

# Europe-Latin America Cooperation in ICT Research: State of the Art, Opportunities, Challenges

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**Abstract:** This paper presents a number of activities that are being carried out, under the coordination of the WINDS-LA project and with the involvement of a number of key ICT research stakeholders from Europe and Latin America, with the aim to foster bi-regional cooperation in a long-term perspective. The rationale beyond the exercise is that the cooperation between Europe and Latin America in S&T, and more specifically in ICT research, has reached a maturity stage that calls for a reflection (represented by the work of selecting key issues for cooperation), a stronger Multistakeholder dialogue (represented by the recommendations) and for a rationalisation and articulation of the cooperation possibilities (represented by the proposed Committee).

**Keywords:** Europe, Latin America, ICT research, cooperation mechanisms, e-inclusion, ICT for environment and biodiversity, ICT for learning, Multistakeholder support to research.

## 1. Introduction

*“The EU plans to invest over €9 billion in research on information and communications technologies (ICTs). This is, by far, the largest single budget item in Europe’s 7th research framework programme that will run until 2013 – a priority set by the EU, acknowledging the importance of ICTs for Europe’s growth and competitiveness.”<sup>1</sup>*

*“The launch of the 7th EU RTD Framework Programme (FP7), 2007-2013, places new emphasis on international research cooperation which is increasingly seen as being at the centre of community policies.”<sup>2</sup>*

*“The Commission intends to promote the role of Europe’s cutting-edge sectors in the development of the Latin American region, particularly through initiatives under the research and technological development framework programmes”<sup>3</sup>*

As outlined by the quotes above, ICT research is at the core of the European Union Strategy for growth and inclusiveness and the need to open-up the EU research community to other regions of the world is a recognized priority of the European Commission, being S&T cooperation (including cooperation on ICT research) with Latin America a priority.

In this framework, the European Commission is supporting the WINDS Latin America project<sup>4</sup> with the aim to promote the Seventh Framework Programme in the Latin American

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<sup>1</sup> European Commission Information Society Portal,  
[http://europa.eu.int/information\\_society/newsroom/cf/itemlongdetail.cfm?item\\_id=2994](http://europa.eu.int/information_society/newsroom/cf/itemlongdetail.cfm?item_id=2994)

<sup>2</sup> European Commission (2007), A new approach to international scientific and technological co-operation in the 7th Research Framework Programme

<sup>3</sup> European Commission, A stronger partnership between the European Union and Latin America,  
[http://ec.europa.eu/external\\_relations/la/doc/com05\\_636\\_en.pdf](http://ec.europa.eu/external_relations/la/doc/com05_636_en.pdf)

region, facilitating the formation of EU-LA research consortia in the field of Information and Communication Technologies (ICT) research, and at carrying on a consultation activity on to the research priorities of the region. Why specifically ICT research? The justifying ground is that EU-LA cooperation in research and more generally in Science & Technology, is suffering from a set of problems that can hardly be tackled by addressing the whole of EU-LA S&T cooperation, while they can be significantly improved by addressing the ICT research sector.

This is true for at least six reasons:

- ICT research is transversal to virtually all research fields;
- ICT research is by nature extremely open to international collaboration;
- ICT research is by nature multistakeholder, strongly involving the private sector and – as research stakeholders – many other society constituencies such as NGOs or users associations;
- ICT research is strongly complementary to the existing EU-LAC dialogue on Information Society, developed through the EU-LAC Ministerial Forums on Information Society of Seville, Rio, Lima, Lisbon in the period 2002-2006;
- ICT “research champions” exist in LA (as shown by the WINDS-LA mapping results), and can help other LA research organisations to improve their performance in an international perspective;
- ICT “policy champions” also exist (such as Brazil, with its long-term strategy planning in the field), and can help other countries to build up research agendas in the ICT field.

In this context, the challenge for Latin America is to be able to engage in collaboration schemes with the EU with more emphasis and success than in previous Framework Programmes.

## 2. Objectives and methodology

In order to make this improved collaboration durable in a long term perspective, WINDS-LA is carrying on a quite innovative consensus building exercise aimed at facilitating dialogue among all the European and Latin-American stakeholders on both the themes on which cooperation should focus and the long term strategies needed to improve existing collaboration schemes.

The present paper presents the results to date of this ambitious dialogue exercise and its possible developments. The starting point of the analysis has been the recognition that, in general contextual terms, EU-LA cooperation in ICT research depends on a number of factors, such as:

- Policy factors - EU ICT research is largely responsive to policy and strategic drivers, and reflects a growing consolidation of knowledge (Lisbon Strategy, e2010 Plan). In LA research is more bundled by national dynamics and in the majority of the countries the priority assigned to research is lower than in the EU.
- Economic factors –ICT research performance is strongly linked with national and regional economic development, the disparities in wealth between and within the EU and LA regions deeply affect ICT research. Comparing the EU and the LA region in general terms might lead to misleading results, since significant variations within the regions exists, for example between the ICT research developments in Chile and in Bulgaria. These structural conditions are in turn linked to demographic features – particularly differences in age profiles, and to factor such as rurality. These in turn have a knock-on effect in terms of government spending on the research system.

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<sup>4</sup> The WINDS consortium is coordinated by the MENON Network and includes the Technical University of Madrid as well as the Technical University of Catalunya (both Spain), the University of Duisburg-Essen (Germany), The Technological Institute for Higher Education of Monterrey (Mexico), the Pontifical Catholic University of Río de Janeiro (Brazil), and the Foundation for Management and Development (Argentina).

- Science and Technology contextual factors - key issues are, firstly, ICT infrastructure and capacity in place and, secondly, variability in cultural adaptation of ICTs. The two regions themselves, and countries and communities within them, are at different stages in terms of access to ICTs, usage and quality of use. There are also significant variations in the cultural adaptation of ICTs, shaped by the ‘temporality’ of everyday life (for example how the ‘working day’ is defined); occupational structures and the division of labor; the nature of ‘solidarity’; the degree of ‘individuality’ and ‘communality’ in the culture.
- Education factors - this is twofold. In the first place, there is a Human Resources factor: both in the EU and in LA there is a dramatic shortage of informatics professionals and technicians, with a strongly perceived need for the education system to be able to train the number and quality of professionals needed in Knowledge Society. In the second place, productive interaction between universities and IT enterprises has not yet reached the necessary level of integration.

In order to build a vision for future ICT research cooperation between the two regions, all the above factors must be taken into account.

The process that WINDS-LA is conducting in order to strengthen dialogue on a sustainable perspective is organizing and bringing forward a number of different inputs coming from:

1. A desk-research based context analysis carried on by the WINDS-LA project in Argentina, Brazil and Mexico, whose results are available in the form of national reports;
2. The consultations organised in the frame of three conferences that WINDS-LA organised in Brazil (October '07), Argentina (November '07) and Mexico (December '07), involving all the major national ICT research stakeholders;
3. A consultation work carried out involving some key personalities of the ICT research sectors from Europe and Latin America focusing on the issues of EU-LA common benefit and interest;
4. The analysis of the results of a number of initiatives that analysed the issues of EU-LA cooperation on ICT research from different perspectives, such as the Prominence project<sup>5</sup>, or the SCOPE 2015 project<sup>6</sup>.
5. A broader DELPHI consultation with key stakeholders of EU and LA ICT research, which is running at the moment of writing.

### **3. First component: Focusing cooperation on the right issues**

The first fundamental component of a meaningful cooperation strategy is a common understanding of the themes on which this cooperation should focus. In the present case, this is even more important since the themes that have been identified could represent the object of specific FP7 Calls for Proposals targeted to the Latin American region (the so-called SICAs, Specific International Cooperation Actions), therefore giving a clear message of openness and capacity to listen to the needs of the LA region by the European Commission. The following are proposed by WINDS-LA as three priority issues of common benefit and interest for future EU-Latin America cooperation in ICT research, on which to focus cooperation in the period 2008-2009:

1. ICT for social inclusion and connectivity: focusing on ICT innovative solutions at facilitating social inclusion of marginalised citizens (disabled, socially excluded, geographically isolated); connectivity-related research both on high-speed networks and low-connectivity solutions. Future cooperation in the area would be of mutual benefit of

<sup>5</sup> See <http://www.prominence-online.net>.

<sup>6</sup> See [http://prest.mbs.ac.uk/prest/SCOPE/Latin\\_America.htm](http://prest.mbs.ac.uk/prest/SCOPE/Latin_America.htm).

Europe and Latin America due to the high priority assigned to the area in political terms in most of LA countries (just to mention some Brazil, Argentina, and most the smaller countries) and to the existence in the region of a high number of important research actors active in the field, both major universities (the UNAM from Mexico or the University of Sao Paulo, just to mention some) and smaller actors, such as many research centres and NGOs carrying on relevant research. Fostering cooperation in this area would also increase networking and articulation between EC-funded research and actions supported by other national and international donors (such as the Interamerican Development Bank) and would help capitalising existing EC-supported research infrastructures, such as RedCLARA.

2. ICT for environment and biodiversity: focusing on flexible and user-centric ICT solutions for sustainable use of natural resources and for better management of ecosystems including the mitigation of degraded environment (including biodiversity), high risk exposure to diverse pollutants and to disasters, as well as on the vision of ICT contributing to a cleaner, safer and healthier global environment. Future cooperation in the area would be of mutual benefit of Europe and Latin America due to the high priority assigned to the area in political terms in most of LA countries, to the high biodiversity richness of the LA region and to the existence in the region of a high number of important research networks in the field (almost every LA country is supporting a research network in the field). Finally, this theme would allow EU and LA research networks to provide a contribution to global problems, such as disaster reduction or climate change, and to facilitate research integration across Latin America (facilitating exchange across LA countries).

3. ICT for learning: focusing on using ICT to make digital resources available to researchers and citizens (with specific attention to local cultural specifications, to linguistic diversity and to bottom-up content production) and on building ICT-supported learning networks at different levels (school, universities, informal and non conventional learning) able to embed lifelong learning strategy into every aspect of citizens' life. Future cooperation in the area would be of mutual benefit of Europe and Latin America due to the high priority assigned to the area in political terms in most of LA countries (the lack of specialised human resources, especially in the ICT field, was recognised in all WINDS consultations and events) and to the existence in the region of a high number of important research actors and networks active in the field, such as the RELPE network for ICT in school education, and of a high number of private sector actors active in the field (both SMEs and large companies).

Apart from the three top priority areas identified above, the following seven issues have been identified as important for EU-LA mutual benefit cooperation, since all of them are of high priority in the LA region and can count on a relevant number of research institutions active in the fields:

- Software engineering: focusing on web services infrastructures, particularly on on-demand software, open source applications, which are allowing reacting with software solutions to challenges of a changing environment; software for transport and automotive industry.
- ICT and energy: focusing on ICT and increasing demand for energy, ICT contribution to optimise the use of renewable energy sources, throughout the whole life-cycle of products and processes, design smarter and cleaner products and processes, optimising energy consumption and reducing waste.
- eHealth: focusing on ICT for personalised care solutions, patient safety, medical/health imaging and mobility support, as well as on ICT-supported health systems management improvement.
- Security and prevention systems, self defending networks: focusing on ICT use to strengthen security and dependability of key infrastructures such as energy production

sites and transmission systems, storage and distribution, ICT networks, sensitive manufacturing plants, banking and finance, healthcare, or transportation systems.

- Grid computing, massive data processing, e-science: focusing on distributed and peer-to-peer systems, complex computer clustering, parallel computing; future internet technology.
- Mobile/ubiquitous computing: focusing on interoperability and flexibility of mobile and broadband technologies, ubiquitous access to broadband mobile services, context awareness; traffic processing between core and edge networks.
- eGovernment & services to citizen: focusing on ICT applications able to enhance the interaction and transparency between citizens and government and to help coordinating administrative services at different levels.

#### **4. Second component: Building a long-term strategy**

As a preliminary step to identify strategies to improve cooperation in the long-term perspective, an analysis of the barriers, pitfalls and problems affecting collaborative processes is necessary. The research carried out to date, by consulting the main stakeholders of ICT research from Europe and Latin American including decision makers, private sector and users' representatives, as well as civil society constituencies, has brought to the emergence of the following problems:

- Fragmentation of Programmes, projects and support measures – having to do both with the fact that coexistence of regional, sub-regional and bilateral cooperation is hard to articulate efficiently;
- Scattered knowledge in the EU on the heterogeneity and potentials of LA especially in potentially interesting sectors such as biodiversity, energy, health, and at the same time scarce knowledge in LA on existing cooperation possibilities with Europe;
- Lack of continuity in supporting mechanisms – the well known syndrome of “reinventing the wheel” in terms of supporting EU-LA cooperation research, where many support mechanisms exist for a limited time (normally 2 years) against cooperation programmes with a longer duration (such as the 7 years of FP7);
- Lack on articulation of the different research agendas gravitating around the Latin America Region (European Commission, organisation of American States, Bilateral Agreements agendas, National agendas of LA countries...).

These problems are being checked, though a DELPHI survey, against the WINDS-LA vision for EU-LA ICT research cooperation. To build this vision, the WINDS Roadmapping team has integrated existing visions with the results of the WINDS mapping work, has discussed this during the three Conferences organised in Argentina, Brazil and Mexico, and has come up with the following vision for EU-LA cooperation in ICT research.

*EU-LA cooperation in ICT research should be open, inclusive and reciprocal and should aim at support competitiveness and social inclusion of both Europe and Latin America. ICT research should drive the innovation discourse and foster benchmarking and integration among Latin American countries. Furthermore, due to the specific nature of ICT, EU-LA collaboration in ICT research should:*

- *pay attention to the impact of its results on final users, both in EU and in LA;*
- *improve the relation between S&T and society;*
- *involve all the stakeholders of research: from policy makers in charge to users representatives to researchers;*
- *keep a balance between support to commercially exploitable research activities and open knowledge based activities.*

In order to approach the scenario corresponding to this vision, a number of recommendations are at the moment being validated and will be introduced to the policy makers in charge of ICT research both in Europe and in Latin America. To date, the WINDS project is proposing the following:

- Creation of a EU-LA ICT Research Multistakeholder Committee, a stable and open group representing the European Commission, Latin American governments, research networks, international organisations, civil society networks and research users' associations, in charge of following the status of EU-LA cooperation in the field, of monitoring research results and developments and of validating key research themes;
- Establishment of a EU-LA Science and Technology Liaison Office in Brussels with a specific unit for ICT research;
- Monitoring of the ICT research excellence and priorities of LA, in order to be able to focus cooperation and funding on themes of EU-LA common interest ad benefit;
- Support LA governments in the definition of a Latin American strategy for ICT research cooperation with Europe, articulated both with existing S&T strategies (FP7) and with Information Society Strategies (@LIS, eLA2010);
- Establishment of strong links between different EU-LA funding schemes that deal with ICT and with research such as FP7, ALFA, @LIS, but also CYTED, OEI;
- Development of awareness-raising actions to raise the profile of LA ICT research amongst key EU stakeholders, particularly policy-makers and funding agencies, through discussion papers and other dissemination vehicles (seminars, workshops and round tables);
- Capacity-building actions to improve the skills base of Latin American ICT researcher, especially in terms of project planning and management;
- Inclusion of 'third sector' and SMEs as relevant stakeholders and partners in EU-LA ICT research cooperation;
- Establishment of ICT research bilateral funds (EU-Mexico, EU-Brazil, etc...), together with an articulation mechanism among them.

## **5. Third component: Preparing the sustainable dialogue infrastructure**

Among the above recommendations, probably the most important is the creation of the EU-LA ICT Research Multistakeholder Committee, a stable group representing the European Commission, Latin American governments, research networks, international organisations, civil society networks and research users' associations, in charge of following up the proposed Roadmap, evaluating research results and developments, validating key research themes. The importance of this Committee stands in the fact that it shall be the responsible actors to monitor the adoption of the other recommendations and to propose strategies for structural cooperation improvement.

The Committee would represent an articulation mechanism aimed at giving coherence to all the actions that different projects and stakeholders realize to support the previous points, such as:

- Awareness-raising actions to raise the profile of ICT research amongst key stakeholders, particularly policy-makers and funding agencies, through discussion papers and other dissemination vehicles; seminars, workshops and round tables;
- Capacity-building actions to improve the skills base of ICT researcher, especially in terms of project planning and management. These should include the development of cost-effectiveness models; work on ways of recruiting more ICT researchers; work on continuing professional development and studies on streamlining and improving the efficiency of the current research infrastructure;

- Collaborative partnerships to reduce fragmentation and promote integration and cohesion. These should engage the wide spectrum of stakeholders involved – including ‘third sector’ and commercial organizations;
- Review and evaluation studies and activities – including meta-analysis studies – to assess ‘what works for who under what conditions’;
- Promoting knowledge exchange between regions, countries and sectors including building on current web-based collaborative knowledge platforms. These should be aimed at addressing differentials in expertise between and within regions, and provide knowledge transfer to areas that are ‘lagging behind’ in particular key fields.

The EU-LA ICT Research Multistakeholder Committee shall be composed by representatives of the following institutions:

- a) EU and LA policy makers in charge of ICT research
- b) Representatives from private sectors
- c) Representatives from the research sector
- d) Representatives of civil society
- e) International organisations dealing with ICT research

The EU-LA ICT Research Multistakeholder Committee will be a consultation and knowledge-sharing group, monitoring collaboration between Europe and Latin America in ICT research, promoting knowledge sharing and benchlearning among its members and available to provide feedback on specific initiatives in the field. The Committee shall meet at least once a year in occasion of existing meetings (each participant institution shall cover expenses of its representative) and will exchange information through a specific web-platform, supported by the WINDS-LA project.

## 6. Conclusions

The present paper presented a number of activities that are being carried out, under the coordination of the WINDS-LA project and with the involvement of a number of key ICT research stakeholders from Europe and Latin America, with the aim to foster bi-regional cooperation in a long-term perspective. The rationale beyond the exercise is that the cooperation between Europe and Latin America in S&T, and more specifically in ICT research, has reached a maturity stage that calls for a reflection (represented by the work of selecting key issues for cooperation), a stronger Multistakeholder dialogue (represented by the recommendations) and for a rationalisation and articulation of the cooperation possibilities (represented by the proposed Committee).

If the exercise described is able to reach the appropriate profile of decision makers and other stakeholders, the impact will be twofold: on one side the existing cooperation schemes and links will be strengthened and rationalised, on the other the “EU-La cooperation arena” will be opened to many more actors (researchers, users, developers, private sector) hat the ones collaborating at the moment.

This will have an important effect on the LA ICT research community, at the level of the research institutions, since many more “quail-excellence” actors will be motivated to be part of cooperation projects, at the level of the single researchers, which will benefit from these collaborations independently from the excellence of the institution they belong, at the level of the policy makers, which will benefit from a more articulated and reflection-based EU-LA ICT research collaboration area.

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