transversal axis of innovation. The SOM held in March 2017 in Brussels, recognizing the importance of innovation, decided to initiate the definition of a bi − regional cooperation framework structured around innovation. The October 2017 SOM is the setting to define the best options to generate and implement such a framework.

An examination of the various statements, policies and strategies adopted by the countries of the ALC region shows the need to define the different concepts of innovation that today are handled.

The concept of technological innovation was developed from theoretical and empirical studies over the last thirty years. The OECD (2005) defines it as creating products, services and processes, new or improved, favoring business competitiveness and increased living standards of individuals. To the extent that the concept has been analyzed in greater depth, its taxonomy has been better defined and understood and it includes technological, organizational and service innovations, that in this "concept note" are called economic innovations.

In line with a deeper analysis, Cooper (1998) describes a multidimensional approach to innovation, which breaks down into three blocks:

a) Technological innovation against administrative innovation: the first refers to those ideas that directly affect a production process, while the second has to do with those

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changes that influence the policies, the allocation of resources and the social part of the organization.

b) Product Innovation against Process Innovation: The first finds its meaning in those changes made to the product or service sales organization, and the second indicates those changes in the organization that produces those final products or services.

c) Incremental innovation against Radical innovation: The first represents significant advances that can help revolutionize an organization and its networks completely, while the second refers to changes that improve and expand the technology base.

More recently it has emerged the concept of social innovation, which is a much broader and dynamic concept, able to overcome the limitations of technology - based innovation to face many challenges of a social nature (Rehfeld & Terstriep 2017).

Social challenges defined in 2015 on the sustainable development agenda of the United Nations to be achieved over the next 15 years should be approached from the social innovation perspective as a tool to meet social needs. Economic innovation complements this action to meet social needs through the implementation of improved processes, products and services, technologies, lower costs and higher added value for the customer as an actor in society (Bonilla-Moreno & Rojas Calderón2012).

As Lemarchand (2016) points out this concept of social innovation has been extensively developed in LAC, having established an important school of thought. Several programs in the region attest to this development (in Brazil PROSOCIA in Colombia Ideas for Change, in Mexico HABITARE, sectoral funds linked to water and social development in Peru, INCAGRO and Technology Innovation Centers in Uruguay, Project CEIBAL).

Table 1 shows the differences between economic and social innovations. This "concept note" will mainly deal with economic innovation, recognizing the enormous importance of social innovation in response to the challenges of poverty and exclusion faced by ALC.

Section 1 of the "note" examines the current state of innovation in ALC, taking into account, inter alia, the wide diversity of geographic, demographic, environmental and other situations that presents the region. *Section 2* will discuss the current state of bi - regional cooperation in innovation and technology transfer, including opportunities for future collaboration.

The "note" concludes in *Section 3* with recommendations to advance one hand the structuring of bi - regional cooperation on innovation, and on the other to define specific actions to continue to implement the "Common Research Area". It is important to note in the recommendations that these are primarily addressed to "economic innovation", but does not neglect considerations as to "social innovation".

Table 1. Innovation "Economic" vs. Social Innovation

		Social Innovation	Economic Innovation
Components	Actors	Social entrepreneurs initiatives, movements, foundations Beneficiaries, Public sector Real Estate Management	Company, Homes Public sector Investigation
	Means	Economic and social, capital, infrastructure, participation resources politics (vote, protest)	Capital, work, land, knowledge
	Institutions	Market, welfare regime, local or regional governance	Market
goals	Social	Predominant	Directed partially by CSR, sponsorship, etc.
	Economic	Often neglected or subordinate	Predominant
Beginning	Efficiency	Balance of social and economic objectives with clear social priority	Balance of different economic objectives
	Governance	Internal: participatory External: complex mode of regulation, negotiation, cooperation and conflict	Internal: hierarchical with different degrees of participation External: competition and cooperation

Source: Rehfeld & Terstriep(2017)

1. *Status of Innovation in Latin America and the Caribbean*

1.1. *Overview*

Several recent studies have characterized the state of innovation and national research and innovation systems in Latin America and the Caribbean. Lemarchand (2016) notes that an examination of these studies shows different traits, first, a number of countries (Brazil, Mexico, Argentina, Chile and Uruguay) have modified their horizontal mechanisms for promoting research and innovation by others of a sectoral nature, which defined a strategic direction towards productivity and competitiveness through innovation.

Several countries apply specific policies and incentive mechanisms to develop strategic technologies (biotechnology, nanotechnology, biofuels, space technologies). Another group of countries implements a number of scientific and technological funds to expand research activities and endogenous innovation (Peru, Paraguay and Panama), others are promoting competitiveness programs (Rep. Dominicana, El Salvador and Guatemala).

In practice, several instruments have been used in ALC to encourage and promote research and innovation. Table 2 gives an idea of the number.

Table2.Number of policy instruments used in LAC

country	Number of operational policy instruments by objectives and targets												
	a	b	c	d	e	F	g	h	i	j	k	l	m
Argentina	22	9	25	2	32	15	5	4	5	14	12	10	38
Bolivia	2	1	1	1	8	1	1	1	4	-	3	1	5
Brazil	15	10	31	6	6	15	5	5	-	5	8	4	27
Chile	25	12	25	6	24	17	7	-	-	6	14	6	37
Colombia	6	1	2	1	10	1	-	1	3	2	2	1	6
Costa Rica	2	2	10	2	23	4	3	-	-	-	4	4	4
Cuba	-	-	-	-	5	-	-	-	-	-	1	-	-
Dominican Rep.	-	-	-	-	1	-	-	-	-	-	-	-	-
Ecuador	-	-	5	-	4	2	2	-	4	1	1	-	4
The Savior	-	4	2	-	5	-	9	1	-	-	6	-	2
Guatemala	3	-	6	-	6	-	2	-	-	-	1	-	4
Honduras	1	-	1	-	-1	-	2	-	-	-	-	-	1
Mexico	16	9	13	5	6	14	6	-	3	4	6	5	19
Nicaragua	1	-	1	-	-	-	-	-	-	-	-	1	-
Panama	5	2	14	-	6	-	3	-	-	1	1	1	4
Paraguay	8	1	6	-	5	4	1	-	-	3	2	5	3
Peru	10	7	12	1	6	3	5	-	1	-	1	2	6
Uruguay	13	3	11	1	13	9	2	3	-	3	8	4	14
Venezuela	5	1	3	2	7	-	-	-	-	-	2	1	1

Notes:

Policy instruments: a) Strengthen endogenous production of scientific knowledge; b) Strengthen infrastructure of research laboratories (public and private);c) Capacity building in R & I and strategic planning; d) Strengthen gender equality in R & I) To strengthen the social appropriation of scientific knowledge and new technologies; f) Development of strategic areas of research; g) Strengthening science education from primary to post-graduate level; h) Development of green technologies and technologies that promote social innovation; i) Promotion of local (ancestral) knowledge systems; j) Strengthen coordination, networks, and integration processes in the eco-system of I + i to promote synergies between government, university and productive sector; k) Strengthen the quality of foresight to: evaluate potential markets of high value; development of business plans for high-tech companies; build and analyze long-term scenarios; provide consulting and strategic intelligence services; l) Strengthen regional and international cooperation, networks and promotion of science and technology; m) To promote "start ups" in fields of high technology and new niche products and value added services.

Source: Lemarchand(2015)

As an example of these instruments, the Colombian National Development Bank provides preferential loans for projects involving innovation. Similar arrangements exist in other countries in the region, where the use of fiscal mechanisms is widespread. In the case of Mexico, a stimulus program for innovation was introduced in 2009 with three elements: INNOVAPYME for small and medium-sized enterprises; PROINNOVA (for new and potential technologies) and INNOVATEC (for large companies).The latter operates with a system of calls. In countries like Colombia and Mexico, important regional funds for research and innovation have been created thanks to oil royalties; Bolivia established research funds derived from tax on hydrocarbons; there also exists a

number of sector funds for research and innovation, particularly in the agricultural sector.

A second feature of research and innovation in ALC is the low investment. In the first case, between 2004 and 2013, the regional average rose from 0.54% to 0.76% of GDP, the public sector being the main investor. Only three countries (Brazil, Mexico and Argentina) account for 91% of regional investment in research. Private investment in Brazil represents43% of the total, while in other countries the percentages are lower (Mexico 36%, Colombia 34%, Chile 33%).The capital stock of innovation is much lower in ALC (13% of GDP) than in OECD countries (30% of GDP).

The third characteristic of research and innovation in ALC indicated by Lemarchand (2016) is the low number of researchers, although in recent years several countries have made great efforts to improve the situation (Brazil, Mexico, Argentina, Chile, Panama, Costa Rica and Caribbean countries).These efforts have gone to meet the structural weakness that affects the growth of research and innovation, more than 60% of the graduates and 45% of the doctors obtain their corresponding degrees in social and human sciences. In Argentina, Brazil, Chile, Colombia and Mexico there is a lack of private sector engineers that impose limits on innovation in SMEs and only a small fraction of the scientific researchers work in the private sector in ALC (24%) compared with the OECD average (59%).

Other regional characteristic is the small number of applications and patent grants. Only between 1% and 5% of LAC companies have generated at least one patent. It is also low the number of applications and granting patents for ALC firms in developed country markets, showing the absence of a business strategy of international competitiveness based on technological innovation. Brazil, Mexico, Chile, Argentina and Colombia are the countries with the highest number of applications and grants patents between 2009 and 2013, although in terms of patent applications per million inhabitants, Chile, Brazil, Uruguay and Panama have the highest proportions. In terms of patents granted per million inhabitants, Panama, Chile, Cuba and Argentina have higher values.

Of particular importance to this "concept note" it is as defined Lemarchand (2016): *a corporate culture away from endogenous innovation.* With the exception of Costa Rica and to a lesser extent Mexico, production structures and exports show a low profile. Indeed, the export figures of ALC over the last twenty years show that between 30% and 40% of exports has been raw material *(commodities);* about 20% of manufactures based on natural resources; 10% of low-tech manufactures; 20% medium- technology manufactures, and only 5% to 10% of high tech manufactures Prado (2016).

Angelelli, Luna, & Suaznabar (2,017) after analyzing 9 agencies promoting innovation in ALC and 6 developed countries report a wide variety of strategic approaches, scope and objectives according to the environment in which they operate, while there are substantial differences in organizational and institutional aspects and performance. The

authors show that in the research and innovation system of the most advanced countries, development agencies have an obvious transformative approach to the economy, while the most strategic approach of the region is mixed, it aims to improve the capacities of existing businesses as well as to promote the development of new technologies and business areas, in many cases from existing platforms generating sectors based on natural resources.

The study of Angelelli *et al.,* also shows a different institutional framework, strongly focused on the public sector. In some countries the mixed nature of these innovation agencies allows greater flexibility in managing its resources, which are generally low, except FINEP (Brazil) and CORFO (Chile), but the need for all agencies to negotiate annual budgets introduces uncertainty and limits their sustainability. It is also noted that inter - agency coordination is still weak, with some exceptions such as the ANII (Uruguay) and FINEP (Brazil). Tables 2 and 3 include a sample of agencies in ALC devoted almost exclusively to financing innovation and those that in its portfolio include both research funding and innovation, respectively.

Table 2. Agencies dedicated to financing innovation (almost exclusively)

Name of agency	Initials	country	Year of creation	GDP per capita	Global Innovation Index
Development Corporation	CORFO	Chile	1939	$ 23,367	41.2
Studies and Projects Financier	FINEP	Brazil	1967	$ 15,391	35.0
National Program of Innovation for Competitiveness and Productivity	Innovative	Peru	2014	$ 12,529	34.9
Business Growth Management Unit	iNnulbul	Colombia	2012	$ 13,829	36.4
N Route Corporation	ROUTE N	Colombia	2009	$ 13,829	36.4

Source: Authors based on Angelelli, Luna & Suaznabar (2017)

Table 3. Agencies funding research and innovation (with varying degrees of intensity)

Name of agency	Initials	country	Year of creation	GDP per capita	Global Innovation Index
National Agency for Research & Innovation	ANII	Uruguay	2008	$ 21,244	35.8
National Agency for Scientific and Technological Promotion	ANPCYT	Argentina	1997	$ 20,364	34.3
National Council for Science & Technology	CONACYT	Paraguay	1990	$ 9,198	30.7
National Secretariat of Science and Technology and Innovation	SENACYT	Panama	1997	$ 22,237	36.8
National Research Council	CNPq	Brazil	1960	$ 15,391	35.0

Source: Authors based on Angelelli, Luna, & Suaznábar (2017)

There exist in ALC in several countries that do not have a funding agency for research and innovation, but provide funding through their budgets with limited funds granted to them by central government. This is the case in several countries in Central America and Bolivia. In the case of the Caribbean countries, a major source of funding for research and training of human resources is the Science Foundation, which is a private organization supported by donations from the Caribbean Diaspora and private companies.

Table 4 shows the strategic approach adopted by the innovation agencies analyzed by Angelelli, Luna & Suaznábar (2017). The table illustrates the fact that all agencies studied they have a median (half) or low focus which can signify atomization of the financial resources it handles attending a high number of beneficiaries. The study notes that there are a variety of instruments used, thematically diversified, mostly non - refundable and low support per beneficiary (US $ 20,000toUS $ 200,000).

Table 4. Strategic Focus of Funding Organizations

Agency	goals				Beneficiaries					Targeting
	R & D	Innovation	Entrepreneurial	Development of SNI	Researchers	R & D Centers	Business	Entrepreneurs	Consortia	
ANII	X	X	X	X	X	X	X	X	X	Half
ANPCYT	X	X			X	X	X	X	X	Half
CONACYT	X	X		X	X	X	X	X		Low
CORFO	X	X	X			X	X	X	X	Half
FINEP	X	X	X		X	X	X			High average
Innovative	X	X	X				X	X	X	Low
iNnulbul		X	X				X	X	X	Middle-low
Route N		X	X	X			X	X	X	High average
SENACYT	X	X	X	X	X	X	X	X		Low

Source: Authors based on Angelelli, Luna, & Suaznábar (2017)

This situation of low investment per project is a weakness as research results cannot be effectively be transferred to innovation or have an appreciable impact on economic (or social) growth. The study recommends to develop interventions with greater focus and to create better conditions of the environment that facilitate the operation of the research and innovation system.

For its part, Rivas, Rovira and Scotto (2014) argue that institutional reforms that have operated in the region have had positive impacts, particularly with the creation of specialized agencies and / or funds, but also point out that in many cases the research and innovation systems are in incipient stages of development. This study notes three important results of institutional reforms:

a) A significant increase in public activity in support of research and innovation, as suitable carriers being created to channel public resources.

b) The increase in the work of scientific authors that shows not only an increase in the number thereof but also in quality improvements.

c) The new agencies have become true leaders of innovation in their respective countries.

Despite the achievements mentioned, Rivas *et al.,* maintain that there are still important challenges ahead, including increasing investment, achieving greater involvement of the private sector. Also they consider necessary to advance the definition of their own models of governance and institutional strengthening. In the context of policies, it is necessary to correct coordination failures, reduce policy overlap, and structure a stronger capacity for evidence-based decision making.

Padilla-Pérez (2013)and Padilla-Pérez and Gaudín (2014) compares the research and innovation systems in Central America, noting its heterogeneity especially on the stability of the institutional framework that orients the design and implementation of public policies, committed human and financial resources, quality of research and teaching, and innovative capacity of enterprises. Nevertheless, several strengths and weaknesses are common to all countries. The study of Padilla-Pérez's points out the strengths of the systems:

a) They are composed of organizations (companies, universities, research centers and government agencies) that interact in the context of emerging innovation systems.

b) They have a knowledge base in the productive sector and universities and research centers in specific sectors such as agribusiness.

c) They have a wide range of academic programs of higher education.

d) There is a business sector that competes in local and international markets.

e) It has developed an institutional framework to support the activities of CTI.

f) They operate in research laboratories working on issues of national priority.

g) They have a wide network of organizations that facilitate the diffusion and absorption of knowledge.

The study also points out the weaknesses it identifies as:

a) A mainly composed of companies with low productivity, low - skilled labor force and a reduced investment in innovation industry commitment.

b) Relations between enterprises are mainly commercial nature and, to a lesser extent, exchange and knowledge creation.

c) Training college degree is concentrated in the social sciences, and graduate training is low.

(d) The relationship between university and company focuses on the formation and flow of human resources, and shows little guidance to the dissemination and generation of innovations and limited knowledge transfer.

e) The resources devoted to research in universities are low.

f) Research activities often lack specific targets market - oriented.

g) Public resources to promote coordination between CTI and system components are insufficient.

h) Lack coordination between policies carried out by various government agencies.

(i) There is a weak financial system support innovation.

j) No systematic and periodic collection of indicators of technological capabilities and lacks exercises monitoring and evaluation of policies.

Within national research and innovation systems, companies are essential for transforming knowledge into new products and services actor. IDB (2010) notes that there is not a clarity of understanding of the concept of innovation by companies; innovation activities in them are oriented to the acquisition of capital goods and equipment to incorporate in their production processes, leaving aside the activities associated with research.

The main obstacles to innovation in enterprises in most countries in the region are according to the IDB and the results of the studies cited:

a) Weak linkage between research and innovation in the productive sector. The productive sector is composed mostly of companies that have low productivity, low-skilled labor and low investment in innovation. There is a strong focus on marketing and not the creation and sharing of knowledge.

b) Weak linkage between supply and demand of national innovation systems.

c) Weak culture of evaluation and supervision of scientific programs and projects.

(d) Low linkage between various public bodies when developing policies.

e) Scare financing.

F) Low sustainability during periods of innovation, which are regularly long before starting to receiving benefits.

g) Small markets to allow a profitability of the process.

h) Limited qualified human resources.

(i) Aversion of the risk, the absence in many countries of venture capital.

Crespi and Zúñiga (2012) investigated in detail the drivers of technological innovation and how these are is inserted into the business productivity in ALC. The results show solid evidence in the link of innovation and productivity. From the view of policy the result of the study highlights the need for action and more effective policy to overcome obstacles encountered by businesses to invest in innovation, and provide better market conditions and business, but also recognized the determinants of innovation are not the same for each country, and is necessary the adoption of differentiated approaches.

Lemarchand's (2015) analysis recognizes that the private sector has recently had a more proactive behavior to push innovation on the public policy agenda. In this line, specific mechanisms have been created in several countries, facilitating their participation, most notably the Competitiveness and Innovation Council of Chile (since 2006), the Private Competitiveness Council of Colombia (since 2007).In Peru private companies participated in the preparation of the competitiveness agenda, and these participate in organizations such as the Science and Technology Advisory Forum of Mexico (since 2002) and the High Technology Advisory Commission of Costa Rica.

There are also local initiatives that are introducing tax incentives and other mechanisms to become "centers" of innovation" as is the case of Buenos Aires and Bariloche (Argentina), Belo Horizonte and Recife (Brazil), Santiago (Chile), Medellin (Colombia), Guadalajara and Monterrey (Mexico) and Montevideo (Uruguay). On the other hand, a growing number of companies are leading innovation processes as shown by the results of surveys conducted innovation in several countries in the region (Table 5).

Table 5.Percent of Latin American companies involved in innovation

country	Year /Period	Conduct Internal Research%	Hire External Research%	Acquire machinery, equipment and software%	Acquire external knowledge%	Ccnduct training%	Conduct market innovation%	Number of innovation surveys conducted
Argentina	2007	71.9	19.3	80.4	15.1	52.3	-	9
Brazil	2009/2011	17.2	7.1	84.9	15.6	62.8	33.7	5
Colombia	2009/2010	22.4	5.8	6.6	34.6	11.8	21.4	5
Costa Rica	2010/2011	76.2	28.3	82.6	38.9	81.2	-	4
Cuba	2003/2005	9.8	41.3	90.2	36.6	22.1	83.8	2
Ecuador	2009/2011	34.8	10.6	74.5	27.0	33.7	10.6	1
The Savior	2010/2012	41.6	6.7	-	-	-	82.7	1
Mexico	2010/2011	42.9	14.5	35.4	2.6	12.5	11.4	7
Panama	2006/2008	11.4	4.7	32.2	8.5	10.0	-	3
Uruguay	2007/2009	38.7	4.3	78.2	14.5	50.2	-	5

Note: Innovation surveys were also conducted in Chile (8), the Dominican Republic (2), Guatemala (1), Paraguay (2), Peru (3), Venezuela (2).Source: Lemarchand (2015).

1.2.   Innovation policies

Different manifestations have shown the high interest of the countries of the region to strengthen innovation policies and to deepen their content. In fact, there has been in recent years a significant advance in its conception, definition and implementation. There is evidence of that because, despite a slow pace, the ALC economies are approaching the knowledge economy, having greater (albeit still limited) investment in business innovation, building scientific and technological capabilities, including design capabilities policy, greater availability (though not in the numbers needed) qualified human resources and attempts to improve the business climate.

Two new policy approaches are evident in ALC. The first, as it is the clear case of Panama, to identify major challenges rather than sectors, in order to make effective the system approach and overcome the linear model of innovation that is still present in many countries. This approach is in line with the proposal of Schott (2016) to move towards a "model of transformational innovation" posing the question of how to use the science and technology policy to go to meet social needs and meet the challenges of development sustainable and inclusiveness ,at a more fundamental level than previous models or their associated ideologies and practices?

In this approach, there are proposals whose analyses should lead to the definition of a policy defining a national research and innovation system that addresses both the aims of economic growth and sustainable and inclusive development (Hall *et al.*2014; Aguirre-Bastos & Weber 2014; Aguirre-Bastos, Bortagaray & Weber 2015).

The second approach in ALC shows that there is a significant movement towards defining regional - territorial innovation systems, overcoming a centralized management model. These efforts are entailing a progressive transformation of traditional institutions and the creation of others in the public sector. The regionalization policy approach is in line with the observations of differences between national and regional innovation models that suggest the need to design differentiated policies to strengthen the innovation process with local stakeholders (Llisterri & Pietrobelli 2011).

Cummings (2013) points out that strengthening capacity for innovation and building innovation systems should be key elements in a strategy of sustainable territorial and inclusive economic development. Generalizing the observations of this study to the ALC countries, especially the weakest, it is hard to think of an innovative company with no view immersed and actor of a robust process of territorial development.

In this new framework of territorial innovation policies already exist concrete expressions in the LAC region (Barroeta *et al.*2017):

a) Chile moves towards a decentralized system, designing financial plans to secure regional programs.

b) In Brazil, the development of horizontal coordination between states is explored, which would allow important synergies in the efforts made by certain states to define their specialization strategies and support states that are lagging behind.

c) Colombia and Peru emphasize aspects related to the public resources destined to innovation programs, the consolidation of the systems of governance and the definition of priorities of regional specialization.

(d) Mexico needs to increase its efforts in coordination between the national level in defining policies and state initiatives.

e) In Argentina, a framework that encourages strategic process of regionalization and innovation, incorporating outlying provinces to the central approach would help identify potential for innovation in the sub-national level.

While ALC countries move towards conceptualizing a model of territorial development based on innovation, there are difficulties structural, social and political type that can limit the development of a territorial specialization:

a) A decentralization process in the territories that requires the political will of regional and national authorities.

b) A weak human and technical resources for the development of innovation in the regions capital.

c) Lack of adequate investment budget for innovation activities. If this the main factor (Barroeta *et al* . 2017).

(d) The lack of continuity of policies for science, technology and innovation, so that transcend governments, due to the absence of state policies and consensus among political parties, Padilla-Perez (2013).

In the above context, and l study of Barroeta *et al. ,* has identified the main problems of the regional innovation systems (RIS):

a) Weak institutions and governance of Regional Innovation Systems (RIS) have a negative impact on stability still insufficient capacity and management of government agencies related to science and technology.

In relation to this weakness, and in view of the bi - regional cooperation, it should be mentioned the European experience to support weaker regions as outlined in the next section, under the concept of " smart specialization". The study of such experience, together with ALC own experiences, can be a real topic of bi regional cooperation.

b) In many cases, regional innovation policies are diluted with other instruments such as policies promoting exports and foreign direct investments or policies responsible for promoting the development of labor skills and human capital.

c) In general, the regions of ALC have a fragile knowledge infrastructure that often does not reach the critical mass or the level of development needed to be set up centers of international excellence that if such infrastructure exists, usually it directed mainly to higher education and basic research rather than technology transfer.

(d) The innovative business sector has poor relations with other key players in the Regional Innovation Systems (RIS), universities and research and, there is mistrust of the management capacity of the public authorities in terms of innovation policies.

e) Funding for Regional Innovation Systems (RIS) is generally insufficient to sustain a complex program of instruments and policies.

f) Information on the results and impacts of national innovation systems is low and is even scarcer in relation to Regional Innovation Systems (RIS), making it difficult to design procedures reform or extension tools.

2. *Current state of cooperation for innovation within bi - regional EU-CELAC*

The ALC EU strategic partnership began with the Rio de Janeiro summit in 1999, which was structured on the basis of a relationship built over many decades. Casanueva (2014) is critical of the slow progress of the association, noting that LAC is in deficit, because the EU has "*done everything possible to make this strategic partnership work on line for mutual satisfaction*" but that ALC has failed to structure a common position and agree on a "Strategic Partnership Agenda". At the same time, it recognizes that no other two regions in the world have the historical affinity and the same values that ALC and Europe share , and that, to meet the challenges of globalization, complementarity is needed to influence the construction of the future , thus opening up many opportunities for cooperation .

Science, technology and innovation, higher education and bi - regional cooperation has been characterized by a large number of projects and programs that have been made operational; to cite only a few: ELAN, ALFA, @LIS, CLARA, EULARINET, ALBAN, ALINVEST, ALURE, URB-AL, ATLAS, Ceasar Marie Curie Fellowships. DG REGIO programs. The Joint Research Center and other European agencies have also been major players in the bi - regional cooperation.

Moreover, there is a wealth of cooperation on a bilateral basis by which laboratories are installed, networks are opened, and technology transfers, and also contributes to bi - regional cooperation and involving universities, non - university research or public centers research. The participation of research groups LAC, limited mostly to larger countries is in the Horizon 2020 program provides a solid basis for deepening bi - regional cooperation in innovation.

Two recent projects have been instrumental in the process of building the "Common Research Area". The first, ALCUE Net (2013 and 2017) established to create a platform to bring together both public and private actors, processes research and innovation in both regions, and to facilitate bi - regional political dialogue.

The main result of this project have been Silenzi (2017):

a) Establishment of a Technical Secretariat fundamental to the preparation of concept notes, action plan and other documents for SOM.

b) Foresight study on the strategic vision to strengthen bi - regional cooperation.

c) Impact Monitoring and evaluation of the project.

(d) Establishment of four thematic networks have mobilized 350 experts set up specialized platforms, and mainly resulted in the definition of joint calls under the ERA Net Project LAC.

e) Proposals for the development of skills and capacity mapping.

f) Definition and strengthening of structures "NCPs" .

g) Facilitating missions, broadcast via its website, etc.

The second project ERA Net LAC (2013 - 2017) was established with the main aim to promote openness and coordination of projects and programs, infrastructure and cooperation. One of its main objectives are fully achieved over their activities, was to create a platform for funding agencies in both regions. Under this platform two joint calls have taken place and a *third one will be launched in October 2017;* additionally ERA Net LAC served as a platform for launching joint calls in the area of health and physical infrastructure.

The political dimension of ERA Net LAC plays an important role in the process, as it complements JIRI under which strategic sectors and issues for cooperation are defined.

From the vision of strengthening innovation in bi regional cooperation, several of the projects awarded under the ERA Net LAC Project have had innovation development objectives and have successfully participated in private sector companies.

On the other hand, regional cooperation policy of the European Union (EU) has been the main driving force for promoting innovation internally. The concept of "smart specialization" which is being implemented in Europe has been instrumental for this purpose, (Barroet a *et al.*2017). Through its implementation, European regional cooperation has given importance to the regions and territories which has allowed the identification of priorities for these areas causing a regional empowerment in designing policies of national and regional innovation. In Europe most countries are strategically allocating resources and promoting broad participation of the business sector.

The concept of "smart specialization" is now being considered by several countries in the ALC region and indeed has promoted a model of bi - regional cooperation to develop strategic issues (Barroeta *et al. 2017).*The following initiatives are part of this model:

a) RED Project in Chile to promote the connection of innovation activities in the territories.

b) Cooperation in Regional Innovation Systems EU-Peru to support the transfer of methodologies of Regional Innovation Strategies (RIS).

c) Interregional cross-border cooperation has enabled the implementation of the European Territorial Cooperation Instrument (Interreg) in the cross-border cooperation processes of LAC.

(d) Innovation and territorial city-region links that promote increased sustainability in cities and innovation in various regions.

Other topics in the innovation process have been of interest to both regions and that can fit into the concept of "Smart Specialization" are those of extraterritorial cooperation, productive diversification based innovation and competitiveness, decentralization through processes of technical cooperation, etc. It is recognized that such regional cooperation is of great importance for those small and emerging economies, where human and financial resources for innovation are often scarce and local markets lack the size needed to encourage investment in innovation (Padilla-Pérez 2013).

On the other hand, it is recognized that the international and bi regional cooperation has promoted innovation in public policies through the dissemination of good practices and funding for testing new policy instruments favoring new ideas and projects SELA (2016).This has contributed to improving the indicators that describe the status of research and innovation in ALC.

An important example of cooperation in research and innovation within the ALC region plus Spain and Portugal is the CYTED Program. It has succeeded in mobilizing a large number of researchers, and entrepreneurs, and creating extensive thematic networks. However, as noted by the last evaluation of the program (Molero-Zayas, Alonso-Rodríguez, Granda-Gayo, 2009), the priority governments attach to the program is limited, which is reflected in deficiencies in meeting the budgetary commitments of many countries.

On the side of the projects, and relevant to the bi - regional cooperation driven by innovation, the evaluation indicates that the CYTED Program should consider first to deepen some conditions of context and recognize that research is not the only source of innovation; secondly, the need to consider markets and social demands; and thirdly, precisely define the role of business and consider whether their needs for innovation can be met with a research - oriented program.

In the ALC region there is a large number of initiatives that can lead to greater cooperation with Europe in innovation. Examples of such efforts can be found in SEGIB, COMCyT, SICA, MERCOSUR, CTCAP, etc. At the same time several regional bodies such as ECLAC, PAHO, OAS, IDB, have their own policies to promote and support financially and technically the efforts of regional cooperation.

The evaluation of these efforts is beyond this "concept note", but the important thing to note here as a result of the analyses of cooperation, is that the bi regional cooperation to succeed in focusing on innovation it is necessary to convene and ensure the commitment of key innovation actors that are the companies.

3. *Recommendations to increase collaboration on innovation, research and technology transfer in the framework of the EU-CELAC Joint Research Area*

National innovation studies show that the main challenge for ALC is related to institutional weakness with the organizations responsible for coordinating research policies and innovation to implement their own policies and manage resources (and procedures) needed to finance companies with innovative potential.

In this general context, there are several possibilities for bi regional cooperation that are already being exploited or can be explored and consolidated in the short and long term, and on which the SOM should discuss. Some of these are:

a) In spite of the difficulties of bringing economic innovation policies closer to innovation policies for inclusion, bi-regional cooperation can advance in practical ways and contribute to the communication of these policies. In this line, cooperation should analyze the experiences of territorial development and the proposals of policies of "transformative innovation", as well as existing experiences in the application of research and innovation for economic growth, and sustainable and inclusive development.

b) In order to facilitate the development of innovation in a cooperation framework, it is necessary to create a joint strategic intelligence. In ALC there are several elements that need to be considered in this regard: the strengthening of prospective capacities, the development of think tanks, and execution of joint policy dialogues at the academic, governmental and business levels.

In this regard the SOM has a challenge to face and solve, once the first actor in the creation of a strategic intelligence is precisely the SOM. In that sense it requires a permanent secretariat. The experience developed in ALCUE Net shows that a "permanent" technical agency is an effective tool for the proper operation of the bi - regional cooperation and the SOM itself.

c) Moreover, for an effective bi-regional cooperation framework based on innovation, innovation actors, companies or their business associations must be present. The current format of development from the linear model of research involving primarily and almost exclusively its agents does not apply to economic innovation.

(d) Key to the success of innovation-led bi-regional cooperation is the creation of research and innovation networks. Many are already created, but require political and operational support. They also need to internalize the concepts of open innovation and others that affect how these networks can be developed today. In this sense, a SOM under a new format may be required, considering that a broad orchestration of activities is required.

e) Policy dialogues help to create better paths for cooperation. For these to be effective, they must create a better understanding of cultural factors that promote or constrain innovation activities. This process can be accelerated by implementing bi regional foresight efforts or by establishing concerted research and innovation agendas.

f) A cooperation agenda for innovation cannot ignore the fact that today science and technology are advancing at giant strides, which can affect society with unpredictable results.

Thus it is necessary that the agenda includes certain important elements: firstly, the identification of future trends through analysis thereof; On the other hand, the rapid definition of research leading to innovation on topics that may be new to many ALC countries, such as nanotechnology, new energy technologies, 3D printing, robotics, artificial intelligence and many more.

In these cases direct support of the cooperation is required to build local capacities. A cooperation agenda should also consider the ethical issues that arise in the application of new scientific knowledge. These issues are not on the agenda of current cooperation.

g) At the same time to be open new fields or subject areas, it is also necessary to redefine the number of subject areas in this way to concentrate resources on those that present greater opportunities. For this, activities of vigilance and foresight are absolutely essential. The idea of "observatory" that is being discussed in the current cooperation must concur to the concept of surveillance in a much more structured way.

h) Once the innovation promotion agenda has been defined, the European Commission may consider specific calls for LAC in this area. In practice there already exists an instrument that can serve as a basis for these calls in the ALINVEST Program.

(i)   The inclusion of financial institutions in cooperation driven by innovation is key. The Inter - American Development Bank today is very important funder of research and innovation for most ALC countries. Moreover, already the Bank offered its active participation during the Madrid summit in 2010, facilitating the definition of a regional agenda for policy dialogue; the evaluation of innovation policies and programs. For its part, the Latin American Development Bank has generated in the past expertise in financing companies, and has technological development program in strategic areas.

j)   Although the recommendations of this "conceptual note" are aimed at economic innovation, it is necessary for the SOM to define an innovation agenda for inclusive development and for further activities to integrate economic and social innovation policies, under the conditions of each country. For cooperation to be effective in this area, the exchange of experiences, the definition of benchmarks and other instruments is necessary.

The final result of the exercise should show the feasibility of forming national research and innovation systems that can meet the objectives of economic development and the objects of environmental and inclusive development.

It is important to recognize that the realization of the regional agenda can help the one hand, to the ALC countries to lay the foundations of intra-regional cooperation, and on the other, the European Union or its member states to identify priorities and allocate resources in accordance with those priorities.

So as to guide the discussion towards the future, the SOM should analyze the results of the foresight (with vision to 2030) undertaken under the framework of ALCUE Net, on the recommendation of the SOM held in San José in 2015.The study four scenarios constructed primarily from the perspective of LAC (Aguirre-Bastos *et al.*2017).One of the most important objectives pursued by the study was to identify the most important and relevant drivers of current and future cooperation between the two regions and to identify areas of potential for collaboration.

The vision of the future that can be built upon examination of the scenarios shows that the bi regional cooperation will be developed under an increasing number of global challenges of economic, social, environmental, and in particular the rapid scientific and technological development (see also Bitar, 2016). In the latter case, the OECD (2016) warns that mega trends are already defining future capacity and activities in research and development, and that technology is aimed at influencing society with unknown results. Many of these challenges can be clearly faced by the bi regional cooperation.

The recommendations made in this "note" are compatible and can be assimilated with those made by the ELAN network (in 2015) for the purpose of exploring and prioritizing recommendations on specific issues and include:

a) Internationalization by providing intermediation services to facilitate the identification and acceleration of technology-based business opportunities.

b) Programs of cooperation and mobility of the actors of the system of investigation and innovation.

c) Interregional cooperation for joint inter-agency learning on policies and programs to stimulate innovation, involving enterprises especially SMEs.

(d) Entrepreneurship between the two regions

e) Technology Transfer and Market-Oriented Research

f) Capacity Building

From the above *specific actions* that might permit to continue to implement cooperation in innovation, research and technology transfer within the common area of EU-CELAC Research, it can be recognize the need to::

to) Develop methodologies for foresight (expert panels, Delphi surveys, identifying critical technologies and scenario building) and concerted research and innovation to strengthen the capabilities of a intelligent joint strategic agenda in ALC.

b) Redefine the number of thematic areas to focus resources on those with the greatest opportunities.

c) Create an "Observatory" would be essential for the more structured monitoring related to the evolution of technology (patents filed, announcements and appearances at fairs and congresses related to technological progress or the emergence and industrial products news, events etc.)

d) Develop or support think tanks.

e) Promote cross joint and horizontal policy dialogues between academics, government and business levels.

f) Adopt information technologies that allow traceability in the implementation of policies and resource management. This action must be framed within the concepts of mobility, ubiquity and availability.

g) Strengthen ALCUE Net as a technical agency "permanent" for effective operation of bi - regional cooperation and the SOM itself on issues of innovation.

h) Strengthen the political and operational support of research and innovation networks through the allocation of permanent funding.

(i) Define an innovation agenda for inclusive development that promotes the integration of policies of economic and social innovation, under the conditions of each country.

j)   Establish programs of cooperation and mobility of the actors of the research and innovation system for the LAC region.

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Annex. Resume of the state of innovation in ALC

Institutions, policies and instruments

Institutional framework	• Diverse: - Ministries, Secretariats or equivalent of science, technology and innovation - Ministries, Secretariats or equivalent of Science and technology - Directorates or departments of Science, technology and innovation within ministries of education - National councils for Science and technology - National councils for innovation and competitiveness • The institutional framework is centered in the public sector • In many countries the governance of the national research and innovation system is weak.
Policies	• The majority of countries define policies with little strategic depth and with a short term vision. • Policies do not transcend government periods • It is evidenced an improvement in Policy making but there is lack of monitoring and evaluation policies.
Policies and Supply policy instruments	• Use of traditional Policy instruments: - Research funds for infrastructure (most countries except BOL and SLC) - Research fellowships, studies abroad or educational programs in all countries - Post graduate programs, some cooperative with European universities - Return of talents (f.e. PAN) • Support to centers of excellence (ARG, BRA, CHL, COL, MX, URY) • Payroll incentives for resident researchers ARG, MEX, PAN, URY, national researchers system) • Formal links with nationals abroad (ARG, CHL, COL) • Weak mobility and linkage between the scientific productive environments
Policies and Demand policy instruments	• Funds for innovation and competitiveness development (ARG, BRA, CHL, COL, CRI, MEX, PAN, PER, PRY, SLV, URY), but limited in amounts. • Fiscal incentives for research (ARG, BRA, CHL,COL) • Creation of research consortia • Science parks with Enterprise services • Risk capital and other funds for enterprises (ARG, BRA, CHL, COL, URY) • Promotion for the transfer of technology (ARG, BRA, PAN, PER, PRY, • Some weaknesses: - Not many enterprises access such funding

Policies and instruments addressed to strategy	• Promotion of linkages between system actors
	• Strengthening of regional systems of innovation
	• Strengthening of sector systems of innovation and creation of sector funds (in a few countries)
	• Mission oriented research and innovation
	• Vision towards grand challenges (few countries make the ways to do this this explicitly)
	• State procurement (not present in the majority of explicit policies).
	• Programs in priority areas (ARG, BRA, CHL, COL, MEX, PER, URY)
	• Clusters and equivalent (ARG, BRA, CHL, DOM, URY)
	• Coordination mechanisms among actors) dialogues, innovation chambers, etc.) ARG, BRA,CHL, MEX, PAN, URY)
	• Weaknesses
	  - Results of dialogues do not reach Policy makers
	  - The instruments for the application of mission oriented research and innovation are not fully developed. In general the "call system" does not respond to this vision.

B.   Financing

Financial mechanisms	• Diverse financing
	  - Specific funds for innovation (f.e.FINEP in Brazil)
	  - Institutionalized funds for both research and innovation, in aby cases research has the priority.
	  - In many countries the science, technology and innovation organizations that finance research and innovation form the operative budgets.
	  - Nota all countries have a specific financial mechanism.
	• One weakness is the small amounts dedicated to each Project, so that outputs have an impact.

Resources invested and human capital (expenditures in research and innovation and number of researchers)	• Average expenditure in ALC 0.76 of GNP, below OECD average. • Brazil and Chile are above the average, Brazil is the highest investor and represent 60% of the total expenditure of the region. • Limited participation of the private sector. Growing in Brazil and larger countries. • Private sector contract few researchers (40%) • Lack of linkages of the private sector with the university environment. The latter is disconnect from the productive system. • Companies in ALC base their innovation efforts in purchases of capital goods and do not generate its own technologies • There is a small number of large enterprises that can self-finance their research and innovation projects, but it is not the case of the majority and there is not a good number and variety of financial products either public or private that support innovation. • ALC still lacks sufficient advanced human capital • Market size is reduced (in many countries) and there are deficiencies in the economic regulations

C.   Products (outputs)

Products obtained (scientific publications, patents, technology exports)	• Scientific publications have grown, but still number is well under developed countries. • Patent production is smaller. • Technology dependence has grown. International investment is not being used to produce transfer and spillovers are not observed • Increase of scientific capacities in important topics (microbiology, ecology, environmental ecology, agriculture, botany, and zoology), but do not correlate to innovation • Larger number of networks but still weak inside the region
Innovation indexes and indicators	• The countries in ALC are still well below developed countries in all innovation, competitiveness, high tech exports, etc.

Note (1) Sample of countries: ARG, BOL, BRA, CHL, COL, CRI, DOM, GTM, MEX, PAN, PRY, SLV, URY, VEN. The list is not exhaustive and the countries that appear in the boxes are not necessarily the total of the countries in the region that use the instruments. Source: Botella & Suarez 2012