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PROmotion of an Ict Dialogue between Europe and America Latina

D5.1- Status of ICT policy development. Country report Argentina

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SEVENTH FRAMEWORK PROGRAMME

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1. INTRODUCTION

This report presents the status of ICT Policy Development in Argentina, and aims to summarize the situation of ICT in the country, including the status of public policies for industry development, as well as the strategies at corporate and business association level. The report is part of the deliverables included in WP5 (D5.1 – D5.4), which are to provide an overview and common understanding on ICT policies in the Latin American partner countries of PRO-IDEAL, in view to possible future EU-LA cooperation.

WP5's general objectives are to strengthen ICT dialogue with selected stakeholders from the EU and PRO-IDEAL target countries, i.e. Argentina, Brazil, Chile and Uruguay, in order to support Latin American national policies on international S&T co-operation in the ICT field, as well as to involve other stakeholders or initiatives in the PRO-IDEAL activities. The reports included in WP5 intend to contribute to the dialogue and cooperation in ICT R&D between the European Union and Latin America through the dissemination of the national policies and priorities in that area. In order to facilitate comparisons and extract common conclusions, a common methodology and structure for all the reports was agreed although national reports can present a number of differences to properly cover each country individuality.

The objective of this national report is to explore the status of ICT policy development in Argentina in order to compare to what was done in previous analysis. In particular, this report is based in previous research and surveys conducted by PRO-IDEAL: the report on ICT priorities in Latin America (D.1.2), published in may 2009, and the survey performed in June 2010 by PRO-IDEAL and PRO-IDEAL Plus on ICT research priorities in the countries partnering in the PRO-IDEAL projects. Although the background and institutional information are mainly the same, there are some new initiatives to support the ICT development in Argentina.

In the framework of this report, same focused surveys were carried out during the second half of 2010 to revise national policies and strategies recently launched in the R&D context in Argentina and to identify main stakeholders working in ICT R&D in the country (including representatives from the national agencies, universities, research centers, and the private sector).

Besides the information gathered by the survey carried out by PRO-IDEAL, this national report is based on the White Book issued by the MINCYT in 2009 since it presents a valuable informative and prospective work on ICT R&D in Argentina. This was an important particularity of Argentina's context that was kept in mind by those who prepared this report in order to avoid double efforts and to preserve the relevance that official documents comprised in this kind of studies.

2. NATIONAL POLICIES AND/OR STRATEGIES FOR ICT INDUSTRY DEVELOPMENT

2.1 Public policies/strategies for ICT development

The Argentinean Government's S&T competencies lie at the federal and provincial levels, with the main policy making, management, promotion and coordination entities around the National government. The most relevant one is the Ministry of Science, Technology and Productive Innovation (MINCyT)[1]. The National Congress, the House of Senators and the House of Representatives have S&T commissions, whose role are to assess the performance of the sector and to promote the legislative actions deemed necessary for its development. At the level of the provinces, some governments have agencies for the promotion and coordination of S&T activities, such as the S&T Ministry of the Province of Cordoba[2], or the Scientific Research Commission of the Buenos Aires Province (CIC)[3]. The main policies and national strategies for ICT development in Argentina depend to these two structures.

Upgrading the Secretary of Science and Technology (SECyT), in 2007, at the ministry level (MINCyT) shows the recognition of the key role of RTDI for achieving a prosperous, equitable society, being the only one of its kind in Latin America that includes Productive Innovation associated to Science and Technology. In order to contribute to meeting priority economic and social objectives, MINCyT's clear policy is to position Argentina in the high-value added segment of the global economy, and thus to invest heavily into developing its S&T system while at the same time connecting it more strongly to productive and service sectors, under the paradigm of knowledge as the axis of development. Regarding those sectors, innovation support is tilting the balance from stimulating enterprises to engage in innovative activities at all, to encouraging them to cumulative and interactive learning and innovative processes tightly linked to their ability to increase competitiveness and market shares.

The core lines of Argentinean policies are based on promoting the growth of National Science, Technology and Innovation by increasing the salaries of researchers and the provision of infrastructure, actions aimed at linking the academic and productive systems to generate public - private partnerships; the bridging of the gap existing between the big cities and the interior of the country through credit lines granted by the Federal Council for Science and Technology (COFECYT)[4] whose priorities -closely addressed to regional needs- were set by the provincial authorities.

MINCyT aims to offer concrete solutions to the challenges of the society, promoting a productive initiative that ties what researchers produce to the market and the social needs. With this objective, MINCyT develops sectorial programs to promote the public-private association to solve, through strategic planning, technology inequalities in high-priority sectors such as health, agro-industry, social development, energy and environment. In order to obtain significant contributions from science and the technology to these areas, the Argentinean scientific and

[1] MINCyT's official website: http://www.mincyt.gov.ar/
[2] S&T Ministry of the Province of Cordoba's official website: http://www.mincyt.cba.gov.ar/
[3] CIC's official website: http://www.cic.gba.gov.ar/
[4] COFECYT's official website: http://www.cofecyt.mincyt.gov.ar/

technology policy is focused on three technological platforms that cross the problematic before mentioned: Biotechnology, Nanotecnología and ICT.

In the following paragraphs, the most recent official documents that guide Argentinean policies in ST&I are considered, in particular those that have relation to the ICT sector. Two of them, the White Book and the National Digital Agenda, are presented in detail due to their validity and use.

One of the ICT public policy foundations in Argentina is the Law of Science, Technology and Innovation (Nº 25.467/01) which establishes the following issues:

- the National System of Science, Technology and Innovation
- the objectives of the national scientific and technological policy
- the responsibilities of the National State in ST&I
- the structure and planning of the National System of ST&I
- the definition of funding schemes of the R&D activities and their evaluation

In 2005, the former SECyT, then part of the Ministry of Education (ME)[5], and the related Observatory, developed the "Bases for a ST&I Strategic Plan 2005-2015" containing the core guidelines for the policies and planning of these activities. They include a serious of strategic objectives and goals:

- Increasing consistency and social equality, aim RTD towards the improvement of quality of life and social development.
- Promoting sustainable development, adopt environmentally friendly technologies for the exploitation of natural resources and the improvement in the related techniques.
- Moving towards a new productive specialisation profile, with further incorporation of knowledge.
- Fostering access to a knowledge-based society and economy, increase public and especially private RTDI investment, and the number of researchers and technologists.

In 2006, the "Strategic Plan on Science, Technology and Innovation "Bicentenario" (2006-2010)" was launched. This Plan takes some inspiration, e.g. from European foresight studies and projections, and has four major components and foci: Global scenarios; Agro-Food; Industrial Sector; and Higher Education.

Articulated to MINCyT, the National Agency for S&T Promotion, "La Agencia" (ANPCyT)[6] is a major funding agency concentrating the implementation of S&T research, and innovation instruments, with the following main programmes:

- **FONCyT** (Fondo para la Investigacion Cientifica y Tecnologica) supports projects and activities that generate new scientific and technological knowledge carried out by researchers from public and private institutions located in the country.
- **FONTAR** (Fondo Tecnologico Argentino) manages funding from different origin, public and private to help innovative technological entrepreneurs.
- **FONSOFT** (Fondo Fiduciario de Promoción de la Industria del Software) is a software industry trust fund that aims at boosting the strengthening of software-related activities nationwide.
- **FONARSEC** (Fondo Argentino Sectorial) aims to improve the sector competitiveness, offering solutions to the identified problems and giving answers to the community supporting projects and activities to develop capacities in areas of high potential impact and with a permanent transfer to the productive sector.

[5] ME's official website: http://www.me.gov.ar/
[6] ANPCyT's official website: http://www.agencia.mincyt.gov.ar/

The White Book

The "White Book of ICT Prospective. Project 2020" presents a foresight exercise on ICT in Argentina in 2008. Departing from an initiative of the MINCyT, this work is the outcome of the consultations to more than 150 relevant stakeholders from the academic sector, public sector, industry and the IT community that sought to identify technologies, entrepreneurial and application areas that should be promoted primarily in Argentina in the ICT area in the coming years. For this purpose research lines were detected for further promotion, the education needed for the development of ICT was described, and the promotion of the interaction between public-private and academic sectors was developed.

The method applied to prepare this book was to study the application, technology and transversal areas. The application areas under study were the following ones: Industry, Agro, Government, Services, Contents and Security. The technology areas are: Software Engineering, Signal, Image Technologies, Embedded Software, Micro and Nanoelectronics. Finally the transversal areas: Education and Human Capital, Innovation and R&D and Diaspora.

The integration of documents among sectors was developed by means of a three-dimensional matrix that identifies critical areas and technologies foci. In the critical areas, the intersection of the cross-sectional areas of application and technology (walls of the cube) and the technological foci (floor) the intersection of technologies and applications were found. After reviewing overall trends, the application, technology and transversal areas were presented, in order to establish the proposed actions dividing technological focus of critical areas.

In the application areas, emphasis was placed in market analysis. For example, in the case of IT services three variables that turn Argentina into an attractive target for the growing global trend, focused on outsourcing-off sourcing, such as capabilities of suppliers, cost and communication. They are struggling to meet this demand, particularly because they lack human capital, thus opening the game to new players. The domain of "open-source", technology which increasingly transcends the realm of Linux, as well as the country's human resources are irreplaceable skills in the world of IT services and is a strength to be harnessed by the country. The biggest threats to the development of this sector in Argentina come from the shortage of trained human resources in the area (under 10,000 new incomes into the market per year) and macroeconomic conditions in the exchange rate.

In the case of technology areas, the situation of the discipline was presented. For example, it was performed a prospective analysis of software engineering as a discipline, trying to identify those aspects that are relevant to the development of software industry and ICT in Argentina. After explaining why Software Engineering is fundamental to the development of software, industry and ICT a set of proposals and measures are submitted and the areas of software engineering that are emerging as opportunities for Research and Development are analyzed.

Finally, cross-sectional areas were analyzed as providers of solutions for applications and technologies. In the case of the Diaspora, it was analyzed how a process of brain drain can be used to raise the profile of the country's productive specialization. The "brain gain" would take advantage of critical resources, such as Argentinean professionals abroad and their networks, so as to modify its specialization profile of the country. While Argentina compares favorably with other Latin American countries in terms of educational level of its human resources, has a poor efficiency in terms of the use of these assets due to the predominance of a non-intensive profile of specialization in knowledge, lack of coordination between

education and productive system, difficulties to overcome the limitations of the linear model of innovation, and to link science, technology and social and productive development.

In the final comments, it is postulated that the future of ICT in 2020 is more closely linked to requirements, restrictions on learning and economic and social development than scientific and technological challenges, at the same time, new inventions and results seem to strongly influence, as never before, in shaping this new society, generally called "Knowledge Society". It was proposed that the main challenge for Argentina in terms of Science and Technology is to change the model of RTDI. This change, a cultural revolution is an unavoidable precondition to overcome a delay of 40 years in the next 20. This transformation can be summarized as the passage from linear to non-linear paradigm of research and development. To do the following conditions must be met:

1. Encourage research primarily in the "cutting edge" of science and technology, to achieve the best global level in competitive specializations in "key" areas. That is to "focus".
2. Promote training of human resources capable of carrying out the lines of fundamental research and development related to specialization, but also for the production and marketing of results.
3. The States, at all levels, must explicitly intervene not only in their role as provider of education and science and technology sponsors, but it is also essential to use its enormous power to guide and fund strategic and complex projects in key areas to generate major challenges for the scientific and technology companies.
4. Internationalizing firms and R&D centres.
5. Encourage the creation of new businesses and technology clusters and strengthen existing ones.
6. Encourage the culture of scientific and technological evaluation, consistent with the pursuit of a change in the paradigm
7. Invest the necessary resources for analysis, planning, promotion and exploration in science and technology and provide long-term support in terms of equipment and plans
8. Set, prioritize and sustain R&D programs aimed at multidisciplinary specializations. Not from the "scientific supply" but mainly on the demand for knowledge and solutions required by the specializations.
9. Build effective and efficient mechanisms for searching, finding and supporting projects, companies, equipment, people and innovative regions. It is not reasonable to devote all the resources to "open and transparent calls", or calls on general topics.
10. Generating conditions, and intervene heavily from the state for the creation and maintenance of a risk capital market-oriented to technology.
11. Adopt proactive policies regarding intellectual property rights, both at the local and at regional and international levels.
12. Develop effective and efficient actions for dissemination, promotion and integration of technology in society. Promote and encourage the productive use of technology demand.

On October 26, 2009, this book was officially presented by the Minister in Science, Technology and Productive Innovation, Dr. Lino Barañao, in the Centro Cultural Borges.[7]

[7] More information about the presentation and the individual panelists at http://www2.mincyt.gob.ar/index.php?contenido=noti_libro_blanco

National Digital Agenda

Led by representatives from all ministries and designed in collaboration with business councils, representatives from the academic and scientific community, NGOs and community organizations, Argentina produced its first National Digital Agenda[8], which was officially launched on 8 May 2009 by the President Cristina Fernández[9] with the Decree Nº 512/09.

The Digital Agenda was thought as a federal plan promoted by the national government, which seeks to increase the strategic use of ICT to generate development, to promote strategic investment, and to foster social inclusion. It is focused on six strategic spheres: government (including education, justice, health and security), ICT industry, research and innovation, environmental control, and civil society.

This document is not presented as a closed document; it is a process, a collaborative construction, open and ongoing. Multisectorial working groups continue running in order to update the original plan and elaborate technological analysis and proposals to be presented in periodic meetings. This group puts at the disposal of its members a space of collaborative virtual work in the official website, with the aim of facilitating the exchange of information.

This initiative was welcomed from all sectors since the socio-political and economic crisis that Argentina underwent in 2001 brought about a temporary postponement of the plans and programs focusing on ICT. Since 1998, partial programs had been developed in Argentina related to the Information Society (IS), in different jurisdictions, with a development taking parallel work strategies, with own visions, agendas and projects. This National Digital Agenda aims to bring a national strategy with an integrative vision and joint participation.

2.2 Active public policies for ICT industry development as a cross technology in other value chains

The 2010 total public investment in ICT R&D in Argentina was USD 30 million and the current private investment in ICT R&D is USD 18 million per year.

The ICT private sector had revenues of USD 15,000 Millions during 2010, a 20,7% growth with respect to 2009. This amount can be split into USD 10,000 Millions corresponding to the telecommunication sector, USD 2,500 Millions corresponding to the hardware sector and USD 2,500 Millions corresponding to the software development and software service sector.

The telecom sector does not invest in R&D in Argentina (the main players in are international companies without research centers in Argentina).

On the other hand, it's interesting to analyze the IT private sector in Argentina, according to the data of the local IT chamber. The sector grew 217% from 2005 up to 2009, it's a mix of international big companies (with and without research

[8] Digital Agenda's official website: http://www.agendadigital.ar/ The site outlines the main working groups: Human Capital, Content and Application, Infrastructure and Connectivity, Finance and Sustainability, Legality.

[9] Video of the Digital Agenda presentation at http://www.en.argentina.ar/_en/country/C1904-argentina-digital-agenda-has-been-presented.php

centers located in Argentina), a few local big companies, and local SMEs. There are roughly 60,000 people working in this sector, and in 2010 the sector exported roughly USD 630 Million.

Three initiatives for the promotion of a greater interaction between the private sector and other actors of the Science and Technology System at the international level are to be pointed out:

- The Secretariat for Scientific and Technological Articulation (Secretaría de Articulación Científico Tecnológica) at MINCyT: Aimed at fostering the linkage between academic agencies, universities and R&D institutions towards greater coordination in research activities.

- The National Inter-university Council (Consejo Interuniversitario Nacional): An organization that encompases all the national public universities. Since 2001, it has held a cooperation agreement with the Industrial Union of Argentina (Unión Argentina Industrial) to work jointly in the creation of cooperation opportunities between the productive sectors, the public and private universities, and the rest of the scientific, technological and education system.

- The Network for Technology Linkage (Red de Vinculación Tecnológica - RedVT) between public universities in Argentina: Its overall objective is to coordinate the efforts of technology-related areas for promoting knowledge contribution and cooperation between Argentinean universities and the social, productive and governmental sectors.

Facts about R&D in Argentina are interesting to note. According to The Economist Intelligence Unit 2009 report on IT industry competitiveness index, Argentina occupies the third place (position 41st, total score 36.5) in Latin America, after Chile (position 27th, total score 46.1) and Brazil (position 40th, total score 36.6). But a deeper analysis of the data shows that when R&D environment is considered, Argentina ranks first in Latin America (position 26th, 20.3 total score) – R&D environment is measured using Gross government expenditure in R&D per 100 people, Gross private-sector expenditure in R&D per 100 people, Number of new domestic patents registered by residents each year per 100 people, and Receipts from royalty and license fees per 100 people.

Public support to the ICT industry

As was mentioned earlier in this report, ANPCYT-MINCyT is formed by four funds: FONCYT (finances public or private non-profit R&D institutions), FONTAR (finances technological modernization and innovation in the productive sector), FONARSEC (finances the technological transfer of R&D results to the productive and social sectors) and FONSOFT. Mostly all the public financing of ICT R&D activities comes from ANPCYT. ICT R&D is mainly financed by FONSOFT and FONARSEC.

In 2004, the Argentine National Congress passed a law, called the "Promotion of Software Industry" Act, which reduced taxes for IT companies, and also created a trust fund, FONSOFT, for the promotion of the software industry, as part of the ANPCyT. FONSOFT is a competitive funding program that supports R&D in IT SMEs and the start up of new IT companies, through matching funds.

FONARSEC supports three technological platforms (biotechnology, nanotecnology and ICT) and the development of five strategic sectors: health, environment, sustainable energies, agro-industry, and social development. During the second

semester of 2010, FONARSEC summoned to public-private partnerships constituted or in process of constituting itself for the presentation of projects oriented to support activities that incorporate added value and/or improve the competitiveness of the ICT sector. Four projects were selected to receive financing (total amount of four projects $99.870.809, 43):
• Platform for the production of electronic technology of high complexity
• Platform of interoperability and smart TV (for digital television)
• Project Waves (for the construction of a simulation platform)
• Technological platform of Integrated circuits and encapsulation for more efficient illumination

A new line of support has been launched by MINCYT: FONSOFT[10] and FONTAR[11] offer non-reimbursable funds to partially finance innovation and development technology projects carried out by SMEs in the scope of binational and multinational cooperation agreements.

As specific projects, recently this year, the president Cristina Fernández presented the **"Plan estratégico Industrial 2020"**[12] which aims to reduce in 45% the level of imports, to foster the production in 10 key sectors loaf the economy, and reduce the unemployed level to the 5%. This plan will work from 5 axes: the situation of the national production, substitution of imports and increase of the exports; the incorporation of science and technology and innovation; the consolidation of local value chains; insertion in the chain and growth of the SMEs; and regional and global integration. The value chains considered will be: Food; Footwear and Clothing; Wood Furniture; Building; Capital Goods; Agricultural Machinery; Car Industry; Pharmaceutical Industry; Software Development; and Chemical and Petrochemical Industry.

In February 2010 the government launched **"Conectar Igualdad"**[13], an initiative intended to provide secondary school students and teachers with netbooks, and to provide schools with the necessary equipment to interconnect those netbooks and to create a network of schools. The programme is complementary to the 'Un alumno, Una computadora' (One student, One computer) plan, aimed at technical schools students. The goal is to achieve social integration through the computerisation of the public education system while introducing students to new technologies. Three million netbooks will be delivered to every public institution in a three-year period, starting in 2010. The budget destined to the project is approximately of US$750m. Government's netbooks will have specialised software, designed to meet with students' particular requirements. Computers will be given as a bailment and students will be able to keep them once their secondary education is successfully completed.

Other programme, **"Argentina Conectada"**[14] has the objective to nationalize the availability of Internet broadband, television and telephony. A National Optical Fiber Network will be deployed to cover all the country. It is estimated that approximately 26.000 km will be built in three years. The first five Knowledge

[10] Information about FONSOFT financing for international projects can be found at http://www.mincyt.gov.ar/financiamiento/convocatoria_detalle.php?id_convocatoria=140
[11] Information about FONTAR financing for international projects can be found at http://www.mincyt.gov.ar/financiamiento/convocatoria_detalle.php?id_convocatoria=117
[12] Read more about the launching event of the project at http://www.prensa.argentina.ar/2011/02/24/16964-se-lanzo-el-plan-estrategico-industrial-2020.php
[13] Official website of the project: http://www.conectarigualdad.gob.ar/
[14] Read more about the launching event of the project at http://www.argentina.ar/_es/pais/C5121-plan-nacional-de-telecomunicacion-argentina-conectada.php

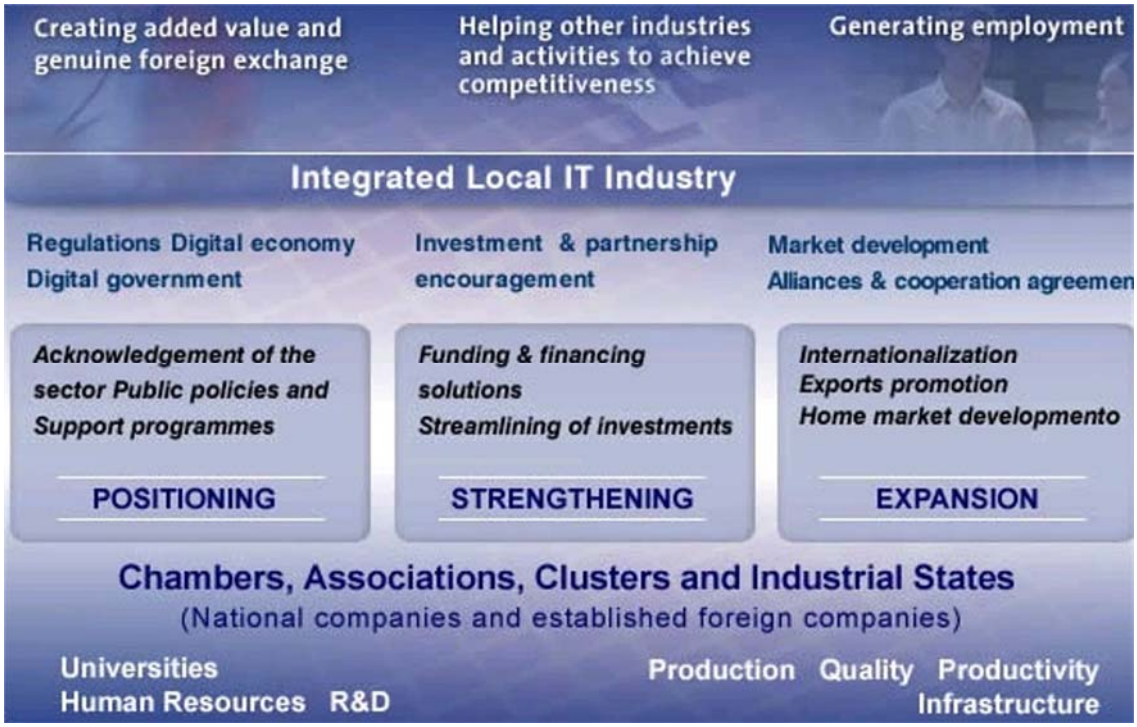
Access Points (Núcleos de Acceso al Conocimiento - NAC) have been already inaugurated as free and no charge places for all the community. Equipments for the implementation of other 150 NAC have been acquired to be installed in different points of the country. This programme has been articulated through national chambers and federative associations with more than 700 enterprises and cooperatives.

In 2009, the **ICT Scholarship National Program** (Programa Nacional de Becas TIC)[15] was jointly launched by MINCyT and the Ministry of Education (ME) to promote and increase the student enrolment in ICT undergraduate careers. Another objective, no less important, is to increase student retention. Actually, this initiative tries to solve a key need of the ICT sector: the unsatisfied industry demand in number and professional profiles.

2.3 Strategies at corporate or business associations level for ICT industry development

In this field, according to what is published in the website of the Chamber for Information Technology Companies in Argentina (CESSI), the strategy of this sector could be summarized in the concept of VALUESHORE – VALUESOFT. It expresses more accurately what Argentina has to offer to its society and to the world: trademark and tailor made software and computer services to increase the value of their customers, instead of large-scale selling of off shore – low added value services. This strategy involves many policies and actions concerning key issues such as human resources, home and foreign markets, financing and state's computerization process, R&D, entrepreneurship, quality standards and information society.

The following chart summarizes the strategy model and scope that CESSI proposes with the concept VALUESHORE – VALUESOFT.



[15] Read more about the program at the ME's website: http://200.51.197.59/tics/tics.php

Source: CESSI website, 2011

In 2008, this strategy was published in the format of "Proposals for the Action Plan 2008-2011", which aims at boosting the sector in different aspects and to primarily identify strategic areas to solidify the growth of the IT industry in Argentina. This sectorial action plan presents the proposals of actions, as a complement to the Strategic Plan of Sector 2004-2014 (Blue and White Book), and defines the package of measures that next national administration should take into consideration to consolidate the results that this industry has been obtained in previous years.

Based on a local and global situation analysis, CESSI's report raises a horizon of growth of 92% in the total invoicing of the sector, duplicating the exports and generating at least 30,000 new jobs. It states 8 strategic areas divided in two groups:

Well identified areas due to their current developments:	**Potential areas that should develop further:**
Agro Business Solutions	Electronic Government Solutions
Health and Environment Solutions	Productive Chain Solutions
Dynamic Contents Solutions	Education Solutions
Added Value Services	Tourism Solutions

The CESSI document identifies 41 measures in a broad range, from education for employment to funding, computerization of the State, the impulse to external markets and diverse activities to consolidate the sector in Argentina.

Another effort that CESSI has carried out recently to promote the software and computer science services of Argentinean companies in the Spanish and European market was to put into operation an ICT Office in Barcelona in 2010[16]. Its goals are to collaborate in the generation of businesses for promoting national computer science supply of products and services and to make more visible the Argentinean industry IT in Europe. For the first 18 months, the ICT Office counts with the AL-INVEST support through the Argentina Industrial Union (UIA).

On the other hand, the National Chamber of Informatics and Communications (CICOMRA) affirms the necessity to continue working on a Digital Agenda Argentina, conceived like a strategic plan that allows thinking ICT as a key Ecosystem that deserves an integral vision and considering them like a strategic factor for the country. This proposal refers to the Digital Agenda before mentioned that was officially launched in 2009 by the presidential decree N° 512/09.

2.4 Legal framework and other public documents relevant to national ICT policies

Argentina counts with different laws that organize the system of science, technology and innovation. The adoption of Law 25.467 on Science, Technology and Innovation in September 2001 played an important role in giving legal status and assigning responsibilities to key players in the Argentine ST&I system.

[16] Read more about the CESSI's office in Barcelona at http://www.guiaindustriatic.com.ar/paginas.php?iid=15

In 2004, as mentioned before, Argentina was the first country in the MERCOSUR to adopt a law related to software production at national level with the "Ley de Promoción de la Industria del Software (law 25.922), which established the creation of the FONSOFT and a special system for software promotion under the MINCyT umbrella. Another law related to the endorsement of software as an industry (law 25.856). Other laws that were ratified later on are e-government, digital signature, and digital invoice, among others.

In addition, on May 2009, Argentina approved its first Digital Agenda at the national level by Act 512/09. Although the country has counted with ICT projects and national plans since the nineties and many of those initiatives have been successful, the implementation of the national Digital Agenda consolidates a vision and a strategy that are indispensable to seize the "digital opportunity" and frame cooperation actions in a long-term .

Argentina counts with the following laws related to the ICT sector:
Law N° 26.653 – Information Accessibility in Websites
Law Nº 25.036 –Intellectual Property
Law Nº 25.326 – Personal Data Protection
Law Nº 25.467 – Science, Technology and Innovation National System
Law Nº 25.506 – Digital Signature
Law Nº 25.856 – Software as an Industry
Law Nº 25.922 – Software Promotion
Law Nº 26.032 – Liberty of Expression on Internet
Law Nº 26.388 – Digital Crimes

3. PUBLIC AND PRIVATE INSTITUTIONAL STRUCTURE FOR THE DEVELOPMENT OF ICT

3.1 Public and research institutions

A significant part of research in Argentina is conducted by scientists in Argentina's public universities and public research institutes and laboratories (among them the Atomic Energy Commission (CNEA)[17], the Administration for Health Laboratories and Institutes (ANLIS)[18], the Institute of Agricultural Technology (INTA)[19], the Institute of Industrial Technology (INTI)[20]; National Commission on Space Activities (CONAE)[21]; and the Argentinean Nanotechnology Foundation (FAN)[22]). Private companies and to a lesser degree private universities also sponsor and execute research activities.

The National Council for Scientific and Technological Research (CONICET)[23] was created in 1958 to promote and conduct research. CONICET played a key role in establishing research as a formal career in Argentina. Headed by a board composed of public and private stakeholders in the Argentine ST&I system, CONICET executes policies and strategies formulated by MINCyT.

[17] CNEA's official website: http://www.cnea.gov.ar/
[18] ANLIS' official website: http://www.anlis.gov.ar/
[19] INTA's official website: http://www.inta.org
[20] INTI's official website: http://www.inti.gov.ar/
[21] CONAE's official website: http://www.conae.gov.ar/
[22] FAN's official website: http://www.fan.org.ar
[23] CONICET's official website: http://www.conicet.gov.ar

CONICET promotes and performs S&T activities at the national level in the different areas of expertise, based on the general policies set forth by the Government, and the priorities and guidelines established in the S&T National Plans. It is the leading entity in charge of the execution of RTD activities, together with National Universities.

There are roughly 1200 ICT researchers in Argentina, belonging to more than 40 research labs. Strong networks have been established with different European countries, particularly with Spain, France, Germany, Czech Republic, Finland, Portugal, the Netherlands and Sweden. There are also strong connections with other Latin American countries, particularly with Brazil, Uruguay and Chile.

According to Red Iberoamericana e Interamericana de Indicadores de Ciencia y Tecnología (RICYT)[24] recent report, Argentina has the highest researchers per thousand labour force ratio in Latin America, with a ratio of 2.47 for Full Time Equivalent researchers per thousand.

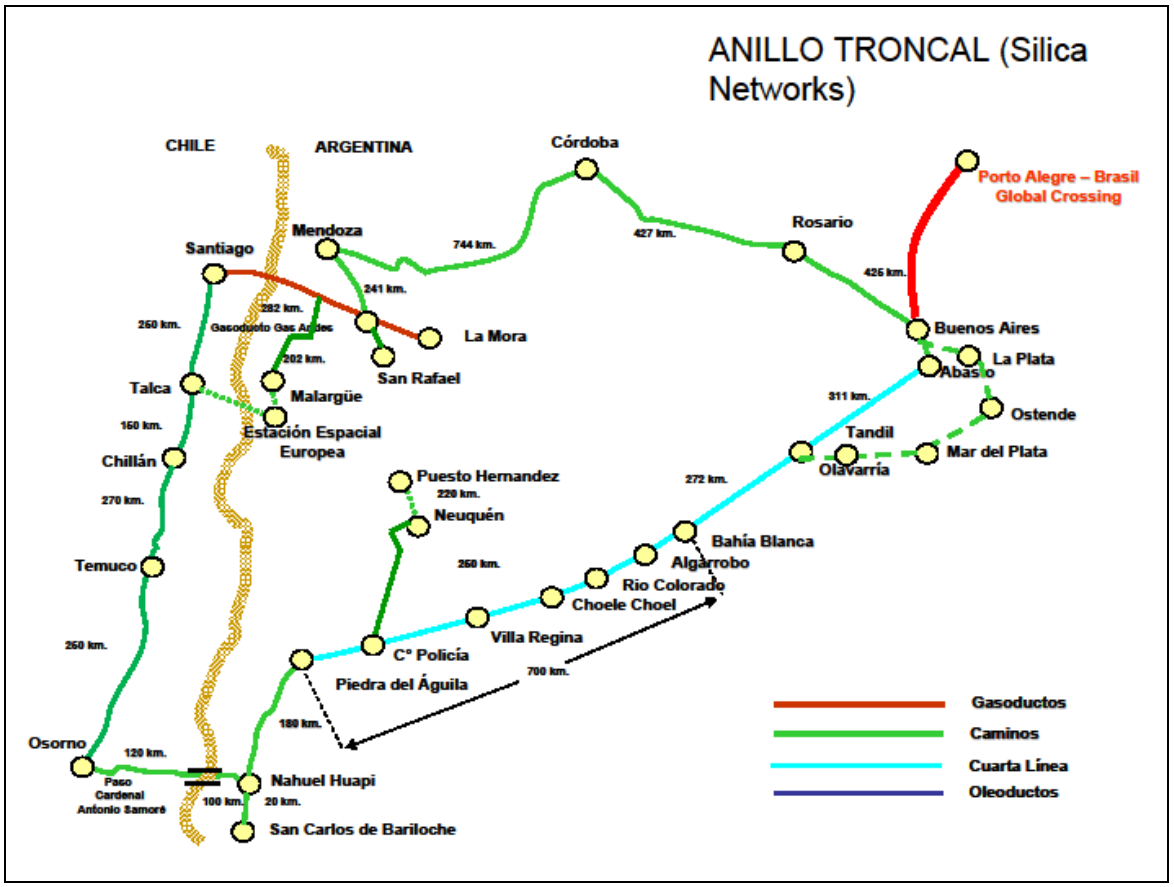
High-Performance Infrastructure Network

Innova-Red[25] is the National Research and Education Network of Argentina, a project of the Fundación Innova-T[26], the technology-transfer unit of CONICET. Its continuing mission is to provide to the education and research communities of Argentina state-of-the art technology in data transfer and assist them in any development they may profit from using advanced networking. It cooperates and coordinates actions with other academic networks in the country but it is the sole provider of advance network connectivity to other countries and regions. Under its current denomination InnovaRed began operations in December 2006 but its activities date back to 1990 and it connected to the Internet in March 1994.

In 2001, InnovaRed launched the Advanced Academic networks program fostering the use of advanced research networks throughout the country. Thus, it became a partner in the AmPath Project funded by National Science Foundation from United States and under the management of the Florida international University. In 2003, it was part of the CAESAR project[27] funded by the European Commission to assess the possibility of forming and advanced academic network in Latin America. One year later, under the umbrella of the @lis program, InnovaRed became founding member of CLARA, the regional research and academia network.

In 2010 launched a bid to acquire 4,200km of dark fiber which is at this moment (March 2011) being bid in open tender. Currently InnovaRed connects directly to nine public universities and indirectly (through the network of national universities of Argentina) to the other 39. It also gives access to advanced Networking to 24 institutions throughout the country, including CONICET's institutes and regional centres, the INTA, the National Weather Service and the CNEA, to name the most relevant.

[24] RICYT's official website: http://www.ricyt.org/
[25] Innova-Red's official website: http://www.innova-red.net/
[26] Innova-T Foundation's official website: http://www.innovat.org.ar/
[27] More information about the CAESAR project at http://www.caesar-project.eu/



3.2 *Universities*

According to the information provided in 2008 by the University Policies Secretariat of the Ministry of Education, the Argentinean university system is conformed by 87 universities (42 public, 46 private and 1 foreign universities). There are also 20 university institutes at the national level (6 public, 13 private, and 1 international university institutes).

Table 1: Number of universities and university institutes at the national level

	Kind of Institution		
	Total	**Universities**	**University institutes**
Total	107	87	20
Public	48	42	6
Private	57	44	13
Foreign	1	1	-
International	1	-	1

Source: CIIE-SPU 2008

The national universities (also known as public or state-run universities) are the largest university system in terms of student enrollment accounting for 80 percent of the undergraduate population in universities spread across Argentina. These also account for 50 percent of the country's scientific research. These institutions were created out of the National Congress Act (except those preceding the formation of the State – example: Universidad Nacional de Córdoba in 1610 and the Universidad

de Buenos Aires in 1821) as Public Law Legal Entities funded by state through the annual national budget. As of 2006, about 13.1 percent of total government expenditure goes to education of which 17 percent is allocated for tertiary education.

In general, educational attainment in Argentina is high by regional standards. The mean educational attainment of the Argentine population aged 25 years and older is 8.5 years, well above Brazil, Chile and Mexico. A relatively high percentage of the Argentine population has engaged in some secondary or tertiary education. These strengths place Argentina in a comparatively favorable position to embrace the knowledge economy.

As far as thematic, as much in public universities as private, the data available for 2008 show that, for a total of 94,909 granted diplomas, 10.3% correspond to engineering and technology. Regarding the level of graduate diplomas, i.e. postgraduate qualifications (masters, specialties and doctorates), in the same year 7,632 diplomas were granted, with a similar distribution: only 8% correspond to engineering and technology. Within the doctorates, engineering and technology represent 9.3% from the total.

Table 2: Number of students and graduates in Informatics careers at the national level

	Public			Private		
	Undergraduate Students	**New Registered student**	**Graduate**	**Undergraduate Students**	**New Registered student**	**Graduate**
Total	1.283.482	271.428	65.581	317.040	93.799	29.328
All Applied Science Programs	334.711	72.466	13.014	54.453	15.329	3.750
Informatics	**64.924 (5%)**	**16.954 (6.24%)**	**2.663 (4%)**	**15.542 (4.9%)**	**4.171 (4.4%)**	**1.201 (4%)**

Source: CIIE-SPU 2008

There are 36 public universities and 31 private universities that offer undergraduate and graduate programs in Informatics. Taking into account that there are 334.711 undergraduate students and 13.014 graduate students in applied science programs in public universities, only 64.924 undergraduate students and 2.663 graduate students correspond to Informatics programs. Private universities account for 54.453 undergraduate students and 29.328 graduate students in applied science programs, corresponding to Informatics programs 15.542 undergraduate students and 1.201 graduate students.

Like in other regions, Argentinean ICT industry is a full employment sector, and employee's mobility is high. Local universities are not producing enough professionals to satisfy the industry demand in number and professional profiles. That is the reason to encouraging the planning and implementation of more public and private strategies to support programs not only aiming to attract high school students into careers related to ICT[28] but also to retain undergraduate students at

[28] To know more about this kind of projects, read Beech, J.; Artopoulos, A.; Davidziuk, A. (2008). This report examines the outcomes of a project carried out by the Banco Industrial titled "Formación en informática para jóvenes en situación de Vulnerabilidad social" that

universities until their graduation. Many of undergraduate students left their academic programs due to getting very good job offers.

3.3 Main private and corporate ICT stakeholders, including fields of activity

Argentina counts with relevant ICT stakeholders that are having an important role in fostering the sector. The most important ICT Argentinean stakeholders are listed below divided in three tables (public sector, universities and research groups, and private sector):

aimed to facilitate the entrance of young people from poor households to the ICT industry (in software companies) by training them on Java, .Net and other programmes.

Table 3: Argentina national policies and strategies related to R&D in the field of ICT:

Institution responsible	Programme Name	Programme Acronym	Programme description	R&D priorities	ICT priorities (Sub-themes)
Ministerio de Ciencia, Tecnología e Innovación Productiva (MINCyT)	ICT Prospective White Paper - Project 2020	Project 2020	This is an ICT prospective analysis work that the MINCYT prepared in Argentina during 2008. More than 150 actors from the private and public sectors, universities and ICT community worked together in order to identify the technologies, the application and business ICT areas that should have to be fostered in Argentina in the next years.	Application areas: Industry, Agriculture, Government, Services, Contents, and Security. Cross-sectional areas: Education and Human Capital; Innovation and R&D	Technological areas: Software Engineering; Signals; Technologies of the Images; Embedded Software; Micro and Nanoelectronics. ICT Priorities: - Components, systems, engineering: micro and nanoelectronics, RFID, Systems on-chip, Embedded systems: low cost sensors - ICT for Independent Living and Inclusion - Applications of ICT for improving the logistics of agricultural bulk exports - Applications of ICT for greater social inclusion (including applications to education)
Oficina Nacional de Tecnologías de Información (ONTI), Subsecretaría de tecnologías de Gestión, Secretaría de Gabinete y Gestión Pública	Digital Agenda Argentina www.agendadigital.ar	Digital Agenda	The Digital Agenda, elaborated and approved for the first time in Argentina, is a public policy accorded by different social and political actors to establish a long-term strategy to foster the Information Society oriented to an integral human, political, economic and social development for all the	Support projects that foster competitiveness and production through efficient ICT services, improvement on infrastructure, telecommunications, technological innovation, support to SME, etc.	ICT in general

Institution responsible	Programme Name	Programme Acronym	Programme description	R&D priorities	ICT priorities (Sub-themes)
			Argentineans.		
Secretaría de Comunicaciones, Ministerio de Planificación Federal, Inversión Pública y Servicios	National Program for the Information Society http://www.psi.gov.ar	PSI	PSI was launched in 1998 under the denomination "argentin@internet.todos". In 2000 and 2001, it was modified by decrees 252/00 and 243/01 and named under the current name. Its main activities are linked to the design and implementation of public policies related to the Internet universalisation and other digital data networks, the e-commerce development, the formation of specialized human resources, and the promotion of investment and development actions to foster telecommunications, computer science, electronics, software, and other technologies.		- Community Technological Centers (CTC Project): access, e-learning, e-inclusion - Technological Support to the Disable – AteDis Project: access, telemedicine, rights. - Civitas 2.0 Project: local e-gov, digital gap, infrastructure.
Oficina Nacional de Tecnologías de Información (ONTI), Subsecretaría de tecnologías de Gestión, Secretaría de Gabinete y Gestión Pública	eGovernment National Plan - Decree 378/2005	eGovernment National Plan	This plan structures all activities related to e-government of each pubic organism and the National State as a whole. Promote the intensive use ICT in all public dependencies to improve		e-Government

Institution responsible	Programme Name	Programme Acronym	Programme description	R&D priorities	ICT priorities (Sub-themes)
			the relation between the government and citizens		
Subsecretaría de Tecnologías de Gestión, Secretaría de Gabinete y Gestión Pública	Digital Signature – Law 25.506	Digital Signature	Establish the guidelines to obtain a license, technological standards and other issues related to license grants, accreditation and regulation.		Digital signature
Ministerio de Ciencia, Tecnología e Innovación Productiva (MINCyT)	Software Industry Promotion Law – Law 25.922	FONSOFT	Trust Fund for the Promotion of Software Industry		Software applications
Secretaría de Industria	Software Industry Promotion Law – Law 25.922	Regime of Industrial Promotion for the Industry of Software	Tax relief for registered companies		Software applications
Ministerio de Economía y Finanzas Públicas	Programa Mi PC http://www.programamipc.gov.ar/	Mi PC	Joint initiative between private and public sectors, which had its re-launched on March 4, 2009. Its strategic objective is to reduce to the digital divide		- e-inclusion - Equipment, infrastructure, connectivity - ICT capacity building

Table 4: Argentina - Universities leading ICT research

University Name		ICT R&D Areas	Project Name/Programme	Description
Universidad de Buenos Aires	ENGINEERING SCHOOL	- Complex systems - Internet protocols, etc.	Complex Networks and data communication Group	http://cnet.fi.uba.ar/
		- Signal processing	Signal processing and Communications Group	http://www.fi.uba.ar/investigacion/index.php?n=1&m=196&idl=793
		- Image processing - Independent Intelligent agents, etc	Distributed Heterogenous Systems Group	http://www.fi.uba.ar/investigacion/index.php?n=1&m=196&idl=841
		- Electroaerodynamics - Two phase flow control, etc	Hidrodynamic Laboratory	http://laboratorios.fi.uba.ar/lfd/english%20(c)_archivos/frame.htm
		- Automatización, Simulation, etc.	Robotic Laboratory	http://laboratorios.fi.uba.ar/laborob/robotica.htm
		- Nonlinear Dynamics - System Control in Engineering	Mathematical in Nonlinear Dynamics Group	http://www.fi.uba.ar/investigacion/index.php?n=1&m=196&idl=924
		- Signal Processing Problems, - Wavelets theories and associated frames, etc.	Mathematical Aspects of Signal Processing Group	http://www.fi.uba.ar/investigacion/index.php?n=1&m=196&idl=829
		- Partial Derived Differentials - Biomedical Signals, Modelling, etc.	Modelling and Biomedical Signal processing Group	http://www.fi.uba.ar/investigacion/index.php?n=1&m=196&idl=833
		- Hydrodynamics, Sediments, and Pollutants	Mathematical Modeling Laboratory – LaMM	http://laboratorios.fi.uba.ar/lmm/
	EXACT AND NATURAL	- Knowdledge & innovation principles, and Patent granting	INCUBACEN - Technological Companies Incubators	http://www.incubacen.fcen.uba.ar
		- Computing applications	High Computer performance Center	http://pme84.dc.uba.ar/
		- Selection of Technical Topics - Model Based Testing, etc.	Tools and Foundations for Software Engineering Lab	http://www.dependex.dc.uba.ar/
		- Image processing - Computing Vision	Computing Image and Vision Processing Group	http://www-2.dc.uba.ar/grupinv/imagenes/
		- Computational Logic - Natural Language Processing, etc.	Logic and Computability Research Group – GlyC	http://www.glyc.dc.uba.ar/
		- Exact Methods for programming problems; Graphs classes study, etc	Operations research, Combinatory Optimization and Graphs Group	http://www-2.dc.uba.ar/grupinv/invop/

University Name		ICT R&D Areas	Project Name/Programme	Description
		- Electrochemical Treatment of Tumors; High Performance Computing / Grid Computing, etc.	Complex Systems Laboratory	http://www.lsc.dc.uba.ar/
		- Multispectral lossless image compression; CBIR; Pattern recognition, etc.	Compression and Neuronal Networks Research Group	http://www.dc.uba.ar/inv/grupos/crn/
		- Formal language design and analysis; Software verification & validation, etc	Relational Formal Methods Research Group	http://www.dc.uba.ar/inv/grupos/rfm/
		- Graph Theory - Optimization	Graphs and Optimization Research Group	http://www.dc.uba.ar/inv/grupos/grafos/
		- Robotic Learning - Robot Design and development	ICAR – Computing Intelligence applied to Robotics	http://www-2.dc.uba.ar/grupinv/robotica/
		- Problems with words (strings) - Algorithms on identifying patterns inside strings	KAPOW - Knowledgeable Algorithms for Problems On Words	http://kapow.dc.uba.ar/
	Others	- Social inclusión - Gender & ICT	Infópolis – Information Society Research Group	http://www.iigg.fsoc.uba.ar/secciones/programas/programa_infopolis.htm
	Others	- Materials for Electromagnetic Aplications - New Magnetic Materials for Tools	INTECIN – Technology and Engineering Science Institute "Hilario Fernàndez Long"	http://www.uba.ar/secyt/institutos/insuc-intecin.php
Universidad de La Plata		- Software Engineering; MDD; Collaborative atmospheres and groupware; Web Engineering; Digital TV middlewares, etc	- LIFIA - Computing Research and Formation Laboratory	http://www.lifia.info.unlp.edu.ar
		- Open Source; Data Network, etc.	LINTI – ICT Research Laboratory	http://www.linti.unlp.edu.ar/linti
UNICEN		- Intelligent Agents - Software Architecture, etc.	ISISTAN Tandil Systems Institute	www.exa.unicen.edu.ar/investigacion/isistan.htm
		Simulation applied to health, intelligent factories, hydraulic resources, energy, etc.	PLADEMA	http://www.plademe.net/
Universidad de Córdoba	E	- Computer Architecture Simulators - Digital Video Processing, etc	Advanced Computing Architecture Group	http://www.uco.es/investiga/grupos/gaac/

University Name		ICT R&D Areas	Project Name/Programme	Description
		- Computing Science - Artificial Intelligence, etc	Software Engineering, Knowledge and Databases	http://www.uco.es/investiga/grupos/iscbd/
		- Software Design for tutorials, etc.	Virtual Laboratories on Science and Technology	http://rabfis15.uco.es/lvct/
	FAMAF	- Automatic learning - Data Mining; Robotics; etc	Natural Lenguage Processing Group	http://www.cs.famaf.unc.edu.ar/~pln/
	FAMAF	- Security; Verification, etc	Depending Systems Group	http://www.cs.famaf.unc.edu.ar/gsd/
Universidad Tecnológica Nacional	FE		G.E.S.T.I.C. Project (ICT Security Management)	http://www.frsf.utn.edu.ar/area/departamento.php?id=40&mostrar=436
	SANTA	- Ontological Engineering - Analysing supply chain - Distributed Simulation, etc.	CIDISI – Engineering Research and Development in Information System Center	http://www.frsf.utn.edu.ar/area/departamento.php?id=22&mostrar=0
	SANTA	- Digital Images Intelligent Processing; Robotics; etc.	Computing Sciences and Engineering Institute	http://www.uns.edu.ar/departamentos/investigacion/investigacion.asp?dependen=14
Universidad Nacional del Sur		- Communications; Digital Systems; Dynamics System; Control; Microelectronics, etc.	Electric Enginering Research Institute "Alfredo Desages"	http://www.iiie.uns.edu.ar/
		Knowledge Representation and Reasoning, Software Engineering; Graphics and Visualization	Computer Science Department	http://www.cs.uns.edu.ar
Universidad Nacional de Luján		- Data collection - Information system	Project: information systems for the analysis of the social transformations in Lujan	http://www.ciaclu.com.are
Universidad Nacional de Entre Ríos (UNER)	BIOENGINEERIN	- Stimulation and Configuration - Nonlinear dynamics	Bioelectricity Laboratory	http://www.bioingenieria.edu.ar/grupos/labioelec/index.html
	BIOENGINEERIN	- Human Joint Models - Arterial Blood Flow & Lung Models	Computing Biomechanics Group – GBC	http://www.bioingenieria.edu.ar/grupos/biomecompu/index.html
	BIOENGINEERIN	- Oseointegración - Regeneración ósea guiada, etc.	Bioprosthesis Laboratory	http://www.bioimplantes.com.ar/
	BIOENGINEERIN	- Intelligent Image Processing	Cybernetics Laboratory	http://www.bioingenieria.edu.ar/grupos/cibernetica/index.htm
	BIOENGINEERIN	- Medical Technology management	Clinical Engineering Research Group	http://www.bioingenieria.edu.ar/grupos/geic/index.htm

University Name		ICT R&D Areas	Project Name/Programme	Description
		- Security and biosecurity, etc.		
			Applied Microscopy to Molecular and Cellular Studies Laboratory	http://www.bioingenieria.edu.ar/grupos/microscopia/MicroInicio.html
			Signal and Nonlinear Dynamics Laboratory	http://www.bioingenieria.edu.ar/grupos/ldnlys/index.htm
		- Medical Informatics; Telemedicine - Continuing Medical eLearning	CETIFAC Group: Medical Teleinformatic Center	http://www.fac.org.ar/cetifac
Universidad Nacional del Litoral	ENGINEE	- Machine Learning - Signal Processing - Applications	Laboratory for Signals and Computational Intelligence	http://fich.unl.edu.ar/sinc/
		- Languages for Enterprise Modeling - Product Modeling; etc.	INTEC – Technological Development for Chemical Industry Institute	http://www.intec.ceride.gov.ar/
	F	Software Development	Virtual Enterprises Incubator	http://www.sceu.frba.utn.edu.ar/UVT/info_UVT.php?pag=iev_in
Universidad Nacional de Rosario	ENGIN		Rosario Physics Institute – IFIR	http://www.fceia.unr.edu.ar/labinfo/info_academica/institutos/fisica_rosario.html
		- Software quality and development - Computer and Information Security	R&D Group in Software Engineering	http://www.fceia.unr.edu.ar/gidis/
Universidad Nacional de San Juan	ENg	- Robótics and Manufacture System - Artificial Intelligent in Control, etc.	INAUT – Automatics Institute	http://www.inaut.unsj.edu.ar/home.asp
Universidad Nacional de San Luis	FICES	- Robotics Control Theory - Robótica; Modelling; etc.	Mecanotronics Laboratory	http://www2.fices.unsl.edu.ar/~labme/
		- Digital Electronics - Applied Control	Automatic Control Laboratory	http://www2.fices.unsl.edu.ar/~lcafices/
Universidad Nacional de La Pampa	ENG		GIDIS – Research and Development Software Engineering Group	www.ing.unlpam.edu.ar/cupiweb04/cursos.html

Table 5: Argentina Chambers and Associations from the private sector

Institution	Acronym	Location	Website	Associated enterprises
Asociación Argentina de Usuarios de la Informática y las Comunicaciones	USUARIA	Buenos Aires City	http://www.usuaria.org.ar/	45
Asociación De Incubadoras De Empresas, Parques y Polos Tecnológicos	AIPyPT	Buenos Aires	http://www.aipypt.org.ar/	51
Asociación De Tecnología De La Información Y Comunicación De Mar Del Plata	ATICMA	Buenos Aires	http://www.aticma.org.ar/Aticma2010/	
Cámara Argentina de Comercio Electrónico	CACE	Buenos Aires City	http://www.cace.org.ar	142
Cámara Argentina de Consultoras de Ingeniería	CACI	Buenos Aires City	http://www.cadeci.org.ar/	
Cámara Argentina de Internet	CABASE	Buenos Aires City	http://www.cabase.org.ar	89
Cámara Argentina PyME	CAPyME	Buenos Aires City	www.pymes.org.ar/	
Cámara de Empresas de Desarrollo Informático de Rafaela y la región	CEDI	Santa Fe	http://www.cedirafaela.com	18
Cámara de Empresas de Software y Servicios informáticos	CESSI	Buenos Aires City	http://www.cessi.org.ar/	315
Cámara de Empresas Informáticas del Litoral	CEIL	Santa Fe	http://www.ceil.org.ar/	37
Cámara de Industrias Informáticas, Electrónicas y de Comunicaciones del Centro de Argentina	CIIECA	Córdoba	http://www.ciiecca.org.ar	
Cámara de Informática del Interior - Regional Cuyo	CIDICuyo	Mendoza	www.cidi-cuyo.com.ar	
Cámara de Informática y Comunicaciones de la República Argentina	CICOMRA	Buenos Aires City	http://www.cicomra.org.ar/	57
Cámara Infomática de Sunchales	CIS	Santa Fe	http://www.cisunchales.com.ar	10
Cámara Sanjuanina de Empresas de Tecnologías de Información y Comunicación	CASETIC	San Juan	http://www.casetic.com.ar/web/guest	23

Cluster Córdoba Technology	CCT	Córdoba	http://www.cordobatechnology.com/	129
Cluster de Empresas de Tecnologías de la Información de la Provincia Jujuy denominado ClusteAR	ClusteAR	Jujuy	http://www.clustear.com/	10
Cluster Tecnológico Bariloche	CTBar	Río Negro	http://www.ctbariloche.com.ar/	22
Cluster TICs Rosario	CTR	Santa Fe	http://www.clusterticsrosario.com.ar	16
Cluster Tucumán Technology	CTT	Tucumán	http://www.clustertecnologico.com.ar/	
Confederación Argentina de la Mediana Empresa	CAME	Buenos Aires City	http://redcame.org.ar	
Distrito Informático del Gran La Plata	DILP	Buenos Aires	http://www.dilp.com.ar/web2009/	25
Emprendedores Argentinos Asociación Civil	EMPREAR	Buenos Aires City	www.emprear.org.ar	
Fundación Argentina en la Era de la Información	Fundación AEI	Buenos Aires City	http://www.aei.org.ar/	
Incubadora de Emprendimientos Innovadores	EMTEC	Buenos Aires	http://www.emtec.org.ar/	10
Incubadora de Empresas de Base Tecnológicas	INTECNOR	Chaco	http://www.intecnor.com.ar/	
Incubadora de Empresas Innovadoras	INCUEI	Buenos Aires	www.incuei.unlu.edu.ar	
Infotech	Infotech	Neuquén	http://www.infotech.org.ar/	12
Instituto de Emprendimientos Científicos y Tecnológicos	IECyT	Buenos Aires City	http://www.iecyt.com.ar/	
Parque Científico Tecnológico - UNICEN	PCT-UNICEN	Buenos Aires	http://www.pct.org.ar/	
Parque Tecnológico del Litoral Centro SAPEM	PTLC	Santa Fe	http://www.ptlc.org.ar/	
Parque Tecnológico La Punta	PTLP	San Luis	http://www.pilp.edu.ar/	16
Parque Tecnológico Misiones	PTM	Misiones	http://www.ptmi.org.ar/	
Parque Tecnológico Tandil	PTT	Buenos Aires	http://www.pct.org.ar/	

Polo de Tecnología Informática de Buenos Aires	POLOITBA	Buenos Aires City	http://www.poloitbuenosaires.org.ar/	107
Polo IT Chaco	POLOITCh	Chaco	http://www.polochaco.com.ar/	10
Polo IT Corrientes	POLOITC	Corrientes	http://poloitcorrientes.com	9
Polo IT la Plata	POLOITLP	Buenos Aires	http://www.poloitlaplata.com.ar	
Polo Tecnológico Bahía Blanca	PTBB	Buenos Aires	http://www.ptbb.org.ar/	14
Polo Tecnológico Constituyentes	PTC	Buenos Aires	http://www.ptconstituyentes.com.ar/	
Polo Tecnológico Rosario	PTR	Santa Fe	http://www.polotecnologico.net/	74
Polo TIC Mendoza	POLOTICM	Mendoza	http://www.poloticmendoza.org.ar/	54
Sociedad Argentina de Informática e Investigación Operativa	SADIO	Buenos Aires City	http://www.sadio.org.ar	
UBATEC S.A.	UBATEC	Buenos Aires City	http://www.ubatec.uba.ar/	

4. ICT PRIORITIES FOR R&D

4.1 Priorities at national level

In June 2009, MINCyT declared ICT research as one of the national priorities in order to strengthen the country's innovation profile. An advisory board on ICT priorities produced the "White Paper ICT Prospective. Project 2020" containing the identification of ICT challenges and the ICT R&D priorities for Argentina for the next ten years. The white paper states that one of the main challenges of Argentina, in terms of science and technology, is to transform the ICT production from a linear paradigm to a non-linear one based on development and innovation.

The main ICT priorities are identified as the following topics as research strengths and potentials:

1) Technologies for high-value-added IT services

Priority: Software Engineering Techniques for Software as a Service.
Objective: Increase the productivity of the IT Industry through the development of SaaS platforms.

2) ICT for Agriculture and Agrobusiness

(a) Priority: Precision Agriculture.
Objective: Development of innovative solutions that involve the use of Magnetic Resonance Imaging; sensors for real-time data transmission; Near-infrared spectroscopy (NIRS) for the quality control of crops; canopy humidity and soil humidity remote sensing; ultrasonic sensing in mist sprayers; etc.

(b) Priority: Telecommunications.
Objectives: Development of better communications in the countryside, including ZigBee, Wi Max, General Packet Radio Service (GPRS), etc.

(c) Priority: Development of Geographic Information Systems (GIS) to monitor agro-production.
Objectives: Development of systems for meteorological and hydrological alerts; early detection of crop / animal diseases; animal and vegetal genetic databases.

3) Modeling and Simulation Technologies

Objectives: Development of platforms to apply these tools to simulate industrial processes, biological fluid dynamics, financial fluids, material design, etc.

4) New Media Technologies

Objectives: Development of platforms to manage digital contents involving new media and the edu-entertainment industry, particularly Digital TV. Different research lines have been identified, such as segmentation and quantification of objects and textures; image recognition, image identification and image interpretation; intelligent tracking in video sequences; rendering; general-purpose computing on graphics processing units (GPGPU); integration of 3D data bases (medical, geospatial, etc.) with visualization and modeling software; motion

capture, haptics, pose estimation; etc.; Software Engineering for the development of Digital TV interactive applications.

5) Bioinformatics

Objectives: Creation of a network of R&D labs in areas such as protein structural bioinformatics; computational immunology; biological data bases; etc.

6) Applied Micro- and Nano-electronics

Objectives: Integrated Circuit modeling, design and packaging. Expected outcomes of this challenge are R&D projects in microelectronics applied to health, energy, agriculture, mining, transportation, traffic control, mass-market electronics, etc.

7) ICT for Health and Education

Objectives: Novel applications of new media technologies to health and education; health related applications of bioinformatics.

8) Information Security

Objectives: Software formal specification languages for describing security and reliability; user centered environments; security metrics; remote authentication; semantic methods and tools for the traceability of contents; security certification; verifiable environments for secure execution; security policies for network independence; architectural level virtualization; seamless interoperability among heterogeneous networks; reputation based protocols for QoS and security; secure binding between users and devices; trusted computing; fault-tolerant flexible protocols.

4.2 Priorities for international cooperation with Europe

International scientific and technological cooperation, coordinated by the MINCyT's National Directorate in International Relations represents a strategic tool for the policy design. It aims to achieve joint research activities and to transfer the results to the productive sector, including cooperation with science and technology excellence networks in America, the European Union and Asia.

The National Directorate of international Relations at MINCyT works on strengthening the relation with strategic partners in other continents, such as the European Union. Argentina signed the Agreement on scientific and technological cooperation with the European Union in September 1999, which came into force in 2001 and was ratified in 2005 for another 5 years. Since then, one of the Steering Committee functions is to identify among the potential sectors for RTD cooperation, those priority sectors or subsectors of mutual interest for cooperation within research and development activities in science and technology.

Other specific National Directorate in International Relation's action for EU-Argentina cooperation was the creation the Argentine Bureau for Enhancing Cooperation with the European Community in Science, Technology and Innovation (ABEST) in October 2005, with own resources and partial funding from FP6. The aim of the liaison office is to develop a platform to expand cooperative activities in S&T with the EU between local researchers, organizations and SMEs, coordinating this activity with other Latin-American countries which also have agreements with the EU (Brazil, Mexico and Chile).

According to the latest version of the Scientific and Technological Cooperation between EC and Argentina - Roadmap 2010, 13 Argentinean organisations so far participate successfully in FP7 ICT (8) and e-Infrastructures (1) projects, as compared to 9 Argentinean organisations in FP6 IST (4) and e-Infrastructures (2) projects. The projects concern Advanced ICT for Risk Assessment and Patient Safety, Virtual Physiological Human, Service and Software Architectures, Infrastructures and Engineering, Networked Media, International Cooperation, and e-Science Grid infrastructures. There is also good complementarity between research and technical cooperation under bilateral and regional RELEX/AIDCO programmes.

Under three on-going ICT international cooperation projects (FORESTA, PRO-IDEAL, PRO-IDEAL PLUS), Argentina is able to participate and contribute to the definition of topics of mutual interest in this area, and organisations from Argentina interested in participating in the ICT Programme are being supported. MINCYT will collaborate with the FP7 funded FIRST project to identify stakeholders from Argentina and main national priorities on Future Internet and ICT Components and systems.

PRO-IDEAL Survey

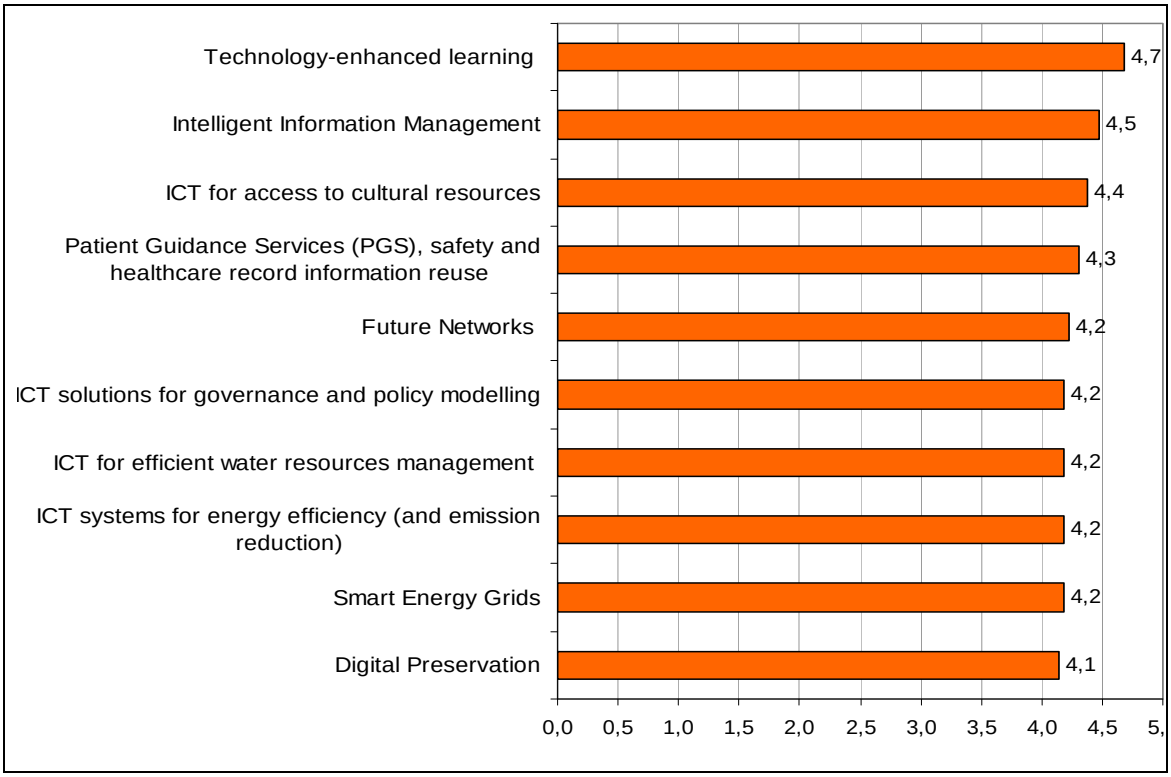
The PRO-IDEAL consortium performed a survey to identify ICT research priorities in target countries of Latin America[29].This survey, conducted in June 2010, detected that the national priorities seems to be in line with the EC FP7-ICT programme. It also identified the top ten ICT priorities in LA, i.e. education and learning, communication networks, information management, computing systems, energy, cultural resources, governance and health. Nevertheless, the study identified five

[29] PRO-IDEAL- Report on ICT Research Priorities in Latin America. September 2010

ICT priority areas for potential cooperation on which the PRO-IDEAL target countries have been focused:

- Internet of Services, Software and Virtualisation
- Nanoelectronics Technology
- Technology-Enhanced Learning
- ICT for Patient Safety
- ICT for Governance and Policy Modelling

The following graphic shows the top 10 ICT research priorities in Argentina identified by the PRO-IDEAL survey:



Source: PRO-IDEAL Survey, 2010

The PRO-IDEAL Plus survey also revealed obstacles to be faced in the future. Although overall opinion about the experience in participating in EU projects is positive, respondents perceived some potential barriers to participate in ICT R&D cooperation projects, such as:

- Difficult access to relevant information about the ICT programme
- Lack of experience in EU/international cooperation projects
- Lack of understanding of the rules for participating
- Difficulties to take part in partnerships
- Complexity of the administrative procedures
- Lack of knowledge about specific research areas for international cooperation
- Lack of knowledge about the success factors to prepare project proposals

Roadmap 2010 Outlook:

- Argentina established an FP7 National Contact Point for this Thematic area; the designated expert is Ms. Rosa Wachenchauzer, who participates in Idealist 2001 Project, an initiative on trans-national cooperation network among ICT NCPs from more than 50 institutions.

- The participation of Argentinean organisations is expected to be further facilitated in the course of FP7 by the continuation of the interconnection of RedCLARA and GEANT.

- During the last SC meeting, held in Buenos Aires, the ICT National Contact Point, Ms. Rosa Wachenchauzer presented the priority themes on ICT areas for Argentina; theses themes were: Components, systems, engineering: micro - and nanoelectronics, Radio frequency identification RFID, Systems on-chip, Embedded systems: low cost sensors, ICT for Independent Living and Inclusion, Applications of ICT for improving the logistics of agricultural bulk exports, Applications of ICT for greater social inclusion (including applications to education).

- The ICT NCP also suggested that it would be interesting to participate in these technology platforms:

    1. Networked European Software and Services Initiative (NESSI).
    2. Embedded Computing Systems (ARTEMIS).
    3. Networked and Electronic Media (NEM).
    4. ENIAC
    5. Mobile and Wireless Communications – eMobility

PLATA Future Internet was launched in Argentina

Considering that Technology Platforms (ETPs) are essential to enhance the ARG-EU cooperation, MINCyT decided to join FIRST project[30], a support action funded by the EC-FP7-ICT programme to foster International Cooperation in the areas of Future Internet and ICT Components and systems between Europe and Latin America to create, launch and support Latin American Technology Platforms (LATPs).

The main objective of the Argentine Technology Platform is to foster and promote a consistent approach to R&D activities in Argentina in collaboration with the European Technology Platforms and having the Seventh Framework Programme as the reference basis for R&D in the Future Internet field. The Argentine Technology Platform gathers most of the relevant stakeholders in Argentina in the field of Future Internet and represents a key milestone in the promotion of R&D activities in cooperation between Argentina and the EU.

All these specific areas have two main objectives: Improving the productive process for Industries and improving the life quality of the population. In order to achieve these goals is of major importance to coordinate the R&D activities and projects with the different needs of the society and the industry. Then, the Argentinean Technology Platform should work as a support point in which these needs and the respective R&D actors will find a common place to interact properly. This interaction

[30] Read more about the FIRST Project at http://www.latin-american-technology-platforms.eu/newsletter-en

will be focused on promoting R&D projects together with the European Union organizations in the field of Future Internet.

This collaboration will give some opportunities to overcome one of the main challenges for ICT international cooperation, meaning to promote and enhance effective cooperation among private enterprises in ICT R&D stakeholders.

4.3 Regional international cooperation

In terms of Regional integration, Argentina focuses on the cooperation with strategic partners of the MERCOSUR countries having, however, the whole LAC Region as horizon. For example, Argentina actively participates at RECyT whose main objective is to promote S&T development in the participating countries, and to modernise their economies in order to increase the spectrum and quality of the resources and services for improving the living conditions of their populations. Main action lines are the MERCOSUR S&T Framework Programme, the MERCOSUR S&T Prize, and sector programmes such as BIOTECH[31], MERCOSUR Digital[32], CINECIEN[33].

There is also a regional convergence towards a common norm for Digital TV: Argentina, as well as Brazil, Peru, Chile, Venezuela, Ecuador, Costa Rica, Paraguay, Bolivia, Nicaragua, Uruguay, Cuba, Belize, and Guatemala have adopted the ISDB-T Japanese-Brazilian Digital TV norm, and Argentina and Brazil are key players in the development of middleware for this norm.

[31] Find more information about BIOTECH at http://www.biotecsur.org/
[32] Find more information about MERCOSUR Digital at http://www.mercosurdigital.org/
[33] Find more information about CINECIEN at http://www.recyt.mincyt.gov.ar/index.php?option=com_content&view=article&id=312&Itemid=68

5. CONCLUSIONS

Argentina plays a relevant role within the LAC countries with respect to the European Union: an Agreement on scientific and technological cooperation with the European Union was signed in September 1999, which came into force in 2001 and was ratified in 2005 for another 5 years, and the implementation of the Argentine Bureau for Enhancing Cooperation with the European Community in Science, Technology and Innovation (ABEST) in October 2005. These two measures resulted in the increase of projects participating in European consortiums, due to the development of a platform that expands cooperative activities in S&T with the EU between local researchers, organizations and SMEs, coordinating this activity with other Latin-American countries which also have agreements with the EU (Brazil, Mexico and Chile).

The ICT sector has become one of the technology platforms considered as strategic by the national government because it causes a positive impact on all productive activities. On the one hand, the growing economic importance that ICT acquired in the last decades is based on its ability to generate high added value and, at the same time, by contributing to differentiate products and competitive advantage in the market. On the other hand, it is because this industry has also become an important source of supply and demand for highly skilled employment.

According to the White Book, the most recent official document that states the ICT priorities, affirms that the main challenge for Argentina is to change the model of RTDI that could be summarized as the "passage from linear to non-linear paradigm of research and development."

Besides its growth and recognized competitiveness, becoming a national ST&I priority, the ICT sector is benefited from more opportunities of promoting and acquiring technology-based innovation, developing human resources, taking an acting role in closing digital gaps, and enhancing the creation of clusters and other active policies.

In the last years, the ICT sector also counts on specific legal and funding scheme that make possible national enterprises to take a more trustful position in the regional and international arena. These two issues are key to achieve opportunities to overcome one of the main challenges for ICT international cooperation, meaning to promote and enhance effective cooperation among private enterprises in I&D ICT stakeholders.

Cooperation in the multilateral level drives the participation of all kind of ICT stakeholders. There is an ever growing interest for cooperation with international partners, and there is funding dedicated to promote the international cooperation of SMEs, so that a coordinating funding mechanism agreement between EU and Argentina is a possibility.

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7. ACRONYMS

- ABEST: Argentine Bureau for Enhancing Cooperation with the European Community in Science, Technology and Innovation
- AIPyPT: Asociación De Incubadoras De Empresas, Parques y Polos Tecnológicos
- ANLIS: Administration for Health Laboratories and Institutes
- ANPCyT: National Agency for S&T Promotion
- ARTEMIS: Embedded Computing Systems
- ATICMA: Asociación De Tecnología De La Información Y Comunicación De Mar Del Plata
- CABASE: Cámara Argentina de Internet
- CACE: Cámara Argentina de Comercio Electrónico
- CACI: Cámara Argentina de Consultoras de Ingeniería
- CAME: Confederación Argentina de la Mediana Empresa
- CAPyME: Cámara Argentina PyME
- CASETIC: Cámara Sanjuanina de Empresas de Tecnologías de Información y Comunicación
- CCT: Cluster Córdoba Technology
- CEDI: Cámara de Empresas de Desarrollo Informático de Rafaela y la región
- CEIL: Cámara de Empresas Informáticas del Litoral
- CESSI: Chamber for Information Technology Companies in Argentina
- CETIFAC Group: Medical Teleinformatic Center Laboratory for Signals and Computational Intelligence
- CIC: Comisión de Investigaciones Científicas de la Provincia de Buenos Aires
- CICOMRA: National Chamber of Informatics and Communications
- CIDICuyo: Cámara de Informática del Interior - Regional Cuyo
- CIDISI: Engineering Research and Development in Information System Center
- CIIECA: Cámara de Industrias Informáticas, Electrónicas y de Comunicaciones del Centro de Argentina
- CIS: Cámara Infomática de Sunchales
- ClusteAR: Cluster de Empresas de Tecnologías de la Información de la Provincia Jujuy denominado ClusteAR
- CNEA: Atomic Energy Commission
- COFECYT: Federal Council for Science and Technology
- CONAE: National Commission on Space Activities
- CONICET: National Council for Scientific and Technological Research
- CTBar: Cluster Tecnológico Bariloche
- CTC: Community Technological Centers
- CTR: Cluster TICs Rosario
- CTT: Cluster Tucumán Technology
- DILP: Distrito Informático del Gran La Plata
- EMPREAR: Emprendedores Argentinos Asociación Civil
- EMTEC: Incubadora de Emprendimientos Innovadores
- ETPs: European Technology Platforms
- EU: European Union
- FAN: Argentinean Nanotechnology Foundation
- FONARSEC: Fondo Argentino Sectorial
- FONCyT: Fondo para la Investigacion Cientifica y Tecnologica
- FONSOFT: Fondo Fiduciario de Promoción de la Industria del Software
- FONTAR: Argentinian Technology Fund
- Fundación AEI: Fundación Argentina en la Era de la Información
- GIDIS: Research and Development Software Engineering Group
- GIS: Geographic Information Systems
- GlyC: Logic and Computability Research Group
- GPGPU: general-purpose computing on graphics processing units

- GPRS: General Packet Radio Service
- ICAR: Computing Intelligence applied to Robotics
- ICT: Information and Communication Technologies
- IECyT: Instituto de Emprendimientos Científicos y Tecnológicos
- IFIR: Rosario Physics Institute
- INAUT: Automatics Institute
- INCUBACEN: Technological Companies Incubators
- INCUEI: Incubadora de Empresas Innovadoras
- Infotech: Infotech
- INNOVARED: Red Nacional de Investigación y Educación de Argentina
- INTA: Institute of Agricultural Technology
- INTEC: Technological Development for Chemical Industry Institute
- INTECIN: Technology and Engineering Science Institute "Hilario Fernàndez Long"
- INTECNOR: Incubadora de Empresas de Base Tecnológicas
- INTI: Institute of Industrial Technology (INTI)
- IS: Information Society
- ISDB-T: Integrated Services Digital Broadcasting - Terrestrial
- ISISTAN: Tandil Systems Institute
- IT: Information Technologies
- KAPOW: Knowledgeable Algorithms for Problems On Words
- LATPs: Latin American Technology Platforms
- LIFIA: Computing Research and Formation Laboratory
- LINTI: ICT Research Laboratory
- ME: Ministry of Education
- MINCyT: Ministry of Science, Technology and Productive Innovation
- NAC: Núcleos de Acceso al Conocimiento
- NEM: Networked and Electronic Media
- NESSI: Networked European Software and Services Initiative
- NGO: Non-governmental organization
- NIRS: Near-infrared spectroscopy
- PCT-UNICEN: Parque Científico Tecnológico
- POLOITBA: Polo de Tecnología Informática de Buenos Aires
- POLOITC: Polo IT Corrientes
- POLOITCh: Polo IT Chaco
- POLOITLP: Polo IT la Plata
- POLOTICM: Polo TIC Mendoza
- PRO-IDEAL: PROmotion of an ICT Dialogue between Europe and America Latina
- PSI: National Program for the Information Society
- PTBB: Polo Tecnológico Bahía Blanca
- PTC: Polo Tecnológico Constituyentes
- PTLC: Parque Tecnológico del Litoral Centro SAPEM
- PTLP: Parque Tecnológico La Punta
- PTM: Parque Tecnológico Misiones
- PTR: Polo Tecnológico Rosario
- PTT: Parque Tecnológico Tandil
- PU: Public
- QoS: quality of service
- RedVT: Red de Vinculación Tecnológica
- RELEX-AIDCO: DG External Relations. Strategic Engagement with Civil Society
- RICYT: Red Iberoamericana e Interamericana de Indicadores de Ciencia y
- Tecnología
- RTD: Research, Technological and Development
- RTDI: Research, Technological Development and Innovation
- S&T: Science and Technology
- SADIO: Sociedad Argentina de Informática e Investigación Operativa
- SECyT: Secretary for Science, Technology and Innovation of Production

- SME: Small and Medium Enterprises
- ST&I: Science, Technology and Innovation
- UIA: Industrial Union of Argentina
- USUARIA: Asociación Argentina de Usuarios de la Informática y las Comunicaciones
- WP: Work Programme