Edited by Jean-Baptiste Meyer

Diaspora

Towards the new frontier

DIASPORA:
TOWARDS THE NEW FRONTIER

UNIVERSIDAD
DE LA REPÚBLICA
URUGUAY

Contenido

A didactic video on this book's subject has been produced and can be watched in three languages on the internet: french, spanish, and english at <http://www.observatoriodiasporas.org/#!libro/cgkd>.

As exchange among peers is the best way to increase knowledge and cooperation, comments are most welcome.

Acknowledgements

We are immensely grateful to many individuals and institutions that have been involved in the development of both the Cidesal project – Creation of Knowledge Diasporas Incubators for Latin America – and this book which presents some of its results.

First of all, the Asylum and Migration Program of Europe Aid (European Commission) funded most of the activities and resources of this project.

The Laboratory of Population, Environment and Development (LPED) of IRD (Institute of Research for Development), coordinated the project and extensively mobilized its administrative staff for the purpose: Audrey Ambrosino, Myriam Defrance, Eloïse Gransagne and Amélie Salmon, as well as its director, Hubert Mazurek. Alexia Galiano and Jean-Jacques Roubion, respectively from IRD finance and external affairs departments, as well as Gloria Zarama from the University of Grenoble, have also been extremely cooperative.

Our thanks are also due to the various teams of the project: Centro Redes in Buenos Aires, Argentina; International Organization for Migration (IOM) Bogotá; *Cancillería* (foreign affairs department) of the Colombian government; Programa de Población de la Universidad de la República in Montevideo; Fundación Polo Mercosur in Uruguay and Laboratoire d'Informatique Mécanique et Sciences de l'Ingénieur (LIMSI) of Centre National de Recherche Scientifique (CNRS) in Paris, France. Many of their staff contributed individually to the success of the project and its outcome.

The Maison des Sciences de l'Homme de Montpellier – which housed the project – too, has always been cooperative: Marie Anchier, Sophie Belacel, Antoine Bourlier, Emeline Mercier, Florian Pascual, and its director Paul Pandolfi.

The participation of Alejandra Feitoo and Maria Isabel Zarama was of critical importance for the success of the symposium in Buenos Aires where regional and global experiments of diaspora networks were shared.

Geneviève Cortes (University of Montpellier), Gustavo Crispino (Jouve, Nancy), Dana Diminescu (Telecom Paris-Tech, EHESS), Nandita Khadria and Binod Khadria (Jawaharlal Nehru University, New Delhi), Gabriela Tejada (CODEV, EPFL Lausanne), Fernando Lozano Ascencio (UNAM, Mexico) and Jean-Paul Wattiaux (consultant, Paris) extended vital intellectual support with major impact on the results of the project.

Finally, Nairí Aharonián, in Montevideo, provided her skillful attention to make this book as accessible as possible for the reader. Thanks to her work, we now wish the readers the most pleasant reading.

The authors

Julieta Bengochea: Graduate of Scientific Anthropology, Faculty of Humanities and Educational Sciences, Universidad de la República, Uruguay. Specialization in Sociodemographic Information Analysis, Faculty of Social Sciences, Universidad de la República. Master Candidate in the Master of Demography and Population Studies Program at the aforementioned university. She has been a teacher and researcher in the Population Program in the Social Sciences Faculty at the university since 2008. Her fields of research are internal migration and spatial population distribution, international migration, skilled migration, and the socioeconomic inclusion of migrants.

Martín Koolhaas: Graduate of Political Science with Specialization in Socio-demographic Information Analysis, Universidad de la República, Uruguay. Master Candidate in the Master of Demography and Population Studies Program at the aforementioned university. He is a teacher and researcher in Universidad de la República's Population Program in the Social Sciences Faculty and a demographic analysis adviser at the National Institute of Statistics (ine, according to his Spanish initials). His fields of research are: international return migration, skilled migration, internal migration and spatial population distribution, production of demographic statistics, and population estimates and projections.

Adela Pellegrino: Full professor in the Faculty of Social Sciences at the Universidad de la República, Uruguay. She was Coordinator of the Population Program from the beginning till 2004 and is now the academic in charge of the Program. She was instrumental in the launching of the Master in Population Studies and, along with Carmen Varela, is coordinator for this postgraduate program. She is a historian and did her doctorate in demographic studies at l'École des Hautes Études des Sciences Sociales in Paris. Her main research interests are demographic history and international migration, on which she has published books as well as articles in specialized magazines. She has received awards and distinctions: Bartolomé Hidalgo (1996), Mujeres en ciencia ("Women in Science") (2010) Ministry of Culture, the Morosoli Prize (2011) of the Lolita Ruibal Foundation.

Jean-Baptiste Meyer: Senior researcher at the Institute of Research for Development (ird) and professor in various universities in Europe and Africa. He has run research and higher education programmes with the National University of Colombia, the University of Cape Town, the Latin American Faculty of Social Sciences in Buenos Aires as well as in North Africa more recently. His works include: *El nuevo nomadismo científico: la perspectiva latinoamericana* (esap, 1998); *Scientific Diasporas* (ird Éditions, 2003); *La société des savoirs : trompe l'oeil ou perspectives* (Harmattan, 2006); *A Sociology of Diaspora Knowledge Networks* (2011) and *Diaspora et développement* (2013). He has been coordinating the Cidesal European research and development project, on diaspora incubators, developing new methods and instruments for global mobility understanding and management.

Caroline Caplan: Doctor in Human Geography, alumni of art-dev (umr 5281), Montpellier University. Recently took a Postdoctorate position in Paris-Descartes. Her studies are mainly dedicated to better understand highly skilled migrants' networks and their role for development. Her cooperations in researchers' networks allowed her

to contribute to the literature. She recently took part in the *Handbook on International Labour Migration* at Palgrave MacMillan Publishing (Fornale, Panizzon & Zurcher, published on March 2015). She also coordinated a group of researchers in 2013 in order to suggest, to the French ministry of foreign affairs, how migrations could be integrated into the post-2015 development agenda (Caplan & Meyer, 2013).

Fernando Lema: Undertakes scientific research activities in the structural immunology area at the Pasteur Institute in Paris (1982-2005). He coordinated Latin American and Caribbean Inter-Regional Scientist Network activities in unesco from 1991 to 1999. He participated in the creation of a document proposed by the French Ministry of Foreign Affairs about "Scientific Diasporas" created by the Research Institute for Development (Paris, 2003). He was an Advisor to the Minister of Education and Culture in Uruguay, General Secretary of the National Commission for unesco (2005-2008), and Director of Cooperation of the Uruguayan National Public Education Administration. He is currently President of the Polo Mercosur Foundation, a platform for academic cooperation between Europe and regional universities.

Valentina Pellegrino: Historian degreed from the Universidad Nacional de Colombia an doctor in Anthropology candidate at the Universidad de los Andes. She's been intern as outstanding student at the Universidad Nacional de Colombia in order to complete her Master in Anthropology, and has won the icanh's (Instituto Colombiano de Antropología e Historia) call for Investigation in Social Anthropology.

Lucas Luchilo: Researcher at the Centro Redes. Secretary of Science and Technology at the Instituto Universitario en Ciencias de la Salud and professor at the Universidad de Buenos Aires.

Alejandro Blanco: Social Communicator, specialist in management and social network analysis, MA in Social Anthropology. He has worked since 2003 on the conection of geographically dispersed migrants, for institutions such as the Ministry of Foreign Affairs of Colombia; the Administrative Department of Science, Technology and Innovation of Colombia; the International Organization for Migration (iom), and the Institute of Research for Development of France, among others.

William Turner: was Senior Research Engineer before retiring from the French National Research Centre (cnrs) at the end of 2013. He headed the Social Informatics Research Team at the Computer Science Lab for Engineering and the Mechanical Sciences (limsi). The goal of this team was to computer support distributed collective practices in both science and industry.

Jorge J. Garcia Flores: is a Research Engineer on Natural Language Processing (NLP) at the French National Scientific Research Center (cnrs). He works actually for the Paris Nord Computer Science Lab (lipn) at Paris 13 University. His research interests are semantic similarity, information extraction, and nlp applications on digital humanities.

Mathilde de Saint Leger: has recently joined the Dynamic Modeling and Corpus at Paris-West University (MoDyCo Lab) as a research engineer expert in statistical computing. Before, and since 2008, she has been working with the Scientific and Technical Information Directorate of the French National Center for Scientific Research (cnrs) where she is project manager for bi project. She has previously worked with the French

National Institute for Agricultural Research (INRA) in bilbiometric research and in the private sector on information management and economic intelligence. She created and developed the textmining software, Calliope.

A pragmatic approach to diasporas

Diaspora… The word until recently sounded like an original form or exotic organization, like a myth attached to some kind of an exceptional society. When we started using it to describe contemporary patterns of societal relationships during the 1990s (Sheffer, 1986; Cohen, 1997; Meyer *et al.,* 1997), we were first received with surprise, then often with strong scepticism (Gaillard & Gaillard, 2003; Lowell & Gerova, 2004). Surprisingly, in one single decade, what was once a vision has become a conventional view. Doubts quickly vanished under convergent evidence and the term 'diaspora' imposed itself as a major concept to describe a globalizing world in a socio-historical perspective (Dufoix, 2008; Gamlen, 2014).

After the paradigm shift announced in the late 1990s (Meyer & Charum, 1995; Khadria, 2001), the emerging migration-development nexus has heavily referred to the expatriates' connection as a positive asset (Faist, Fauser & Kivisto, 2011). Interest has quickly developed from international cooperation agencies, finding a promising opportunity for effective North-South transfers, relieved from exogenous or tied aid problems.

The recent awareness of diasporas' importance and resources (IRD / Barré *et al.,* 2003; World Bank / Kuznetsov, 2006; OECD, 2012) soon faced policy issues and the question of feasibility (EPFL, 2010; UNCTAD, 2012; MAE & OECD, 2012; Diaspora Matters, 2012; IOM & MPI, 2012). The very titles of the publications from these agencies point to their concern about instrumental answers to the challenge of engaging the diasporas in development processes.[1] After the inflation of expectations that diasporic initiatives and resources could help set up capacities in developing countries, the policy concern has, today, become essentially pragmatic.

1 "Scientific diasporas: *How can* developing countries *benefit from* their scientists and engineers abroad?" (Barré *et al.,* 2003); "Diaspora networks and the international migration of skills: *how countries can draw* on their talent abroad" (Kuznetzov, 2006); "an *action oriented toolkit* to assess *good practices* of skilled migrants and scientific diasporas" (EPFL, 2010); "*Harnessing* remittances and diaspora knowledge to build productive capacities" (LDCs UNCTAD annual report, 2012); "*Harnessing* the skills of migrants and diasporas to foster development: policy options" (MAE & OECD, 2012); "Global Diaspora strategies *toolkit: harnessing the power* of global diasporas" (*Diaspora matters*, 2012); "Developing a *road map* for engaging diasporas in development: a *handbook* for policy makers and practitioners in home and host countries" (IOM-MPI, 2012) (emphasis in italics from the author).

How can diasporas be used for creative purposes, in development perspectives?

This book also tries to address this big question. It follows the same track, therefore, as previous endeavors in the same direction. However, there is a major difference with these earlier endeavors. Instead of focusing on political, organizational and management proposals, it turns towards a more fundamental approach. It assumes that diasporas, as transnational entities, require a kind of post-state governance. And it looks for new tools appropriate for this.

Such a pragmatic objective could not be operated in abstract conditions. It definitely needed a hard experimental setting which was found in the Migration and Asylum program of the European Commission. EuropeAid indeed provided the funding for the Cidesal (Creation of Incubators of Knowledge Diasporas for Latin America) project, and allowed access to the real life institutional frameworks. As the EuropeAid program is oriented towards concrete proposals, the exercise had to cover the complete chain from conceptual design to actual devices, a requirement that perfectly met the challenge of combining theory and practice for a new approach.

In Latin America today, diasporas receive much political attention. Like in many parts of the world, they are essentially perceived as extensions of national constituencies. To represent this, central administrations often symbolically stretch the national territory, to include the diaspora within a new division, in addition to the traditional ones. For instance, in Argentina, it is the 23rd Province (*Provincia veintitres*), while in Uruguay, there is the 20th Department (*Departamento Veinte*). It is a proper way to epitomize an entity which is impossible to circumscribe and to try to deal with it in a juridically satisfactory manner. But it is also a denial of the intrinsic extraterritoriality of the diaspora. It is a semantic inclusion within traditional borders of something which remains actually beyond, by definition. It is, thus, an illusory shortcut to translate what the countries are actually trying to reach: their new frontier.

For the historian Arnold Toynbee, the diaspora is the normal step between the ending nation-state system and the advent of a world society (Toynbee, quoted in Dufoix, Guerassimov & Tinguy, 2010). In such a perspective, the current expansion of national policies through diasporic networks may be interpreted as an attempt to adapt locally bounded entities to purely global challenges. The concept of frontier – from American history (Turner, 1895; White, 1991) – deserves to be imported here since it grasps the double dimension of both elusive limits and mobilizing dynamics, through which collective identity is maintained, updated and developed.

However, is the diaspora discourse of today a performative myth like the frontier speech of the past? In order to go beyond simply rhetorical arguments which cannot, alone, sustain collective action for long, there is a definite need

for means and investments. This is where all the policy documents referred to above come into the picture. They try to operationalize the objective of diaspora engagement and mobilization. Public policy aims and programmes are thus listed and, sometimes, implemented. A handbook collecting best practices recorded in many different contexts is proposed, providing governments with a standard scheme of activities development (IOM & MPI, 2012). Isomorphism, derived from the transposition of national experiences produced somewhere, to other countries and settings, is even noticed (Gamlen, 2014), with obvious risks of irrelevant organization.

In fact, the implementation of a diaspora strategy collides with the limits of traditional public policy, within nation-state borders. For instance, how can a government plan actions with the country's expatriates when no – or only a few- statistics and knowledge about them depends on its own services? How can a reach out policy be actually designed and organized if most of these expats are not well identified and located? How can actions be proposed to them if their skills and abilities are not well defined and expressed in accordance with their potential partners' objectives? Lastly, where can shared activities be organized and take place if there is no common space for interaction?

Traditional international cooperation may partly overcome some of these limitations. Information exchange, profiling and matching exercises, distant communication devices etc. have, for instance, been developed in this context by both origin and hosts countries together in the co-development programs. Multilateral agencies have also gained momentum with their unrivalled ability to deal with the dispersal of diasporic communities (IOM MEDA programme, EU African Diaspora project, for example). However, there is an important constraint over these attempts: information remains essentially subordinated to national settings, not only for data collection but also for its very definition, production and access; and space is bounded by sovereignties with impossible overlap, making transnational interaction dynamics virtually impossible, if no substitute is found for an effective meeting place.

Every diaspora project today is confronted with this contradiction: national conditions for a transnational purpose. Countries remain "containers" and "methodological nationalism paradigm" still rules the world (Beck, 2006; Glick-Schiller, 2009). To escape from these enclosures and proceed towards a new frontier, information and space should no longer depend on nation-states' borders. The Cidesal project created devices that were less state dependent in order to produce these new conditions. It focused on three countries with precocious diaspora policies: Argentina, Uruguay and Colombia, and drew lessons from their history. It explored new information sources, channels and indicators. It experimented with original instruments to open room for co-actions of distant potential partners.

In doing so, a mix of social and engineering sciences was used. History, anthropology, sociology, economics, demography, geography, communication,

information science and technology were mobilized. Six teams from public and private organizations have been involved for five years, in four countries. The results of these efforts are some paths opened in the open field of cosmopolitanism that this book presents. Following the pragmatic approach of former explorers, in search of new tools, it is a genuine attempt of actual "realistic cosmopolitanism", in line with Ulrich Beck's vision at the eve of the millennium. These concrete steps in the wild west translate utopia into credible options. We just hope they inspire initiatives for the long way ahead of us.

References

Barre, R.; Hernández V.; Meyer J.-B. & Vinck D. (eds.) (2003). *Scientific Diasporas / Diasporas scientifiques*. Paris: ird Editions.

Beck, U. (2006). *The Cosmopolitan Vision*. Cambridge: Cambridge Polity Press.

Cohen, R. (1997). *Global Diasporas*. London: ucl Press.

Diaspora Matters (2012). *Global Diaspora strategies toolkit: harnessing the power of global diasporas*, Dublin: Diaspora Matters, available at <http://diasporamatters.com/publications-resources-2/> (last visited: 13/2/2015).

Dufoix, S. (2008). *Diasporas*. California: University of California Press.

——— Guerassimoff, C. & Tinguy A. (eds.) (2010). *Loin des yeux, près du cœur ; les Etats et leurs expatriés, Fondation des sciences politiques*. Paris: Presses de Sciences Po (pfnsp).

École Polytechnique Fédérale de Lausanne (epfl) (2009). *An Action oriented Tool Kit To Assess Good Practicces of Skilled Migrants and Scientific Diasporas*. Lausana: École Polytechnique Fédérale de Lausanne.

Faist, T.; Fauser, M. & Kivisto P. (eds.) (2011). *The Migration-Development Nexus, a Transnational Perspective*. Basingtoke: Palgrave-Mac Millan.

Gaillard, J. & Gaillard, A.-M. (2003). "Can the Scientific Diaspora Save African Science?". *Scidev. net*, available at <http://www.scidev.net/global/migration/opinion/can-the-scientific-diaspora-save-african-science.html> (last visited: 15/1/2015).

Gamlen, A. (2014). "Diaspora Institutions and Diaspora Governance". *International Migrations Review*, 48, issue supplement S1, S180-217.

Glick-Schiller, N. (2009). "A global perspective on transnational migration : theorizing migration without methodological nationalism". *compass working paper*, 09-67, available at <https://www.compas.ox.ac.uk/fileadmin/files/Publications/working_papers/wp_2009/wp0967%20Glick%20Schiller.pdf> (last visited: 15/1/2015).

International Organization for Migrations (iom) & Migration Policy Institute (mpi) (2012). *Developing a Road Map for Engaging Diasporas in Development, a Handbook for Policy Makers and Practitioners in Home and Host Countries*. Génova-Washington dc: iom-mpi.

Khadria, B. (2001). "Shifting Paradigms of Globalization: the Twenty-first Century Transition Towards Generics in Skilled Migration from India". *International Migration,* 29 (5): 45-71.

Kuznetsov, Y. (ed.) (2006). *Diaspora Networks and the International Migration of Skills*. Washington dc: World Bank Institute.

Lowell, L. & Gerova, S. (2004). *Diasporas and Economic Development: State of Knowledge, Institute for the Study of International Migration*. Georgetown University, Working paper, available at <http://siteresources.worldbank.org/intprospects/Resources/334934-1322593305595/8287139-1327608098427/LowellDiaspora.pdf> (last visited: 15/1/2015).

Meyer, J.-B. & Charum, J. (1995). "La fuite des cerveaux est-elle épuisée? Paradigme perdu et nouvelles perspectives". *Cahiers des Sciences Humaines*, 31 (4): 1003-1017.

Meyer, J.-B.; Bernal, D.; Charum, J.; Gaillard, J.; Granes, J.; Leon, J.; Montenegro, A.; Morales, A.; Murcia, C.; Narvaez Berthelemot, N.; Parrado, L. & Schlemmer, B. (1997). "Turning Brain Drain into Brain Gain: The Colombian Experience of the Diaspora Option". *Science, Technology and Society (A journal devoted to the developing world)*, 2 (2): 285-315.

Organization for Economic Cooperation and Development (oecd)-Ministère des Affaires Étrangères (mae) (2012). *Harnessing the skills of migrants and diasporas to foster development: policy options*. Paris: mae.

Sheffer, G. (1986). "A New Field of Study: Modern Diasporas in International Politics". In Sheffer, G. *Modern Diasporas in International Politics*. London: Croom Helm.

Turner, F. J. (1893). *The Significance of the Frontier in American History*. Nueva York: Henry Holt and Company.

United Nations Conferencia on Trade and Development (unctad) (2012). *Harnessing Remittances and Diaspora Knowledge to Build Productive Capacities. Least developed countries report*. Génova: unctad.

White, R. (1991). *It's Your Misfortune and None of My Own: A New History of the American West*. Norman: University of Oklahoma Press.

Chapter 1

Profiles and Trends of Highly Skilled Migrants of Latin American and Caribbean Origin

Julieta Bengochea, Martín Koolhaas & Adela Pellegrino

Introduction

One of the aims of the Cidesal Project[1] consisted of developing a knowledge base about the magnitude, demographic characteristics and labour inclusion of highly skilled migrants[2] born in Latin American countries through the processing of statistical data dispersed among various destination country sources. This chapter proposes to present a summary of the main results obtained through the latter task.

Firstly, the chapter presents a summary of the sources of information used to prepare the statistical indicators that provide a view of the mobility situation of the highly qualified or skilled population in question, including an analysis of their potential and limitations, as well as setting out recommendations for improving the quality of migration statistics. Secondly, principal world, regional, and national trends taken from the aforementioned developed indicators are analysed. Emphasis is placed on two preferred destinations of the skilled Latin American migrants: The United States of America (USA) and Europe (in particular, Spain). Finally, some reflections on the migration of skilled individuals are offered as a conclusion.

All the quantitative information presented in this chapter, along with other data that, due to lack of space is not included here, is available on the Mical (Migración Internacional de Profesionales del Conocimiento de América Latina)[3] observatory website on qualified Latin American migrations, created in the Cidesal project framework.

1 Cidesal: Création d'incubateurs de diasporas des savoirs pour l'Amérique Latine.

2 Henceforth when we mention the term 'qualified migrants' or 'skilled migrants' we shall be referring to people with higher educational qualifications who were born in countries other than those they reside in.

3 Latin's America Knowledge Proffessionals' International Migration. See <http://www.observatoriodiasporas.org>.

Statistical information about the highly skilled population's mobility

Population censuses provide the empirical base in quantifying and characterizing the migrant population in demographic and socioeconomic terms. The universality of censuses is an advantage when compared to other sources of information and this characteristic along with the regularity of censuses has made the construction of migration information systems possible. The difficulties encountered in measuring international emigration make it necessary to maximize the cooperative and statistical information exchange efforts, in order to systematize the huge quantum of data that is found dispersed in migrant-receiving host countries. The following outline summarizes the characteristics of three of the most relevant projects.

Unlike Latin America, migration statistics in Europe depend to a lesser degree on censuses and make greater use of household surveys and administrative records. National statistical systems in the European Union have a common regulatory framework aimed at the coordination of concepts, operational definitions, and methodologies. Eurostat, the supranational statistics agency, achieves this through the compilation of coordinated statistics. Article 3 of Regulation No. 862 of the year 2007 stipulates the following basic international immigration statistics that national European statistics should prepare:

A drawback of the European statistics is that there is generally no information disaggregated by country of origin to enable the quantification and characterization of skilled migration. Moreover, a recent IOM (International Organization for Migration) report (2012) points out that European migration statistics and censuses in particular tend to publish information about migrants that is classified according to "citizenship" instead of country of birth, in contrast to censuses in Latin America and the Caribbean.

An exception to the aforementioned is the National Immigrants Survey (ENI) that was undertaken in Spain in 2007. The ENI is a survey specifically aimed at investigating the socio-demographic characteristics of individuals born abroad, of 16 years of age or above, who live in their family homes. It also focuses on migration itineraries, work and residential histories, family relationships, migrants' relationships with their countries of origin, and relationships within the Spanish society. The survey covered all of Spain's geographic territory, interviewing 15,466 immigrants, out of which 3,263 were qualified (had completed higher education). Thus, it is possible to make estimates by continent and, in some cases, at the country level by using these data.

Outline 1. Systematization of Census Data in various International Migration Projects.

	Imila CEPAL-Celade	DIOC OECD	Ipums International Minnesota Population Centre
Characteristics	An inter-regional cooperation project to find out the extent and characteristics of international migration through national censuses. It includes data from the 1990 and 2000 census rounds	Project exchange and systematization of census data from the 2000 round, which originally collected information from immigrants living in OECD countries	Project for the systematization, preservation, harmonization, and dissemination of census databases. The information is codified and documented consistently among countries and through time with the purpose of facilitating comparative research
Accessibility	Tabulated data is available on Excel format on the Celade web page	Databases are available on the OECD website in csv or Stata format	Census samples are available if you register on the Ipums International website in Stata, SAS, or SPSS format
Coverage	Latin American, the Anglophone Caribbean, the United States, and Canadian censuses	*World-wide* The extended 3.0 DIOC-OECD database includes 100 destination countries, 32 of which are part of the OECD. It is estimated that the database covers approximately three quarters of all the migrants in the world	*World-wide* 238 samples of census micro data from 74 countries and a total of 500 million registered individuals
Information contained	Stocks of migrants: a) Matrix of migrants' origins and destinations among the countries b) Specific information according to place of birth or previous residence, as well as the date of entry. c) Socio-economic and demographic profiles of immigrants. d) Returned migrants	Stocks of migrants aged 15 years and above by country of residence, country of birth, education level, gender, age, economic activity status (employed, unemployed, inactive) and occupational subgroup (two-digit classification)	Identification and characterization of migrant stocks based on all variables: sex, age, country of birth, country of previous residence, marital status, economic activity status, and educational level

Imila: Investigación de la Migración Internacional en Latinoamérica; *DIOC:* Database on Inmigrants in OECD Countries; *Ipums:* Integrated Public Use Microdata Series; *CEPAL:* Comisión Económica Para América Latina y el Caribe; *Celade:* Centro Latinoamericano de Desarrollo; *OECD:* Organización for Economic Cooperation and Development.
Source: Koolhaas (2013) based on Bay & Martínez Pizarro (2005), Dumont *et al.* (2010) and information extracted from <https://international.ipums.org/international/> (last accessed: 30/4/2014)

Outline 2.
Scope and limitations of new data from Spain and the United States

	ACS USA	Municipal Survey, Spain	ENI, Spain, 2007
Source type	Multiple purpose survey of a continuous nature	Continuous record	One-time survey
Dimensions-Variables	Basic demographics (sex, age, country of residence), Educational level, Work inclusion, Income, Housing	Sex, age, nationality, and country of residence (autonomous community and province)	Basic demographics, Educational level, Migration history (countries lived in and with whom), Reasons for last migration, Quality of life in Spain (job, housing, educational level, etc.), Link with country of origin (family members, friends), Remittances and other forms of economic linkage with the country of origin
Year of Series Publication	2000 onwards	1998 onwards	2007
Main features	The large sample size enables the multi-dimensional, highly detailed study of the characteristics of the population born in Uruguay.	The volume and basic demographic characteristics of the Uruguayan population at the provincial level can also be disagregated (the same as with a census)	The potentiality of investigating multiple immigration dimensions due to the questionnaires' great reach
Main limitation	For small population groups (such as those individuals born in Uruguay), information cannot be territorially disaggregated.	Limited information to basic variables; information that does not allow skilled migrants to be identified.	The size of the sample does not permit individuals born in Uruguay to be studied in depth (it only allows in-depth study of majority of the colonies)

For the United States of America, a continuous reliable source can be used for the study of skilled migration. The American Community Survey (ACS) is a home survey that enables the study of demographic and social demographics, and living conditions of the people of United States. Because of its large sample size, to which the possibility of publishing triennial or five-yearly micro data is added, this continuous source is an alternative to the census. In fact it has led to a substantial reduction in the number of questions in the census questionnaire, producing statistically representative estimates for small geographical areas and population groups. Its extensive sample size offers enormous analytical

possibilities that enable Latin American and Caribbean regions to make estimates, and in most cases, by country of birth (outline 2).

Taking the aforementioned limitations into account, the search for information about the mobility of the highly qualified population in the framework of the Cidesal project was conducted by drawing information from three sources: censuses, surveys, and registries. In the section about Mical Observatory indicators the sistematization's results are presented and it's there where updated information about highly qualified migration coming from traditional and new sources can be accessed (<http://observatoriodiasporas.org/indicadores>). Amongst the traditional sources, the availability of new information, mainly from various population censuses of 2010 is highlighted. This is how tabulated data and micro data were found from the following censuses: Brazil (2010), Argentina (2010), Ecuador (2010), Mexico (2010), Panama (2010), and Uruguay (2010). Among new sources, the American Community Survey of the United States, the National Immigrants Survey of Spain in 2007, and the DIOC-OECD database from 2005 to 2006 stand out.

The information is presented in tables and maps and is sequenced according to its geographical coverage and target region, in accordance with the following details (outline 3):

Outline 3. Sources of information processed in creating indicators, by destination region

Destination region	Source
World	DIOC extended 3.0 database (circa 2000); OECD, *Education at a Glance* 2012
Europe	Eurostat, Spanish Continuous Municipal Census (1998-2011), the ENI from Spain in 2007, Ipums Project (France 2005)
United States of America	American Community Survey 2006-2011, DIOC extended 3.0 database (circa 2000)
Latin America	Brazilian Census 2010, Argentine Census 2010, Ecuadorian Census 2010, Panamanian Census 2010, Mexican Census (Ipums Project) 2011, Uruguayan Census, Imila-Celade

The search for statistical information about the mobility of the highly qualified population came across various difficulties, derived not only from problems inherent in measuring mobility and diverse definitions of the qualified population, but also from limitations of access to the information provided by censuses, surveys, and records. As such a set of recommendations aimed at improving the information systems are presented here to overcome the difficulties , some of which can also be drawn from other reports analysing the limitations of migration statistics (Santo Tomas *et al.,* 2009; IOM, 2012; Massé, 2013; OAS, 2012, 2011; Koolhaas, 2013):

1. To develop population registers that provide continuous information and, in doing so, overcome the limitations of population censuses.

2. To achieve greater methodological and conceptual quantitative harmonization and greater cooperation among countries and regions (mainly Latin America and Europe). To achieve the latter, applications for supra-regional coordination between technical agencies responsible for the production of statistics should be generated.
3. To strengthen international information systematization projects, by increasing their frequency extending their coverage to other regions (Imila) and incorporating a greater number of statistics (DIOC).
4. To spread micro-data dissemination practices undertaken by some Latin American (Uruguay, Brazil, Ecuador, etc.) and some European countries' national statistical departments, as for example Spain, without compromising on their commitment to protect statistical secrecy.
5. To use household surveys with large enough sample size, such as the American Community Survey, to make skilled migration studies feasible.
6. To implement specific surveys such as the 2007 National Immigrants Survey in Spain to enable study of the history of skilled migration and investigate the links between the skilled migrants and the countries of their origin.
7. Given that the available statistical sources capture temporary or circular movements inadequately, it is imperative to design new methodologies such as surveys specifically oriented towards acquiring information regarding individuals' migration trajectories and mobility.

Trends in skilled migration

The state of high skilled migration in 2000[4]

The aim of this section is to exhaustively characterize highly skilled migrants originating from Latin American and Caribbean countries between 1990 and 2000. With this purpose in mind, the main receiving countries and countries of origin (by birth of migrants) with the greatest emigration intensity have been identified.

The principal source of information used is the DIOC-OECD database, constructed on the basis of information supplied from the year 2000 survey round. In some specific cases, the presentation is accompanied by a comparison of information between the year 1999 and 2000. Unfortunately, a more recently updated data source is not available, given that only a few countries that completed censuses in the year 2010 have published their detailed results till date. Given this, the

4 This section is taken from Koolhaas, Prieto & Pellegrino (2013).

information used here is the most recent and exhaustive in terms of the number of residence and origin countries that it covers.

Despite these limitations of the sources, it is impossible to ignore the fact that in the last decade the number of people residing outside their countries of origin has doubled - with the number of people living in a country other than the one they were born in reaching 214 million in the year 2010 (IOM, 2011). This trend of the growth of migrant stock follows that of skilled migration, although it is not yet possible to quantify its overall growth.

The extended DIOC database identified 25.6 million immigrants with higher educational qualifications in the year 2000, of whom 17.9 million reside in OECD countries (7 out of 10). The United States is the main destination for world migration and for highly skilled migration in particular, bringing together more than 20 per cent of this group. In the year 2000, 31.4 million immigrants aged 15 years or above lived in the USA. In absolute terms, the second migrant-receiving country was Russia,[5] with 10.7 million people born in other countries living there. Germany, India, and France complete the list of the five countries with the largest number of people born abroad (table 1).

Having said that, considering only highly qualified migrants (holders of higher educational degrees), a collective that constituted 20 per cent of the total migrant population in the year 2000, the ordering of principal migration destinations presented in the first column of table 1 is slightly modified. In this case, the first five migrant-receiving countries in absolute terms were: the United States (8.2 million), Russia (2.3 million), Ukraine (2.2 million), Canada (2 million), and the United Kingdom (1.4 million) (table 1).

The 8.2 million highly qualified migrants included in the census of the United States in the year 2000 represented around 14per cent of the resident population who had completed higher education. This percentage was even higher in countries such as Macao, Israel, Luxembourg, Rwanda, Australia, Hong Kong, Switzerland, Canada, New Zealand, Ukraine, and the United Kingdom.

Two conditions are present in both Canada and the United States. On the one hand, there is their position as the principal world destinations for total migrations and for highly qualified migration in particular; and, on the other, the condition of having a high proportion of foreigners within the resident group. Of course, Australia and certain Eastern European countries that were part of the USSR (Estonia, Latvia and Russia), that together account for less than 20 % of international migration, have the highest proportions of migrant population

5 The case of Russia illustrates how changes in the territorial definition of a country, with the dissolution of the USSR, can significantly modify the estimate of the number of immigrants, given that those individuals born in ex-Soviet countries are now considered immigrants. In fact, in the list of the first 15 countries of birth for immigrants who live in Russia (with the sole exception of Russia) all correspond to ex-Soviet republics (in order of magnitude: Ukraine, Kazakhstan, Belarus, Uzbekistan, Azerbaijan, Georgia, Kyrgyzstan, Armenia, Tadzhikistan, Moldavia, Turkmenistan, Germany, Lithuania, and Estonia).

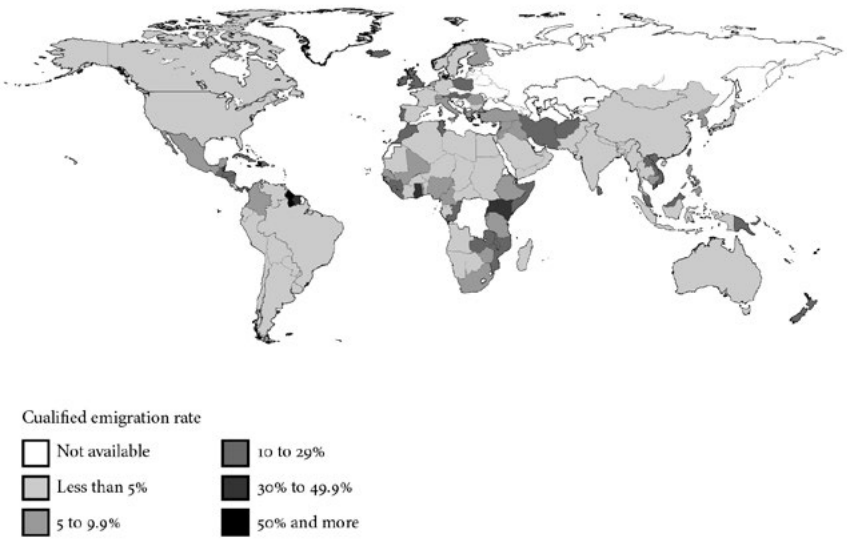
amongst their residents. In Australia or Hong Kong the population of migrants with a higher educational qualification makes up for more than 30 per cent of residents with the same educational level. In Israel, Rwanda, and Luxembourg, this proportion is more than 40 %.

Table 1. Principal destinations of total and qualified migrants in absolute figures, thousands of people (2000)

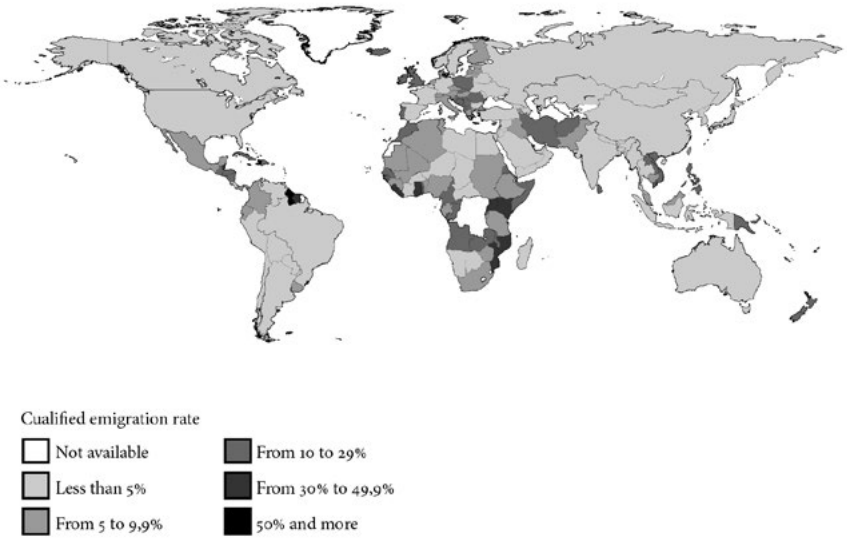
Country of residence	Total Immigrants 15 years old and above (in thousands)			Country of residence	Immigrants 15 years old and above who have completed higher education(in thousands)		
	Men	Women	Total		Men	Women	Total
United States of America	15.558	15.832	31.390	United States of America	4.143	4.060	8.203
Russia	5.360	5.348	10.709	Russia	1.172	1.138	2.310
Germany	3.942	3.894	7.836	Ukraine	890	1.296	2.186
India	3.031	2.846	5.877	Canada	1.005	1.028	2.033
France	2.773	2.828	5.600	United Kingdom	665	709	1.374
Canada	2.576	2.780	5.355	Germany	659	509	1.168
Ukraine	2.074	2.771	4.845	France	530	482	1.011
United Kingdom	2.103	2.401	4.503	Australia	446	451	897
Australia	1.906	1.954	3.860	Israel	318	384	702
Hong Kong	1.137	1.384	2.520	Spain	196	205	401
Rest of the world	18.135	19.317	37.449	Rest of the world	2797	2490	5288
Total	58.595	61.355	119.944	Total	12.822	12.752	25.573

Source: DIOC extended 3.0 database

Figure 1. Estimation of qualified emigration by country of origin
a) Migration rate of the highly qualified above 21 years of age, by country of origin, 1990

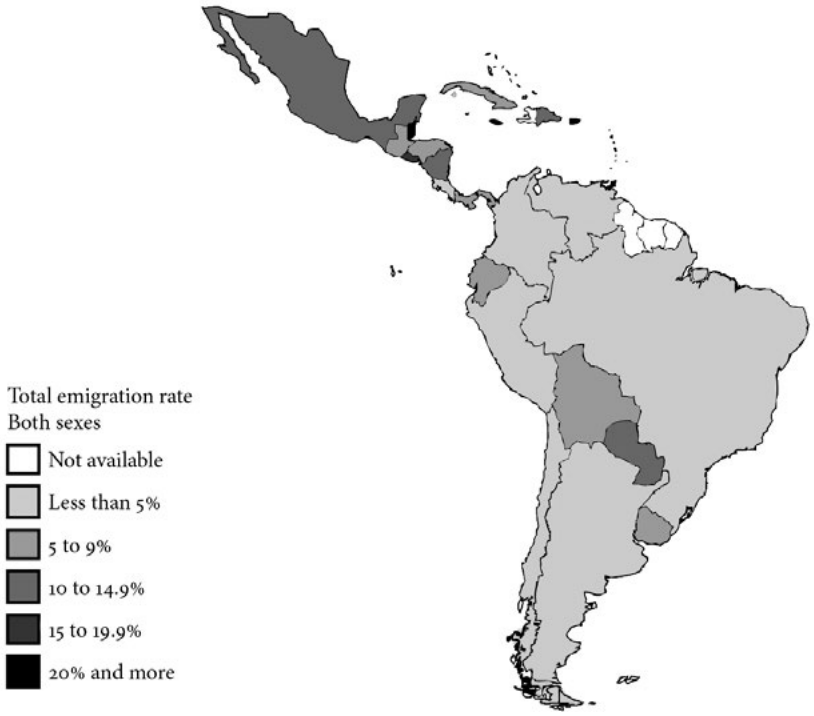


b) Migration rate of the highly qualified above 21 years of age, by country of origin, 2000

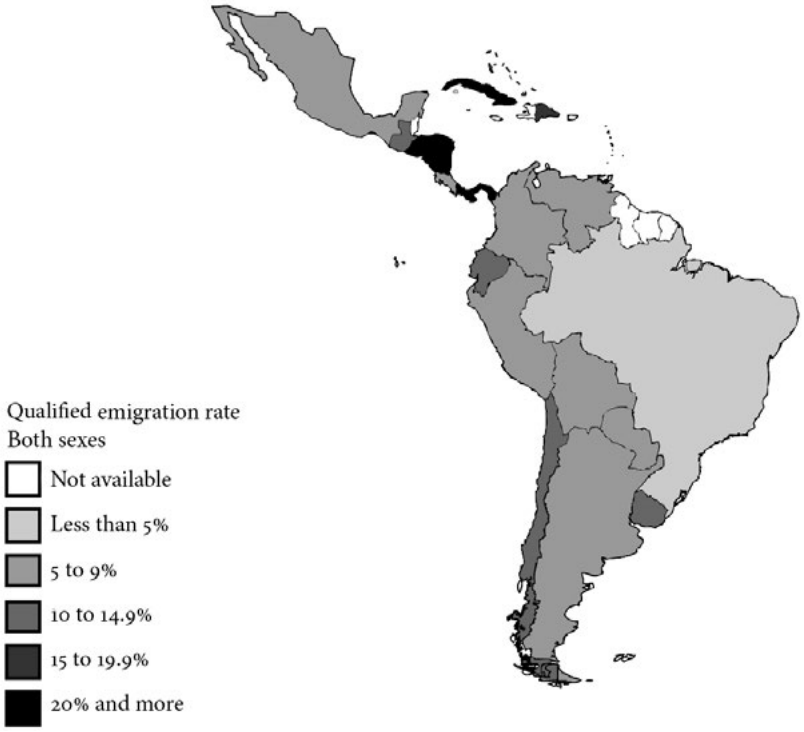


Source: Own creation with data from the *Brain Drain DataSet*, Beine *et al.* (2006).

Figure 2. Migration rates by country of origin, Latin American and the Caribbean, 2000*
a) Total migration rate, both sexes



b) Skilled migration rate, both sexes



* Rates are calculated as a quotient between the population born in the country of origin living abroad and the non-migrant population resident in the country of origin (excluding the foreign-born population residing in the country of origin).

Source: own creation with micro data from the DIOC-OECD 2.0 extended database.

The studies based on the DIOC database in turn have concluded that the countries of birth with the highest rates of high skill migration tend to be the smallest countries, especially those that are located in the Caribbean and in Africa (Dumont & Lemaitre, 2005; Lozano & Gandini, 2009; Dumont *et al.*, 2010). With this group of research projects, Beine *et al*'s (2006) study stands out. This piece of work presents an estimate of qualified migration in OECD countries according to the migrants' age at the time of arrival in these countries. The estimate was made for different groups of qualified people by their age at arrival in the host country. In this way, they were divided into separate groups that include a) those who arrived from the age of 0 years onward, b) those who arrived from the age of 12 years onward, c)those who arrived from the age of 18 years onward, and, finally, d) those who came at the age of 21 years and above. The last one is the group that is considered from here on to account for the skilled population drain from which developing countries suffer, the rationale being the fact that it is at this age that the probability of having acquired a higher educational qualification increases.

In the year 2000, the regions most affected by migration of the highly qualified to OECD countries were the Caribbean, Central America, South East Asia, New Zealand, and Africa. The most extreme case is that of Haiti where the proportion of educated people that resided outside the country represented 67 % of the educated population of Haiti in the year 1990, and 74 % in the year 2000. This phenomenon is also important, although to a lesser extent, even in some European countries such as Great Britain6, Portugal, and Eastern Europe, where more than 10 % of the population with a higher educational degree reside in OECD countries.

A comparison of the two maps in figure 2 leads to the conclusion that in the vast majority of Latin American and Caribbean countries, the skilled emigration rate is higher than the rate of total migration. With the exception of Mexico and Paraguay, in other countries there is a higher probability of migration for the skilled population (college graduates). In particular, this is true in the cases of Central American countries, Chile and Cuba, where the difference between skilled migration rates and migration rates of the total population are more pronounced. The Central American and Caribbean countries with high rates of skilled migration, numbering more than ten thousand, are Cuba, El Salvador, Guatemala, and the Dominican Republic. In South America, the cases of Ecuador, Chile, and Uruguay stand out (see figure 5).

In table 2, the proportion that skilled migration represents in the total population residing abroad, in accordance with the country of origin is shown. It is noted that there are marked differences in the educational level of migrants by country of birth. Venezuela, Panama, Argentina, Trinidad and Tobago, and

6 In fact, it is worth remembering that the preoccupation with the 'brain drain' began to acquire visibility in the 1970s, stemming from the high intensity of the phenomenon of migration of professionals born in the United Kingdom.

Peru have more than 25 % of college graduates residing abroad, a percentage that increases in receiving countries in the OECD. In contrast, countries like Mexico, Paraguay, El Salvador, and Guatemala have an unskilled migration profile, which is associated with the fact that the majority of their migrants change residence within the same region (Paraguayans predominantly move towards Argentina and Central Americans move towards the United States).[7]

Table2. Proportion of degree holders, 15 years or above with a high level of education, by destination region: Selected Latin American and Caribbean countries, 2000.

Place of birth	Total	Country of residence	
		Within the OECD	Outside the OECD
Venezuela	34,7	36,6	23,1
Panama	31,9	32,9	23
Argentina	30,4	32,3	23,3
Trinidad and Tobago	29,7	29,7	14,9
Peru	26,6	27,5	22,6
Cuba	24,9	24	42,5
Jamaica	24,9	24,2	24,4
Costa Rica	24,7	24,7	23,3
Brazil	23,3	26	9
Belize	20	20,4	10
Chile	19,7	30	11
Haiti	18	20	1,9
Uruguay	16,9	27,7	10,8
Colombia	16,1	24,9	6,6
Ecuador	15,3	15,2	15
Puerto Rico	14,9	14,9	35,6
Czech Republic	12,1	12,3	10,2
Bolivia	11,6	27,6	5,8
Nicaragua	11,5	18,1	4,5
Honduras	10,2	10,6	6,9
Guatemala	8,5	8,4	10,6
El Salvador	7,9	7,7	11,6
Mexico	5,8	5,7	24,9
Paraguay	4	23,3	2,8

Source: Authors, based on micro-data from the DIOC-OECD extended 2.0 database

7 Geographical distance tends to be positively associated with the educational selectivity of migration flows: flows between geographically adjacent countries are less selective by education level than the rest of the flows.

While emigration rates are higher for the skilled population than the unskilled, this pattern varies according to destination. In fact, when migration is towards developing countries, it is less selective by educational level, and when migration is towards OECD member countries, it tends to be of the more qualified. For this reason, with the exception of Cuba, Jamaica, Puerto Rico, and Mexico, where skilled migration is channelled mainly towards the United States, other countries in the region have OECD countries as their principal destination for skilled migration.

As for the demographic characteristics of skilled migration from Latin America, it follows the same pattern that is observed on a global scale: it has a predominantly male profile as compared to total migration. Apart from the cases of Mexico, Chile, the Dominican Republic, and Honduras where skilled migration is ; in the rest of the Latin American countries, the share of female migration decreases as the educational level of the flows increases.

Recent trends in highly skilled migration in Europe

The migration of the Latin Americans to Europe is not a new phenomenon. In the mid-twentieth century, at the end of the war that ravaged Europe, a reversal in the trend of the exodus of the European population to America was seen, followed by increases in the intensity of the flows of Latin American migrants to European countries. At present, it is estimated that, for each European person that resides in Latin America and the Caribbean there are 3.4 Latin Americans and Caribbeans residing in European Union countries (IOM, 2012).

Along with North America (USA and Canada) and Oceania (Australia), Europe is the other continent that has historically attracted the most qualified migrants, both in absolute and relative terms. Spain stands out in particular as such an attractor country for the flows of Latin American migrants. In the last decade, Spain has experienced an explosive growth in its migrant stock, irrespective of the migrants' educational levels. The 2005/2006 DIOC database allows this analysis to be extended to all European countries belonging to the OECD and therefore, for this analysis to include a number of very relevant destination countries as attractors of highly skilled migrants such as, among others, the United Kingdom, Germany, and France. Unfortunately, due to the characteristics of this source, it is impossible to conduct a detailed analysis by Latin American and Caribbean origin and destination country parameters. For this reason, an analysis is presented here of the magnitude of the stock of highly qualified immigrants resident in the European OECD-member countries, disaggregated by country of birth.

The growth experienced in European OECD-member countries during the first half of the last decade due to Latin American and Caribbean migration was remarkable. All Latin American and Caribbean countries, with the sole exception of Trinidad and Tobago, saw their native populations residing in Europe grow between the year 2000 and 2005/2006. A substantial group of origin countries,

amongst them Bolivia, Ecuador, Paraguay, Honduras, Uruguay, Argentina, and Colombia, has shown a growth in stock of immigrants in Spain by at least 100 %, which means that the number of expatriates living in European OECD-member countries has at least doubled. In general it could be said that the most explosive growth has been seen among individuals native to South American countries, while in case of Central American and Caribbean countries, this growth has been moderate.

In global terms, highly skilled migration of Latin Americans and Caribbeans towards Europe grew at a similar rhythm to that of medium-skilled and low-skilled migration between 2000 and 2005/2006. All the Latin American and Caribbean countries for which information is available saw a growth in the stock of highly skilled migrants residing in OECD-member European countries. In particular, growth of these highly qualified migrants born in Honduras (308 %), Paraguay (286 %), Ecuador (193 %), Haiti (154 %) and Argentina (150 %) is noticeable. The other two countries involved in the Cidesal project also show considerable growth, with increases in the order of 126 % for Colombia and 99 % for Uruguay. Argentina, Colombia, Costa Rica, Cuba, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Trinidad and Tobago, and Venezuela are further characterized by the fact that they show a higher growth rate in the stock of the highly skilled migrants compared to the total number of migrants. It is for this reason that an increase in the proportion of skilled migrants among the total number of migrants resident in Europe can be observed in table 3.

Another interesting phenomenon that can be seen in Table 3 is that during the first half of the past decade the focus of Latin American migration to Spain increased. With the exceptions of Colombia, Cuba, Ecuador, and Panama, the relative importance of Spain as a destination for emigrants increased for all countries. In any case, it appears that for most of the Latin American countries of origin, Spain accounts for at least half the stock of migrants living in Europe.

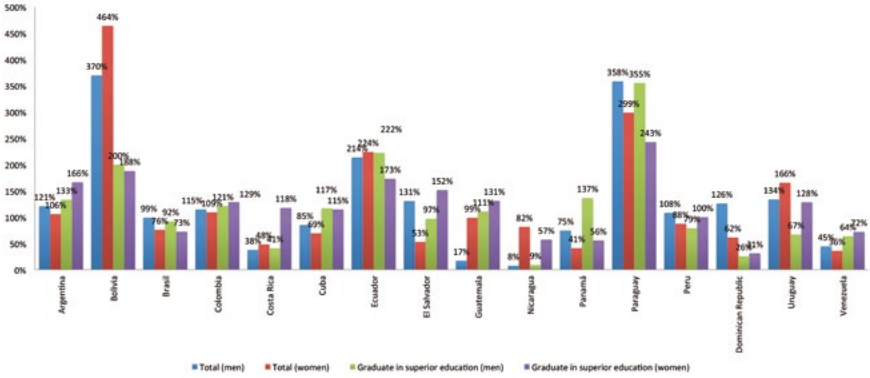
One interesting aspect in the study of migrants' profiles is gender composition. In this context, the question of whether a tendency in increasing intensity of migration of women compared to men is empirically proved arises. The data provided by figure 3 and table 2 in the annex present an approximate answer to this question in the case of Latin American migration to Europe during the first five years of the twenty-first century. In general, it could be said that the hypothesis that an increase in the component of women in migration flows in the case of Latin Americans in Europe is not proved. Dissimilar evolutions by country of birth are observed: while some countries show a decrease in the number of women, others register an increase. Among the group that recorded increase in the male ratio of resident immigrants in Europe, the cases of Argentina, Brazil, Cuba, El Salvador, Panama, Paraguay, Peru, Dominican Republic and Venezuela stand out.

Table 3. Indicators of migrant stock for Latin American migrants of 15 years or above resident in European OECD-member countries, by educational level and country of birth. 2000 and 2005/2006

Place of birth	2000				2005/2006				Percentage variation 2000-2005/06 Total	Percentage variation 2000-2005/06 highly skilled individuals	% of Highly skilled to total, 2000	% of Highly skilled to total, 2005-2006
	Total	Skilled individuals	Total resident in Spain	Residents in Spain as % of total	Total	Skilled individuals	Total resident in Spain (16+ years old)	Residents in Spain as % of total				
Argentina	170.391	48.755	92.680	54 %	362.898	122.028	236.825	65 %	113 %	150 %	29 %	34 %
Bolivia	20.451	5.066	12.360	60 %	106.458	14.898	121.275	114 %*	421 %	194 %	25 %	14 %
Brazil	167.420	40.684	29.280	17 %	309.123	73.069	83.827	27 %	85 %	80 %	24 %	24 %
Colombia	193.036	37.856	143.500	74 %	408.255	85.411	243.539	60 %	111 %	126 %	20 %	21 %
Costa Rica	3.580	1.292	1.200	34 %	5.154	2.322	1.927	37 %	44 %	80 %	36 %	45 %
Cuba	61.494	17.922	45.200	74 %	108.112	38.683	74.596	69 %	76 %	116 %	29 %	36 %
Ecuador	210.256	25.516	190.040	90 %	671.230	74.865	377.776	56 %	219 %	193 %	12 %	11 %
El Salvador	9.515	1.487	1.800	19 %	17.256	3.398	4.443	26 %	81 %	129 %	16 %	20 %
Guatemala	5.019	1.280	1.440	29 %	8.355	2.864	3.431	41 %	66 %	124 %	26 %	34 %
Haiti	21.554	2.385	300	1 %	35.634	6.058	--	--	65 %	154 %	11 %	17 %
Honduras	4.618	983	2.620	57 %	14.736	4.015	8.962	61 %	219 %	308 %	21 %	27 %
Jamaica	143.691	22.296	--	--	155.491	29.104	--	--	8 %	31 %	16 %	19 %
Nicaragua	3.104	1.252	1.020	33 %	4.770	1.706	3.734	78 %	54 %	36 %	40 %	36 %
Panama	4.469	1.874	2.120	47 %	6.896	3.518	3.144	46 %	54 %	88 %	42 %	51 %
Paraguay	4.596	1.047	2.100	46 %	19.366	4.042	28.172	145 %*	321 %	286 %	23 %	21 %
Peru	100.497	28.385	47.900	48 %	196.605	54.311	112.999	57 %	96 %	91 %	28 %	28 %
Dominican Republic	56.783	5.663	36.800	65 %	100.790	7.338	76.787	76 %	78 %	30 %	10 %	7 %
Tr. and Tobago	21.990	9.397	--	--	20.376	11.104	--	--	-7 %	18 %	43 %	54 %
Uruguay	33.310	8.985	21.780	65 %	83.425	17.842	65.630	79 %	150 %	99 %	27 %	21 %
Venezuela	123.775	34.383	60.160	49 %	173.329	57.962	109.875	63 %	40 %	69 %	28 %	33 %

* A percentage greater than 100 as seen in the cases of Bolivia and Paraguay reveals an inconsistency between the two data sources consulted (Municipal Spanish Census - figures up to January 1, 2006 and DIOC database) *Source:* Own calculations based on data from the extended DIOC 3.0 extended database (2000), DIOC-OECD 2005-2006 database, and the Municipal Spanish Census figures up to January 1 2006

Figure 3. Percentage variation in the total stock of migrants and skilled individuals for selected countries according to sex and educational level in the 2000-2005/2006 period



Source: Own calculations based on data from the extended DIOC 3.0 database (2000) and the DIOC 2005-2006 database

The Eurostat website provides information extracted from national statistical offices in some European countries[8] about distribution of Latin American immigrants in Europe in the year 2011 by country of residence. As discussed earlier, Spain is by far the largest recipient of immigrants from Latin America. All South American countries have Spain as their main European destination. Keeping in mind the constraint that information is not available for demographically and economically important countries like Germany, France and the United Kingdom, among the rest Brazil and Peru have a high proportion of immigrants in Italy, while Sweden and the Netherlands appear as other locations of importance to all South American countries (table 4).

The stock of migrants born in Argentina, Chile, and Uruguay, and resident in the European Union has increased very slightly in the last five years (2006-2011), with the exception of their stock in Spain. This is related to the fact that the increase in emigration from countries in the Southern Cone took place in the seventies (political exiles due to military dictatorships). However, a significant increase is noticed in the stock of South American migrants living in the European Union who were born in Brazil, Paraguay and the Andean countries. A significant increase in the number of immigrants born in Brazil is also seen in the Scandinavian countries, while in Spain there is a significant increase in the number of Paraguayans, Bolivians, and Peruvians (table 5).

8 Unfortunately, there is no information available for important European Union countries (Germany, France, the United Kingdom) and for others (Italy) the information is incomplete.

Table 4. Stock of South American immigrants resident in selected European Union countries by country of birth, according to country of residence (2011)*

Country of residence	Place of birth									
	Argentina	Bolivia	Brazil	Chile	Colombia	Ecuador	Paraguay	Peru	Uruguay	Venezuela
Belgium	1.970	945	9.227	4.004	4.839	4.358	358	3.073	432	1.089
Czech Republic	122	66	311	96	166	77	30	176	21	94
Denmark	1.081	429	3.012	1.455	2.947	550	74	989	208	616
Ireland	445	26	3.367	194	180	51	39	175	74	172
Italy	--	--	107.679	--	36.674	85.396	--	101.997	--	--
Latvia	25	--	40	6	9	3	2	8	3	38
The Netherlands	2.882	776	14.041	3.092	13.296	1.891	182	3.589	601	3.451
Poland	170	15	255	43	96	70	7	86	14	73
Slovenia	425	11	88	31	29	9	3	36	7	45
Finland	290	128	980	367	854	153	13	406	80	126
Sweden	2.868	3.762	6.005	28.378	10.531	1.992	180	6.738	2.247	865

* The information for Belgium corresponds to the year 2010
Source: Population Program based on Eurostat

Table 5. Percentage variation in stocks of South American immigrant residents in the European Union countries, by country of birth, and country of residence (2006-2011)

Country of residence	Country of birth									
	Argentina	Bolivia	Brazil	Chile	Colombia	Ecuador	Paraguay	Peru	Uruguay	Venezuela
Denmark	6.0 %	31.2 %	47.9 %	8.4 %	18.3 %	17.0 %	32.1 %	35.7 %	5.1 %	32.8 %
Spain	1.2 %	42.9 %	41.9 %	10.0 %	22.4 %	-0.9 %	192.8 %	55.9 %	10.9 %	23.8 %
The Netherlands	6.7 %	28.1 %	30.4 %	-2.6 %	11.1 %	23.4 %	8.3 %	24.7 %	-1.3 %	17.5 %
Slovenia	17.4 %	--	109.5 %	--	--	--	--	63.6 %	--	60.7 %
Finland	35.5 %	18.5 %	87.4 %	35.4 %	29 %	71.9 %	--	37.2 %	27 %	41.6 %
Sweden	5.8 %	40.3 %	34.7 %	2 %	18.4 %	43.2 %	22.4 %	22.2 %	-2.8 %	47.9 %

Source: Population Program based on Eurostat

A recent IOM report maintains that migration flows from Latin America towards the European Union increased significantly up until 2008, the year in which the focus of the flows originating in the Latin American continent dropped drastically, particularly in Spain (IOM, 2012b). This was a result of the economic

crisis in the region . Since the European crisis, this report identifies the beginning of three simultaneous processes:

> On the one hand, contrary to what was thought in some countries, a massive return of migrants towards the Latin American and Caribbean (LAC) region took place. In general, migrants decided to wait for the economic situation to improve in destination countries. In addition, some countries pushed measures to stimulate the return of migrants, particularly those who were unemployed. These measures bore very little in the way of results, as happened in the case of Spain. On the other hand, there is some anecdotal information that identifies a new flow of European immigration to the LAC countries, particularly from Spain and Portugal. In the first case, from June 2009 until November 2010, nearly 34,000 people emigrated to Argentina and more than 6000 emigrated to Chile and Uruguay (IOM, 2012b: 2)

The case of Spain: explosive growth of immigration until 2007 and significant decline in flows from 2009

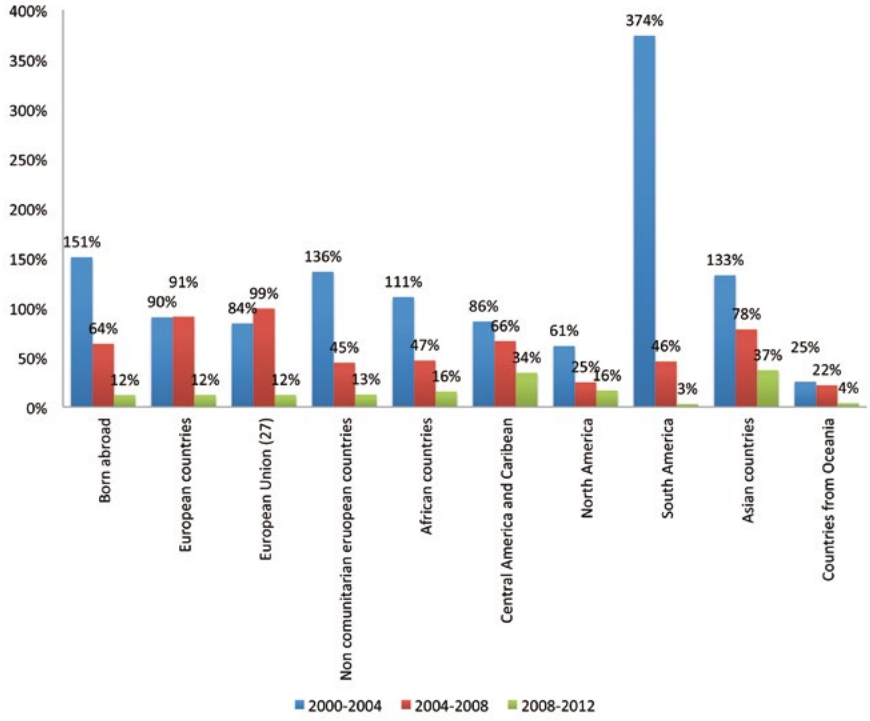
Spain is the largest recipient of migrant flows originating in Latin American countries. Although migration flows originating in Latin America with Spain as their destination have intensified significantly in recent times, they have a long history. A recent report (IOM, 2012b) categorised this migration process into four stages. The first stage was between 1960 and 1991, characterized by flows that originated mostly in Argentina, Chile and Uruguay. These were often politically motivated (in a particularly difficult and turbulent period for democracies in the Southern Cone). The second stage, between 1992 and 1999, was characterized by the predominance of flows of women that originated in Peru and the Dominican Republic. The third stage was from 2000 to 2005, when migration flows predominately originated in Ecuador and Colombia. Finally, the fourth phase was led largely by women, with migration originating mainly from Bolivia, Brazil and Paraguay (IOM, 2012b: 44)

Spain experienced an explosive growth in immigration in the last decade to the point that in mid-2000s international migration was the main determinant of population growth in the country. In 2008 the foreign-born population resident in Spain exceeded 6 million and represented 13 % of the resident population in the country. Four years later, the crisis led to a significant slowdown in the immigration growth rate, the result of a dual process of decline in foreign arrivals and increased return flows of migrants to their countries of origin. In any case, as of January 1st, 2012 the Continuous Municipal Census' figures have shown no decline in the stock of immigrants: the number of people born outside Spain had risen to 6.7 million, from 700,000 more than four years ago. This means that even in the above context, the net migration of the foreign born population in Spain has been positive; and therefore, more migrants have continued to arrive

compared to the number that left, but at a considerably lower rate than what existed before the crisis.

The above figures however hide the considerable differences by region of birth: immigrants born in South American countries (particularly Ecuador and Bolivia) were major players in the rapid growth of immigration seen between 2000 and 2004 while in the 2004-2008 period, it was the migrants from European Union countries who contributed to the growth, in relative terms. Meanwhile, in the most recent period (2008-2012), which is characterized by a low growth rate of immigration, it is observed that migrants born in Central America and the Caribbean had the highest growth rate.

Figure 4. Percentage variation of the stock of immigrants in Spain, by region of birth 2000-2004, 2004-2008 y 2008-2012 (on January 1st each year)



Source: Continuous Municipal Survey

Several factors help to explain the attraction of Spain for migrants in general and for Latinos in particular, at least until 2008. A study recently published by the IOM (Cerutti & Maguid, 2011: 20-23) analyses this said attraction in terms of three explanatory factors: 1) international context and migration policies; 2) historical reasons; and 3) economic and demographic factors. First, the authors emphasize that on the one hand, the events of September 11, 2001 that occurred in the United States influenced the migrants to choose from other less restrictive countries and

this coincided with a preference for Latin Americans in the Spanish immigration policy, reflected in regularization processes through the signing of several bilateral agreements and the no-visa requirement policy for Latin American migrants. Secondly, Latin Americans' preferences for Spanish citizenship can be explained by historical and cultural ties, the common language, and the attraction for the children and grandchildren of Spanish immigrants who arrived in Latin America in the first half of the twentieth century to become Spanish citizens. Thirdly, Cerruti & Magid (2011) highlight the demand for labour in Spain that was caused by rapid economic growth observed from the late nineties until 2008, in the context of a short supply of local workers.

From the perspective of the Latin American countries, one cannot fail to mention that the movement of the native population to Spain forms part of a strategy to try to alleviate the difficulties experienced by these people in their countries of origin in terms of unemployment and living conditions. Indeed, the nineties and the early twenty-first century witnessed a particularly complex economic and social context for many Latin American countries.

With respect to skilled migrants, the conclusions reached by a recent study on the migration of Uruguayan professionals to Spain conducted in the Cidesal project framework and based on a qualitative approach are illustrative (Bengochea & Tomassini, 2013). This research concluded that the main reasons for migration consist of finding opportunities and comparative advantages offered by working, training, developing academically in consolidated spaces, the prestige found abroad, and the opportunity available for full-time dedication to research. In particular, the study found that "in most cases migration is conceived as a temporary life project for the specific purpose of training and specialization" (2013: 197).

A complementary way to analyse the magnitude of immigration in Spain is to look at the intensity of influxes of immigrants from abroad. Since 2008, and more visibly from 2009 onwards, a decline is observed in the growth rate of immigration in migrants from all backgrounds and in those from Latin America in particular (table 6).

The existence of a register of inhabitants in Spain, the obligation that foreigners without a permanent residence permit have to renew their Census registration every two years, and the fact that Spanish nationals can exercise their right to vote when living abroad, mean that the INE of Spain has information that allows us to approximate the immigrant flow from Spain to other countries including the return migration of immigrants who have previously moved to Spain.

Information on the evolution of troughs by residential variation with a foreign destination suggests that a considerable increase in return migration has been established in recent years, together with an increase in emigration of Spanish nationals. Table 7 shows that for the period from 2003 to 2011, the maximum level

of departures to other countries was recorded in the years 2010 and 2011. This is in accordance with the context of serious economic crisis in Spain.[9]

Table 6. Peaks by residential variation with foreigners' origin by country and year. 2003-2011

Country of origin	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total	470.010	684.561	719.284	840.844	958.266	726.009	498.977	464.443	454.686
Europe	180.137	251.140	263.497	307.089	390.378	197.578	147.115	150.098	149.450
EU	155.774	221.520	234.014	275.351	356.837	172.449	128.246	131.277	129.094
Rest of europe	24.363	29.620	29.483	31.738	33.541	25.129	18.869	18.821	20.356
Africa	59.775	90.969	102.324	92.277	110.848	105.530	64.502	42.042	38.186
America	215.034	189.267	215.047	285.527	302.058	234.718	131.589	107.986	110.396
Argentina	29.626	26.852	26.874	25.966	23.651	17.786	9.424	7.875	6.592
Bolivia	18.375	35.655	38.654	69.796	46.323	8.835	4.265	2.874	3.228
Brazil	8.240	14.092	21.860	29.272	32.901	22.715	11.023	8.670	7.239
Colombia	11.602	17.413	21.351	28.650	36.434	34.577	19.469	12.622	11.608
Chile	4.778	6.164	7.731	8.959	8.844	5.939	3.539	3.220	2.870
Ecuador	73.139	12.206	11.830	14.584	25.008	29.743	11.436	5.159	5.119
Paraguay	2.507	8.722	11.272	19.951	22.366	18.247	10.954	9.324	7.145
Peru	13.751	13.461	17.563	19.384	25.093	27.788	13.249	7.520	6.917
Uruguay	11.451	11.456	8.142	8.941	8.560	5.425	2.024	1.757	1.540
Venezuela	18.411	15.039	15.071	14.452	16.761	13.101	9.261	10.827	10.576
Rest of America	25.628	31.678	40.008	56.630	72.084	61.257	45.286	48.140	59.747
Asia	14.670	26.967	33.710	31.955	41.610	45.448	30.956	35.251	30.967
Oceania	394	524	704	865	746	767	623	638	791

Source: Author, based on data from INE, Spain.

Having said that, the question arises as to what happened with the highly skilled migration in Spain? Is there empirical evidence that enables us to see how this type of migration has evolved in comparison to low-skilled and medium-skilled migration? Unfortunately, no specific data covering the recent post-crisis period exists, but statistics about the moment when immigration reached its peak do exist, which is of interest in updating the statistical outlook offered by DIOC.

9 While the increased flow of outputs to other countries is verified, this does not mean that the revenue stream was lower or therefore, that the migration balance was negative. In fact, looking at the stock statistics mentioned earlier, a very slight increase in foreign immigration in Spain is established between January 1, 2008 and January 1, 2012 (see figure 4).

Table 7. Troughs by residential variation with foreigners' destination by country and year. 2003-2011

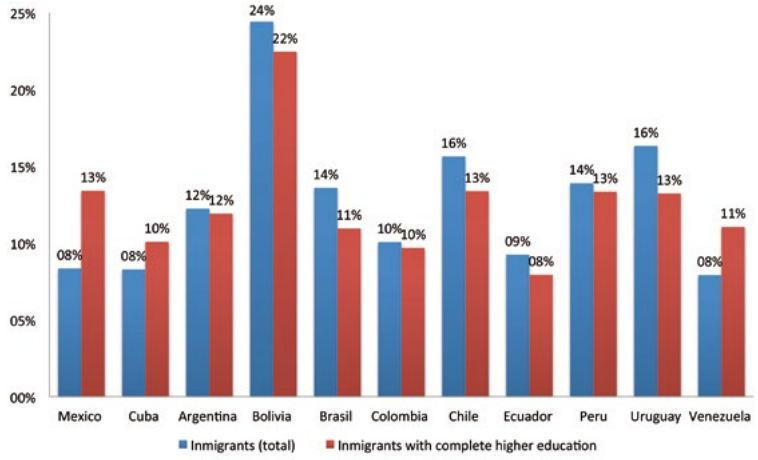
Destination country	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total	25.959	55.092	68.011	142.296	227.065	266.460	323.641	373.954	370.540
Europe	14.481	14.963	20.033	23.507	29.941	36.148	35.427	36.466	44.138
EU	11.858	12.112	16.691	20.365	26.252	31.740	31.576	32.204	38.374
Rest of Europe	2.623	2.851	3.342	3.142	3.689	4.408	3.851	4.262	5.764
Africa	1.477	1.880	3.010	3.752	4.462	5.332	6.040	6.186	6.504
America	9.178	9.070	12.623	15.978	20.490	26.993	29.440	29.319	36.618
Argentina	1.122	1.456	2.261	2.392	2.809	3.432	3.850	3.367	3.943
Bolivia	301	496	846	1.430	2.559	3.436	3.622	2.792	2.518
Brazil	861	374	589	1.089	1.585	2.432	2.092	2.264	2.742
Colombia	794	768	942	1.365	1.425	1.936	2.129	2.231	2.696
Chile	390	348	708	876	900	1.013	970	1.169	1.575
Ecuador	1.414	1.457	1.254	1.347	1.220	1.693	3.027	4.292	6.668
Paraguay	43	109	192	370	795	1.022	856	867	1.037
Peru	279	288	355	482	720	1.017	1.333	1.292	1.884
Uruguay	206	282	383	478	582	782	1.160	969	1.014
Venezuela	496	811	1.119	1.279	1.434	2.130	2.328	2.376	2.798
Other America	3.272	2.681	3.974	4.870	6.461	8.100	8.073	7.700	9.743
Asia	704	721	1.214	1.815	2.485	3.170	3.269	3.154	4.539
Oceania	119	28.458	31.131	40.642	35.002	52.502	95.252	135.314	139.518
Unknown country	0	28.355	31.001	40.439	34.664	52.069	94.850	134.790	138.972
Troughs by expiry	0	0	0	56.602	134.685	142.315	154.213	163.515	139.223

Source: Created on the basis of data from National Statistics Institute (INE), Spain.

The 2007 National Immigrants Survey enables us to get closer to the knowledge about the evolution of the 2006-2007 period, by disaggregating statistics by educational level. During this period, all Latin American countries presented considerable growth in their stock of migrants in Spain; both highly skilled and medium as well as low-skilled migrants. While Mexico, Cuba, and Venezuela recorded a more elevated rate of growth amongst migrants holding higher educational qualifications, the rest of the South American countries (Argentina, Brazil, Bolivia, Colombia, Chile, Ecuador, Paraguay, Peru, and Uruguay) exhibited a

higher level of total migration in comparison to skilled migration (figure 5).[10] For this reason, while the percentage of qualified migration increased as compared to total migration for the first group, it decreased for the second group.

Figure 5. Annual growth rates of all migrants and skilled migrants resident in Spain by selected countries of birth, 2000-2007



Source: National Immigrants Survey processing 2007 and the 2000 DIOC-OECD database

Concluding remarks

The aim of this chapter was to offer a descriptive presentation of the recent, principal trends of skilled migration originating in Latin American countries. Although many difficulties still persist in measuring skilled migration, some progress has been made towards statistical enumeration of the Latin American migrants for the two main destination countries of Spain and the United States. These advances allow an updated view of the number of skilled migrants born in Latin American countries residing in both countries. Nonetheless, to have a complete view that covers the majority of migrant-receiving countries, it is necessary to turn to systematized census data from the 2000 round in the DIOC database.

With regard to the magnitude of the world-wide skilled migration that census data shows, African countries are the most affected by emigration of skilled individuals. In Latin America, the countries with the highest rates of skilled emigration tend to be the Caribbean and Central American countries. In particular, Uruguay stands out as having one of the highest rates of skilled emigration in South America, although from a distance, the figures show other countries as being more affected.

10 It should be noted, however, that in both Argentina and Colombia differences between the growth of total migration and skilled migration are practically negligible.

From the perspective of the receiving countries, in absolute terms the United States continues to be the main attractor country for global skilled migrant flows. Moreover, information updated after the crisis suggests that skilled immigration into the United States has not diminished. One possible explanation is that, different from other developed receiving countries, in the USA the majority of migrants enter through family reunification programs and a lower percentage enters through the economic criteria of labour market requirements.

The global map of skilled migration continues to show considerable differences by educational level according to migrant destination countries. Long-distance migration and migration to developed countries tends to be more selective by educational level than migration to bordering countries or to countries at a short distance. Associated with this relatively stylized pattern, it appears that skilled migration destinations are much more diversified than those of migration in general, which further complicates its quantification and characterization. The case of Uruguayan emigrants illustrates this point well. While skilled Uruguayans that migrate retain the preferences shown by all Uruguayan migrants in choosing Spain, USA, Argentina and Brazil, they have also added other important developed countries such as Israel, Canada, France and Australia, etc. as destination.

As for the future, it is a reality that the availability of skilled resources is a fundamental requirement for development and that skilled migration is an important goal not only in developed countries but also in emerging developed countries, and competition between those countries that have a demand for skills will continue.

There are arguments to support the conclusion that skilled migration will continue and that in some cases it will increase. This type of migration is in line with the measures taken to combat the economic crisis in many developed migrant receiving countries, and that involve an increase in competitiveness and innovation, from which a definite demand for skilled manpower arises. In addition, there are structural demographic reasons that go beyond the current economic climate, and that respond to the progressive reduction of the native population of working age and to the increase in the number of individuals who reach retirement age and increase financial pressure on the pension system. In many cases, receiving countries that are experiencing this ageing process are doing so as a result of two other processes: on the one hand, there is an increase in survival rates and, on the other, the withdrawal from economic activity on the part of numerous generations, the so-called 'baby boomers'.[11]

While the favourable Latin American labour market context and in particular the lack of skilled labour can generate incentives to take measures to counter the loss of highly skilled human resources, the fact is that large asymmetries persist

11 'Baby boomers' are those people who belong to generations that came along in the post Second World War years, when there was considerable growth in births in developed countries. This phenomenon was called 'the baby boom'.

between origin and destination labour markets. These imbalances exist not only in terms of wages, but also in other dimensions valued by professionals related to working conditions and the opportunity for professional development. Therefore, in the short and medium term, no substantial change can be expected in the historical trend that for Latin American countries there is a recorded positive correlation between the intensity of emigration and educational level.

Thus, skilled migration will continue to be an important problem in migrants' origin countries. These countries should have working conditions and infrastructure that create conditions that allow qualified people to continue in their countries of origin. High emigration intensity of a highly skilled native population can seriously undermine efforts to establish a critical mass in science and technology, a situation that some Latin American countries are currently facing.

Finally, it is important to reiterate the importance of improving national statistical systems in the area of international migration and the mobility of highly skilled people. Although the last decade has produced remarkable advances in this area, much remains to be done in terms of the availability of timely and reliable information to serve as input for the design and implementation of proactive policies in origin countries to try and maximize the potential benefits of linking with highly skilled migrants.

References

Bay, G. & Martínez Pizarro, J. (2005). "Una iniciativa pionera: el programa Imila del Celade en América Latina". Santiago de Chile, junio, available at <http://demoscope.ru/weekly/knigi/tours_2005/papers/iussp2005s51517.pdf> (last accessed: 3/5/2014).

Beine, M.; Docquier, F. & Rappaport, H. (2006). "Measuring international skilled migration: new estimates controlling for age of entry". *World Bank Research Report*.

Bengochea, J. & Tomassini, C. (2013). "La migración calificada en Uruguay: el desafío de la movilidad y el retorno". In Pellegrino, A.; Bengochea, J. & Koolhaas, M. (coords.), *La migración calificada desde América Latina. Tendencias y consecuencias*. Montevideo: Ediciones Trilce.

Cerruti, M. & Maguid, A. (2011). "Migrantes sudamericanos en España: Tendencias recientes y perfil de sus migrantes". In International Organization for Migration (iom). *Migrantes sudamericanos en España: panorama y políticas. Cuadernos Migratorios*, 1. Buenos Aires: iom, available at <http://media.wix.com/ugd/a4c774_86235b922c28cca8ef48ec7c1f53f3ba.pdf> (last accessed: 3/5/2014).

Dumont, J.-Ch. & Lemaitre, G. (2005). *Counting Immigrants and Expatriates in oecd countries: a new perspective*. Paris: oecd, available at <http://www.oecd.org/els/socialpoliciesanddata/35043046.pdf> (last accessed: 3/5/2014).

Dumont, J.-Ch., Spielvogel, G. & Widmaier, S. (2010). "International Migrants in Developed, Emerging and Developing Countries: An Extended Profile". *oecd Social, Employment and Migration Working Papers*, 114, available at <www.oecd.org/els/workingpapers> (las visit: 3/5/2014).

International Organization for Migrations (iom) (2012a). *Evaluación rápida de las estructuras de recolección de datos en el área de las migraciones en América Latina y los países del Caribe.* Bruselas: iom, available at <http://publications.iom.int/bookstore/free/Estudio_Evalucion_rapida_final.pdf> (last accessed: 3/5/2014).

———— (2012b). "Rutas y dinámicas migratorias entre los países de América Latina y el Caribe (alc), y entre alc y la Unión Europea", available at <http://publications.iom.int/bookstore/free/Rutas_Migratorias_Final.pdf> (last accessed: 3/5/2014).

Koolhaas, M. (2013) "Estadísticas de migraciones internacionales laborales en el Mercosur: situación actual y desafíos para la armonización". Non-published documento elaborated for the International Labour Organization (ilo), Buenos Aires' Office. Buenos Aires: oit.

———— Prieto, V. & Pellegrino, A. (2013). "Distribución territorial y características demográficas de la migración calificada". In Pellegrino, A.; Bengochea, J. & Koolhaas, M. (coords.), *La migración calificada desde América Latina. Tendencias y consecuencias*. Montevideo: Ediciones Trilce.

Lozano, F. & Gandini, L. (2009). "La emigración de recursos humanos calificados desde países de América Latina y el Caribe", presented at the regional reunion *La emigración de recursos humanos calificados desde países de América Latina y el Caribe*, Caracas, June, 17-18, sela-iom, available at <http://rimd.reduaz.mx/secciones_documentos/859T023600003722-0-La_emigracion_de_recursos_humanos_calificados_desde_alc.pdf> (last accessed: 29/5/2014).

Massé, G. (2013). *Los sistemas de información en Migraciones Internacionales en los países de América del Sur*. Buenos Aires: iom-Oficina Regional para América del Sur, available at: <http://www.flacsoandes.edu.ec/sima/images/3-Los_sistemas_de_informacin_-_G._Masse_-_ultimo_y_final_nov.13.pdf> (last accessed: 18/5/2015).

Organization of American States (oas) (2011). *Migración internacional en las Américas. Primer Informe del Sistema Continuo de Reportes sobre Migración Internacional en las Américas (Sicremi)*. Washington: oas-cepal-oecd, available at <http://www.migracionoea.org/sicremi/> (last accessed: 3/5/2014).

——————— (2012) *Migración internacional en las Américas. Segundo Informe del Sistema Continuo de Reportes sobre Migración Internacional en las Américas (Sicremi)*. Washington: oas-cepal-oecd, available at <http://www.migracionoea.org/sicremi/> (las visit: 3/5/2014).

Santo Tomas, P. A.; Summers, L. H. & Clemens, M. (2009). "Los migrantes cuentan. Cinco pasos para la obtención de mejores datos migratorios". Washington: Centre for Global Development, available at <http://www.cgdev.org/doc/Working %20 Papers/cgd_migration-final_01-19-10_sp.pdf> (last accessed: 3/5/2014).

Chapter 2

The Web of Science: a new window to watch mobility

Jean-Baptiste Meyer

In collaboration with Fan Wang Miao and Yue Zhao[1]

Introduction

An important challenge of the Cidesal Project was the exploration of new modes of access to the diaspora, in order to understand it better and to mobilize it more carefully. A special survey was designed to this effect, seeking to distance itself from the traditional channels of information such as: the web sites of associations of migrant professionals; the consular and diplomatic records; and the interpersonal contacts of expatriates, accessible through the "snowball effect".

The originality of this survey rests on the Web of Science, a complete innovative source for online database. This new avenue opens the way to a systematic and independent analysis, away from pre-existing networks. This chapter explains the very special methodology developed for this purpose. Then the sample populations used for the survey will be described and characterized. Their movements form the subject of a sequential, spatial analysis. The trajectories of circular (returned) and diaspora (settled abroad) migrants will then be differentiated. Finally,

1 Apart from the work in data analysis and processing by the authors, this study required a number of other diverse skills:
- the extraction of the co-publication data from the Web of Science, carried out by Doriane Lemeltier, Engineer for the Atomic Energy Commission in France;
- the presentation and on line placement of the questionnaire, carried out by Alejandro Blanco, Consultant on diasporas, in Bogota, Colombia;
- the design, planning and execution of the procedures for the mass e-mailing to 37,000 authors concerned, undertaken by Fabrice Thomas Ferre of the IRD and Baptiste Billiot from the information technology company Osiatis;
- the removal of duplícate references of co-authors, conducted by Hanka Hensens, documentalist at the IRD;
- the mapping carried out by Stéphane Coursière, from the Laboratoire ArtDev at the University of Montpellier 3.

Without their skills and collaboration, such a study could not have been completed. We would like to express our profound gratitude for their contributions.

in the last part, lessons learned from the new methods and experimental instruments in this exercise will be discussed.

Part 1. Methodology

Objective of the survey

The survey "Mobility by the WoS" aims to draw information from the Web of Science (Thomson Reuters) on the migrations of the researchers and engineers whose publications are listed. This database assembles the addresses of the authors who published the scientific works.[2] Consequently, their place of work was located through the institutional affiliation indicated. We were thus able to obtain the co-publications authored by the nationals of the three countries under study (Argentina, Colombia and Uruguay) with their co-authors from other countries that were published during the past decade (2000-2010). The logic behind this extraction was that the cooperation among these three countries and the rest of the world, as reflected in the co-publication of research results, is associated with the migration of academics, previous or current. If this were the case, diaspora links could then be located and traced from these publications that were systematically listed.

This hypothesis is not gratuitous. A certain number of works during the last decade observed significant correlations between the proportions of co-publications of authors from certain countries and the current or deferred presence of these researchers in the foreign countries with whom they have published articles (Regets, 2001; Agarwal, Kapur & Mc Hale, 2003; Lowell Gerova, 2004; Jin *et al.,* 2007). Thus, the co-publications of Uruguay and Germany, for example, incorporate more frequently than normally authors who have returned to Uruguay after a stay in Germany as well as Uruguayan authors who are expatriates in this country. Starting with a corpus of co-publications of a country with the rest of the world also makes it possible to circumscribe a diaspora and potentially mobile population, without addressing an unlimited and anonymous universe (the *cyberworld*) or networks that are predetermined by existing social actors (official consular records or members' lists of associations).

This prospection approach has never been explored before. The correlation between the rate of co-production and migration intensity has till now been deduced statistically but not exploited to identify, locate and contact individuals on the move. It is this exercise that we undertook in the present survey.

This approach has several advantages:

2 See <http://science.thomsonreuters.com/es/productos/wos/> (last accessed: 28/6/2014).

- it consists of taking a random sample from a limited world – that of producers of scientific and technical results – guaranteeing the viability of the survey and the neutrality of the sample;
- it impacts a general population (in the field of R&D authors) who are not pre-selected for their proven links with their country of origin nor for their membership in some thematic, geographical, professional or social sub-group; and
- it allows direct access to individuals and contact with them, opening up the possibility of a sustainable link and not a simple transitory exchange.

A fundamental choice was made from the beginning: that of emphasizing relationships rather than the most complete flow of information possible, in accordance with the objectives of the Cidesal Project. In fact, the goal of this approach was not to accumulate a plethora of information but to obtain useful information on development, in particular on the links with the diaspora. For this reason, a simple, modest questionnaire of around 20 questions was drawn up (see appendix 1). It ends with a request for the address of the person in order to establish a sustainable link, to pursue the investigation or to participate in actions to support their countries of origin.

Population surveyed and process of access

To find mobile Argentine, Colombian and Uruguayan researchers and engineers, we extracted all the joint publications of the three countries of which they are nationals, together with their foreign co-authors. Over a period of 10 years, this constitutes a large number of publications: 66,256, 12,554 and 5,576, respectively for each of the countries. Each of these indicates a corresponding author and address (from whom a reprint may be requested) whom anyone may contact, in order to interact with the producers of these scientific results. For the publications produced over the period studied (2000-2010), only some of these corresponding authors had an e-mail address recorded in the database of the WoS. For logistical reasons, we limited ourselves to this group of authors who could be contacted by e-mail. This constituted lists of 28,313 authors for Argentina, 6,047 for Colombia and 2,669 for Uruguay. A personal message was addressed to each of them, mentioning the title, year and support (journal) of the publication of which they were co-authors, the names of their colleagues associated with it and our request that they forward our invitation to them (see appendix 2). This invitation followed in the body of the message and referred each national of the three countries under study to a website where the survey questionnaire could be completed (active link).

On the site corresponding to this link, which is that of the Mical observatory,[3] four short pages of open and closed questions could be filled in. The results were

3 See <www.observatoriodiasporas.org>.

immediately accessible on the website of a service company that gathers and files data.[4] On this website, not only could data be displayed and downloaded, but the number of visits to each of the three questionnaires (one for each country) could also be observed and thus the number of those who activated the link in the invitation be compared with those who actually responded. This enabled us to assess the valid response rate of the population sample that felt they were concerned.

Table 1. Scientific publications of migrant researchers

	Argentina	Colombia	Uruguay
Joint publications, period 2000-2009	66,256	12,554	5,576
E-mail address of the corresponding authors	28,313	6,047	2,669
Invalid returns	4,800 (17 %)	998 (16.5 %)	368 (13.8 %)
Effectively contacted	23,513	5,049	2,301
Number of co-authors	58,084	17,265	7,122
Co-authors finally contacted (estimation)	48,210	14,416	6,125
Visits to the questionnaire	4,507 (9.5 %)	2,046 (14 %)	696 (11.5 %)
Valid responses effectively received	795 (17.7 %)	392 (19.1 %)	128 (18.4 %)

Source: own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

Several observations on this process of collecting data should be made:

- for the period under study, the availability of e-mail addresses was limited to the latter part of the decade;
- a certain number of our e-mail messages were returned due to inaccurate or old addresses (rejection rate of about 15 %);
- all the names of the co-authors from the WoS were listed, then duplicates if any were eliminated in order to accurately estimate the extent of the total population sample, to which we applied a rejection rate to subtract the probable number of those who could not be contacted;
- as it was not possible to monitor the effective contact between the corresponding authors and their co-authors, we do not know how many of these latter were reached;
- the proportion of those who reacted (between just under 10 % and nearly 15 %) cannot, as a result, be interpreted as significant for the numbers of qualified migrants sponsored by international cooperation agencies;
- the response rate (just under 20 %) is quite respectable for a survey of this type, in the absence of any reminder messages or previous contacts.

4 See <www.encuestafacil.com>.

In the last part of this chapter, some avenues suggested by this new experimental practice for the purpose of studying and managing migrations and diasporas are explored.

Part 2. The populations

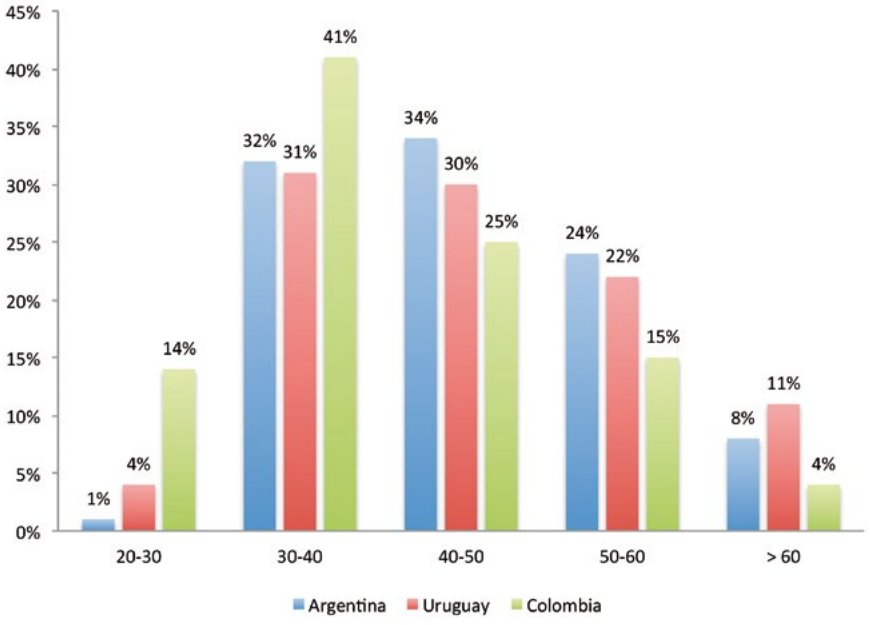
Age and gender

Argentina and Uruguay have a similar profile, with large number of population in categories of over 40 years of age. The population of Colombian researchers is younger, owing to a different history (no military dictatorships during the 70s and an academic system that is more recent than that of the Southern Cone).

The average age of respondents are: Argentines, 45 years; Colombians, 40 years; and Uruguayans, 45 years.

On the whole, the sample population is active and experienced, with a majority of Colombians younger than 40 years while the opposite is the case for those from the Southern Cone.

Figure 1. Age groups

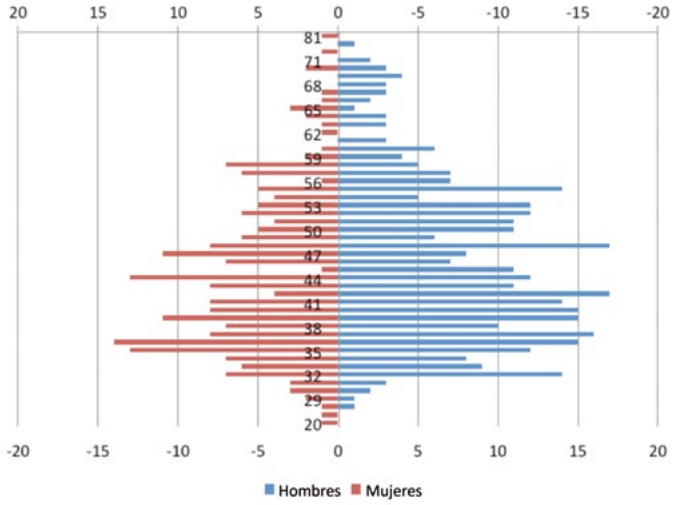


Source: own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

According to figure 1, the predominance of the male gender is clear in all the three countries: Argentina: 62 %; Colombia: 68 %; and Uruguay: 70 %. However,

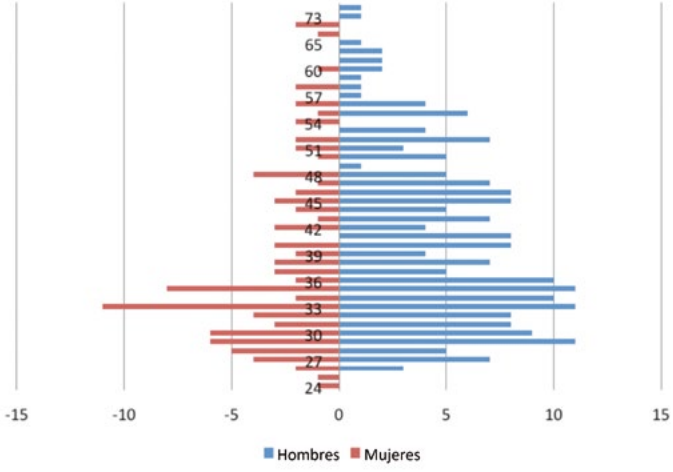
the age pyramids show a substantial change with the increased participation of women over time. In the youngest age groups, women are sometimes in the majority.

Figure 2a. Age groups. Argentina



Source: own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

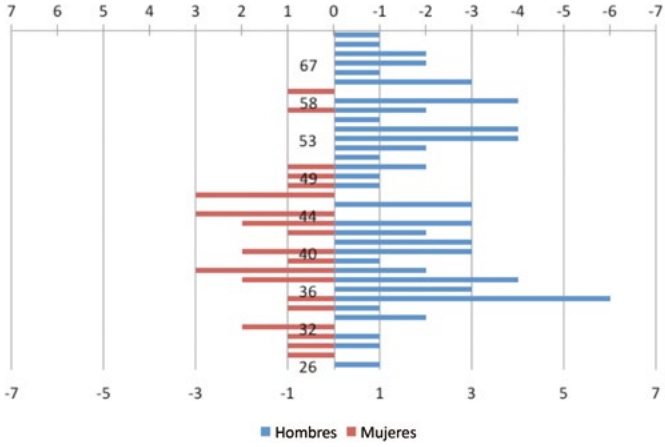
Figure 2b. Age groups. Colombia



Source: own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

The feminization of skilled migrants, identified elsewhere (OECD, 2012), is thus confirmed and re-stated here. This concerns the population samples that are less than 36 years, and it increases erratically and discontinuously, as witnessed from the younger age groups where the majority is male (as of now).

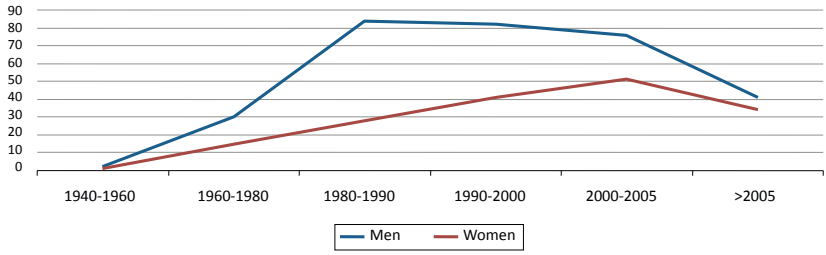
Figure 2c. Age groups. Uruguay



Source: own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

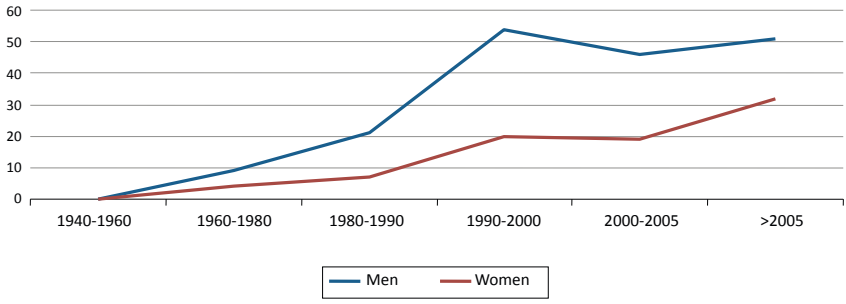
A detailed analysis of the evolution of migration was carried out by cross-tabulating the age of migrants on their departure and the gender of migrants surveyed. This made it possible to show the recent feminization of qualified migrants. During the period 2000-2005, the numbers of women migrants caught up with those of the men. Statistics from later years (2005-2010) and those from Uruguay include a very small number which made it difficult to take them into consideration statistically in a similar way.

Figure 3a. Gender and year of departure from the country. Argentina



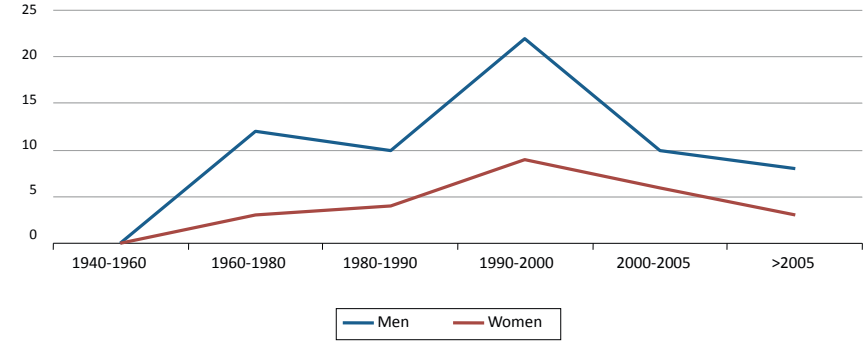
Source: own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

Figure 3b. Gender and year of departure from the country. Colombia



Source: own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

Figure 3c. Gender and year of departure from the country. Uruguay

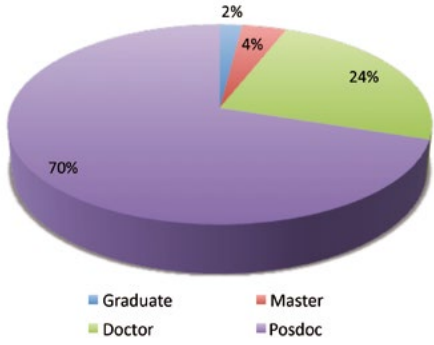


Source: own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

Educational levels

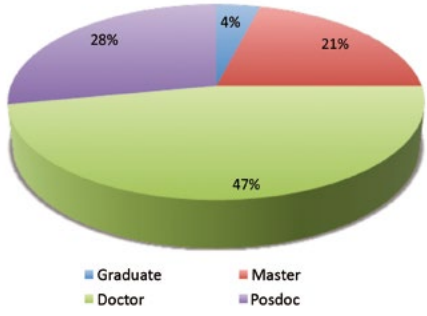
The degrees of respondents surveyed are unsurprisingly very advanced, as this is a population group that is involved in activities of research and development, as it is shown in figures 4 a, b and c.

Figure 4a. Level of education attained. Argentines



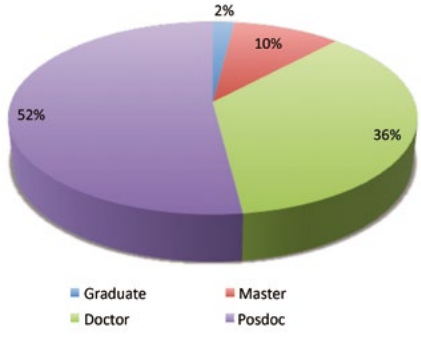
Source: own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

Figure 4b. Level of education attained. Colombians



Source: own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

Figure 4c. Level of education attained. Uruguayans



Source: own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

For the respondents from Argentina and Uruguay, over half of those surveyed have a post-doctoral level of education. Those who do not have a doctorate are a small minority. For those from Colombia, they represent a quarter of the studied population.

These differences are partly related to their age: the age group of 20 to 30 years represents over 10 % of those from Colombia while it is minimal for those from Uruguay and tiny for those from Argentina. However, there is also an educational factor that is specific to these countries, with the presence of doctoral programs, local or otherwise, which also have an effect on these migratory movements. In Argentina, where doctoral training has been present for a long time and enjoys international recognition, graduates today leave the country to do post-doctoral training and research in the same way they used to for doctoral training. In contrast, doctoral training abroad is crucial for Colombia; indeed, it is essential for many disciplines which hardly exist or have been set up only very recently.

In addition, the distinction between expatriates and returnees has different implications for Argentina and Colombia. For Argentina, expatriation, without any ambiguity, is correlated with a higher level of education: those who do not have their doctorates represent 8 % of residents but only 5 % of expatriates, while the rate of post-doctoral training is less than 2/3 for residents but over 3/4 for expatriates.

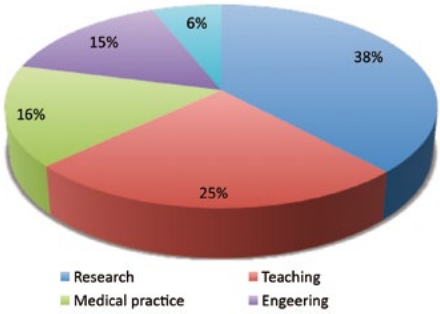
For the Colombians, the situation is less obvious: the rate of post-doctoral students in the diaspora is high in comparison with that of residents (1/3 vs 1/4) but the rate of those who do not have a doctorate is also high (nearly 1/3 vs 1/5).

Lastly, the distinction by gender reveals a slight difference: among the highest degrees (post-doctoral in all three countries and doctoral also in Colombia and Uruguay) the male population is slightly over-represented among the junior degree holders (Master's and Bachelor's). The age factor plays a role in this current difference which could decline in the near future since the proportion of females is higher in the age groups whose training is not yet complete (20-35 years).

Professions and fields of work

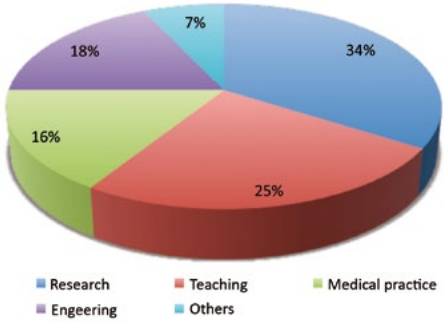
The professional sectors that are the most mobile are those of research, teaching (often confused with the first), engineering and medical practice. Over and above academic research, the work of these actors consequently involves activities in development and the application of knowledge to areas that are important for society (figures 5 a, b and c).

Figure 5a. Professions. Argentines



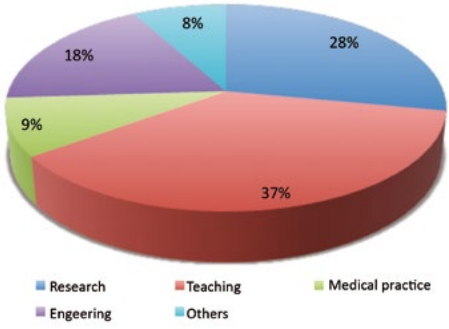
n = 405. *Source:* own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

Figure 5b. Professions. Colombians



n = 273. *Source:* own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

Figure 5c. Professions. Uruguayans



n = 75. *Source:* own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

The proportions are relatively comparable for the population samples of the three countries under study with Argentina and Colombia being very similar. Research and teaching always comprise substantially more of the professional activities mentioned. However, one-third of the producers of scientific results comprise practitioners (doctors and engineers).

When the professions of those who are currently residing in their home countries are compared with those who are expatriates an important difference can be observed between the populations of Argentina and Colombia: the proportion of teachers is very high among those residing in the latter country, whereas it is low in the diaspora. This reflects the institutional situation in Colombia: research and therefore scientific production there are the functions of universities in which the personnel naturally perform the duties of both teaching and research. However, this may also reveal the fact that the diaspora is more likely to devote its skills exclusively to research because the teaching requirements are less intensive abroad… It is also notable that engineers are sought after significantly more for scientific production in Argentina than abroad. This may indicate the higher status of expatriates in the academic sector (teachers and researchers) as well as a differentiation of functions and status, higher in Argentina as compared to abroad.

Areas of work

Regarding the scientific disciplines of respondents according to their country of origin, the fields cited most frequently are biology and health, which represent about a quarter and one-fifth, respectively. Physics and chemistry are always significant, around 5 % and 10 % but agro-food varies, from 13 % for respondents from Uruguay, to 7 % for respondents from Argentina and 4 % for respondents from Colombia. Similarly, the social and human sciences as well as economics and ecology vary in importance between 9 % for respondents from Argentina and Uruguay and 21 % for respondents from Colombia. Mathematics is very significant for respondents from Uruguay, while materials and energy are important for respondents from Argentina; however, electronics, as well as computer science, are of minor importance for the three countries.

When we studied the differences between respondents of the diaspora and those who have returned, it was observed that for respondents from Argentina the health sector is significantly represented for respondents of the diaspora, as also in materials and energy, whereas inversely, agro-food is significant for respondents residing in the home country. For respondents from Colombia, the importance of health is even more marked for respondents of the diaspora than for those residing in the home country, as compared with respondents from Argentina. The social sciences and ecology also stand out, whereas chemistry and economics are more frequently the areas of work for respondents who have returned to their home countries.

Country of birth and nationalities

The origin of respondents was mostly the country of which they are nationals: above 90 % (93 % of respondents from Argentina, 90.5 % of respondents from Colombia, 92 % of respondents from Uruguay). Thus a community of origin is undeniable, which is a characteristic of diasporas, both contemporary and traditional (Berthomière & Chivallon, 2006). Other countries of birth which have any significance are generally in immediate geographical proximity (Brazil, Chile and Uruguay for Argentina; Brazil and Argentina for Uruguay, Venezuela for Colombia), hemispherically (United States for Argentina and Colombia) or historically (Spain with Argentina). There was thus a local territorial and spatial domination, still far from globalization, during the era when these scholars were born, who much later were called on to undertake worldwide journeys. This homogeneity of origins is far from being cosmopolitan or elitist and thus supposedly innately international (Meyer, Caplan & Charum, 2001).

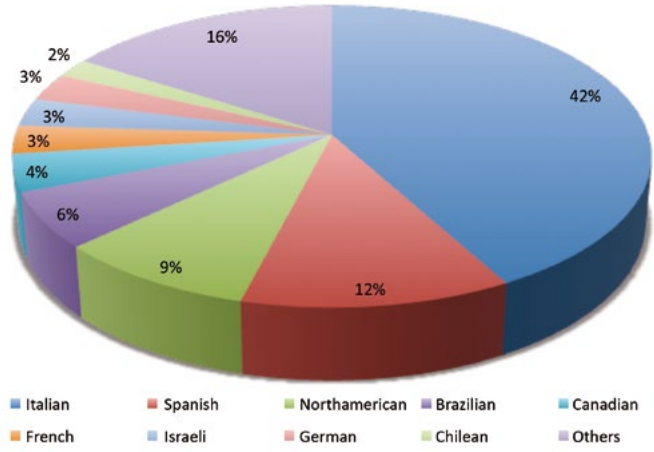
The vast majority of people surveyed have retained the nationality of the country from which they originate. This means that they have not abandoned this nationality or only a very few have done so. However, this nationality is not necessarily unique.

Argentina

90.7 % of researchers originating from this country are of Argentine nationality, a percentage that is somewhat lower than that of their country of origin (country of birth). 34.2 %, or slightly more than one-third, have one or two other nationalities. A tiny minority of 11 people, or 15/1000, even have a third nationality. All of the additional nationalities break down as shown in figure 6a.

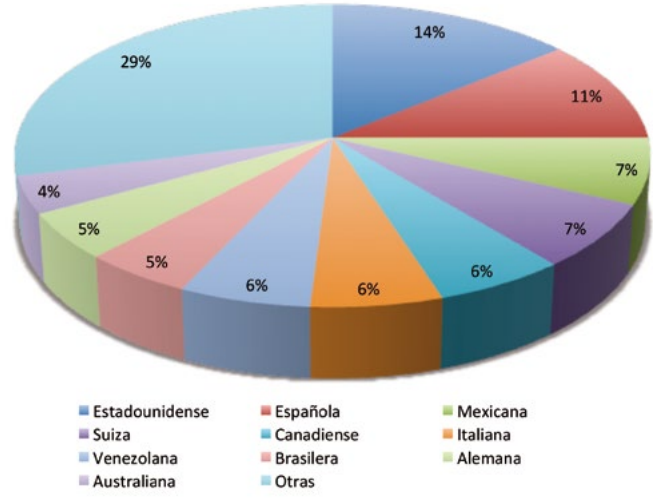
Over half of the 32 additional nationalities are dominated especially by that of Italy and Spain to a lesser extent. This resemblance to the native pattern of the Argentine population as a whole (ancestors in both of these countries) indicates a dual nationality by descent rather than by acquisition during the course of migration in most cases.

Figure 6a. Other nationalities. Argentina



Source: own production based on Cidesal Survey
"Migración internacional de profesionales de América Latina"

Figure 6b. Other nationalities. Colombia



Source: own production based on Cidesal Survey
"Migración internacional de profesionales de América Latina"

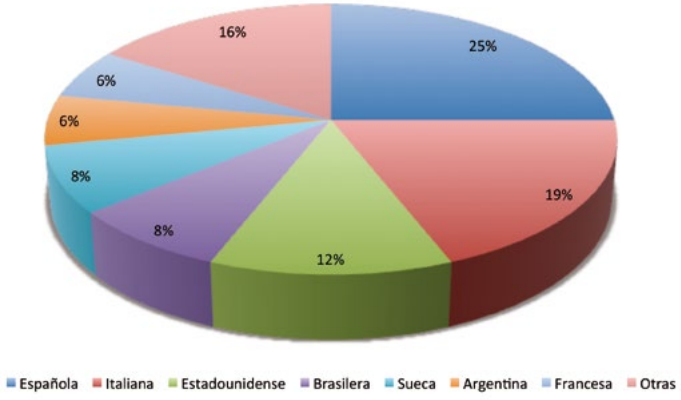
Colombia

In contrast with the case of Argentina, a proportion of respondents somewhat higher than that of the country of origin, 93.5 %, are of Colombian nationality. However, only 17.8 % have one or two other nationalities. All of the additional nationalities break down as shown in figure 6b.

There is a great diversity among the 30 additional nationalities, ranging from North America and Latin America to Europe, without any of them showing a marked predominance.

Uruguay

Figure 6c. Other nationalities. Uruguay



Source: own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

A 95.7 % of researchers who originate from this country are also of Uruguayan nationality, a proportion that is clearly higher than that of their country of origin, compared with the two other countries.

Uruguay is also the country where the proportion of respondents with dual or triple nationalities is the highest: 38.3 %. All of the additional nationalities break down as shown in figure 6c.

The first four nationalities are identical to those of the Argentine population under study but their distribution is different. Spain is more important than Italy, while the United States and Brazil are more heavily represented. Nevertheless, the low numbers make it difficult to generalize from this observation.

Comparing the three countries, it can be observed that Spain and the United States are still among the first three nationalities for migrants from each of these countries and that the Italian nationality is still strongly represented. The Colombian profile is more North American (especially if Mexico is included) than that of the two others which are more 'Latin', both American and European. Finally, the difference in the multi-nationality between Colombia and the countries of the Southern Cone is far from being insignificant. Here again the weight

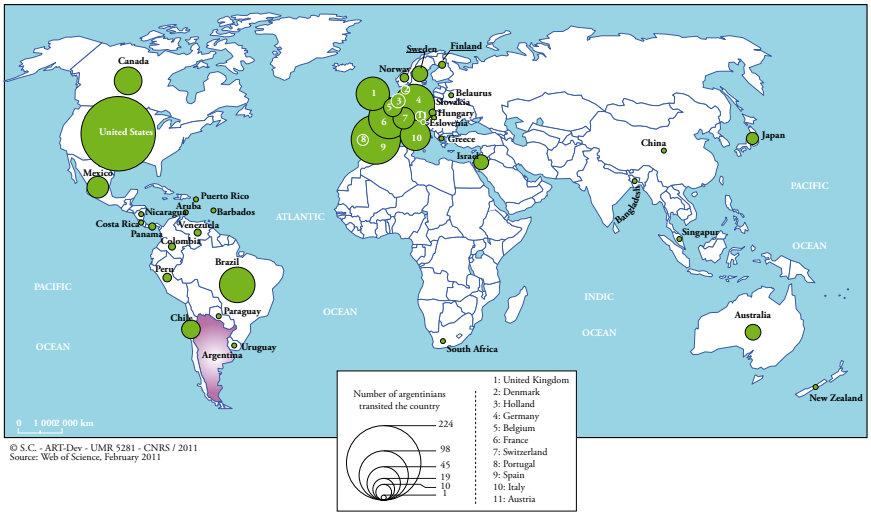
of history is revealed. Recent European immigration has left traces in these latter two countries. Even though they were born in the New World, their solid links with Europe are reflected in their possession of another nationality. For these mobile populations and beyond the confines of their host countries, the persistence of their ancestral links is clear. It remains to be seen whether it has an effect on their geographic mobility or it is independent.

Part 3. Mobility

The destination countries of migrants

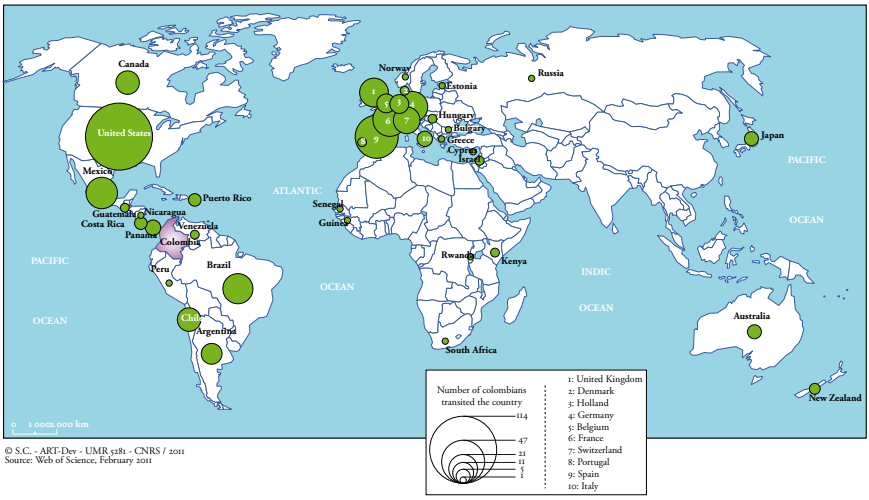
The USA and Spain are the main destination countries for circular migration for each of the three countries of origin. They are still the destination countries for nearly half of migrants from these countries: one-third or more for the USA and about 15 % for Spain. France and Brazil are the two other countries which are still among the five countries that receive the highest numbers of migrants: France between 9 and 12 % and Brazil between 7 and 14 %. Germany, Mexico, Switzerland, Sweden and the United Kingdom also attract a significant number but fewer overall. They especially attract the nationals of one or another of the countries among the three.

Map 1. Destination countries for Argentine migrants



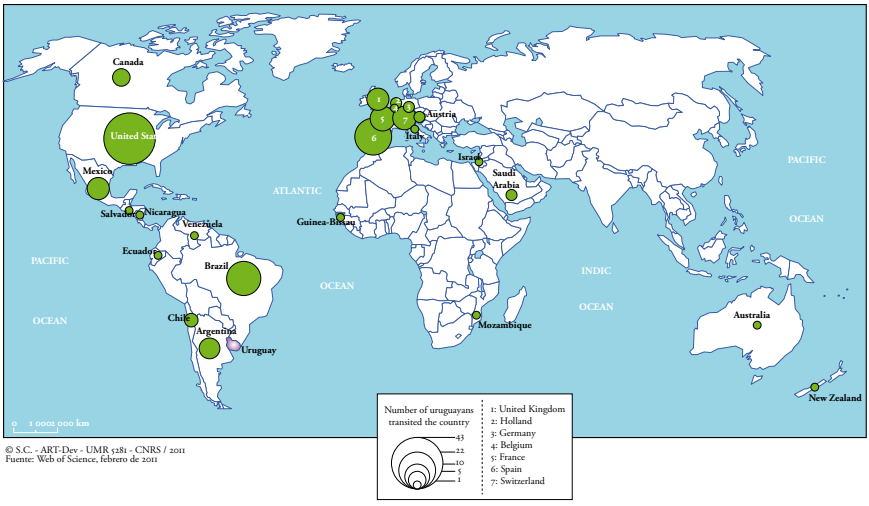
Source: own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

Map 2. Destination countries for Colombian migrants



Source: own production based on Cidesal Survey
"Migración internacional de profesionales de América Latina"

Map 3. Destination countries for Uruguayan migrants



Source: own production based on Cidesal Survey
"Migración internacional de profesionales de América Latina"

When we compare the migration routes of circular migrants (returnees) with those of migrants of the diaspora (settled abroad) differences appear. For the respondents from Argentina, most of those currently resident (who have returned home) have gone through the United States – or the United Kingdom to a lesser

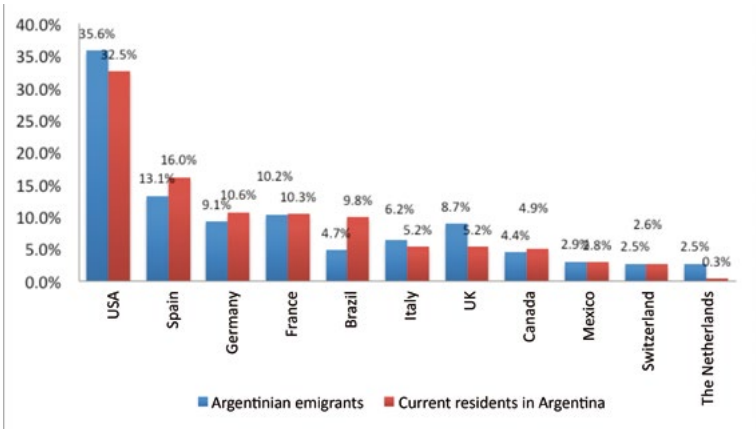
extent – and some through Spain; whereas most nationals of the diaspora circulate or live in Europe and proportionally more intensively, in Brazil.

However, this situation is different and more varied among respondents from Colombia. Migrants of the diaspora are relatively more numerous in the Anglo-Saxon and Germanic countries (except for the United Kingdom) while most of those who have returned went to Latin countries (Spain, France, Brazil, Mexico, Chile and Argentina).

For most of the respondents from Uruguay, the main destination countries for migrants (the USA, Spain and Brazil) attract the diaspora, whereas relatively more returnees went to less popular destinations (France, Mexico, Sweden and the United Kingdom) and are relatively more numerous among returnees.

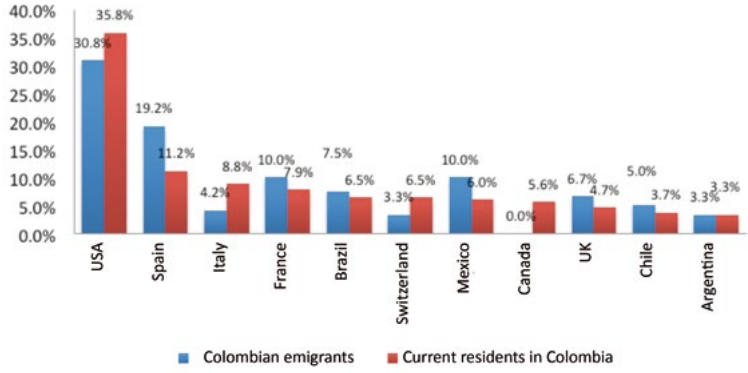
These differences show the diversity of background and orientation of qualified migrants. In accordance with the country, the settlement and circulation of their nationals constitute the choices or strategies which are proper for them.

Figure 7a. Main host countries for Argentines



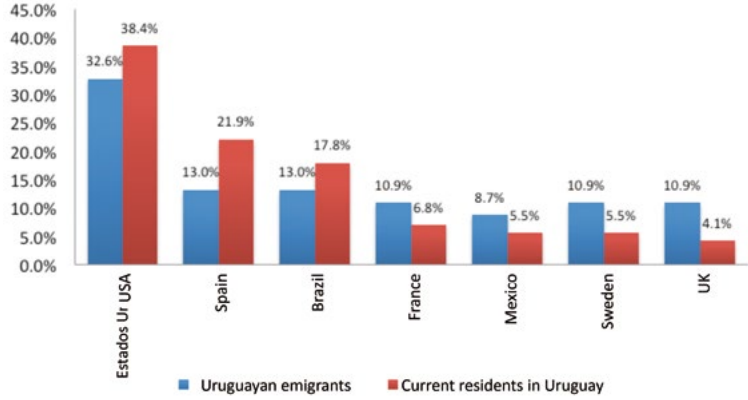
Source: own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

Figure 7b.Main host countries for Colombians



Source: own production based on Cidesal Survey
"Migración internacional de profesionales de América Latina"

Figure 7c. Main host countries for Uruguayans

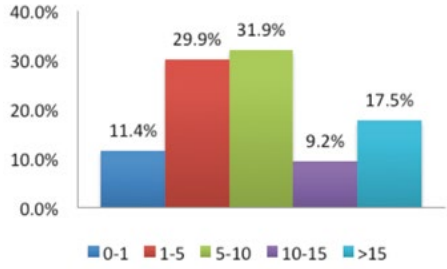


Source: own production based on Cidesal Survey
"Migración internacional de profesionales de América Latina"

Duration of migration

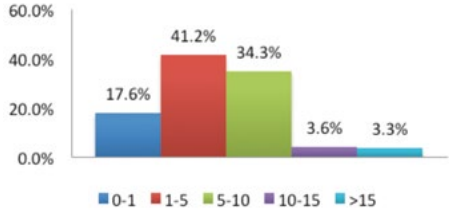
Argentina

Figure 8a. Number of years abroad (total sample). Argentina



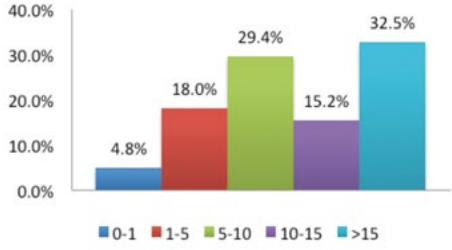
n = 595. *Source:* own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

Figure 8b. Number of years abroad (currently resident). Argentina



n = 306. *Source:* own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

Figure 8c. Number of years abroad (expatriate Argentines)



n = 289. *Source:* own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

Nearly two-thirds of the respondents had spent between 1 and 10 years abroad, but only a quarter stayed longer than that.

However, the contrast in mobility is surprising between those who returned to Argentina and those who stayed in the diaspora. Although over 90 per cent of the former stayed abroad for less than 10 years, half of the latter have been abroad for longer than this and three-fourths for over five years. Of course, the group of refugees/political exiles from the period 1970-80 is clearly the most stable (1/3 have been abroad for over 15 years); but these traces of history do not explain everything. The large numbers of respondents who have been abroad from 5 to 10 years and from 10 to 15 years, and the relatively low numbers of respondents who have been abroad from 0 to 5 years, in a more or less inverse proportion to those who have returned, reflects two different types of migrations: settlement abroad versus circular migration.

Colombia

The length of time spent abroad is less on an average than that of the Argentine respondents, but with a higher proportion for those who stayed abroad from 5 to 10 years (middle category).

In a way similar to the Argentine respondents, returnees have stayed abroad for less time than migrants of the diaspora; nevertheless the largest number of migrants stayed abroad from 5 to 10 years whereas the number of expatriates abroad is lower. Thus, there seem to be cyclic variations according to the country.

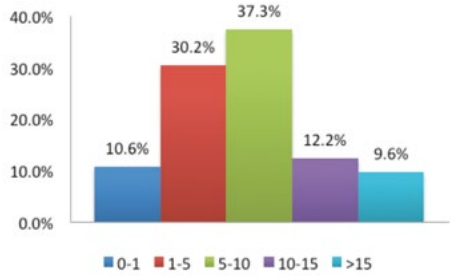
Uruguay

Uruguay is the country where migration is by far the most enduring, as over 70 per cent of respondents had spent over five years abroad (as opposed to less than 60 per cent for respondents from Colombia and Argentina).

For returnees, the periods of their migration were relatively short (mostly from 1 to 5 years). However, the proportion of migrants who returned after over 15 years abroad is considerably higher than those of the two other countries (19 %, as against 4 % for Colombia and even 3.3 % for Argentina). The return migration for the two countries of the Southern Cone is thus very different, in spite of comparable historical and political sequences. The impact of return programs is certainly an important explanatory factor in this (see Lema, this volume).

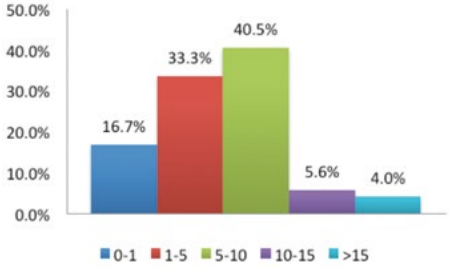
The proportion of those who have been abroad for over 15 years is no greater than that of the Argentine sample; in contrast, the proportion of respondents who have been abroad from 10 to 15 years, with no relation to the period of dictatorship, is over-represented. To summarize, the contrast in migration periods appears less stark than for Argentina.

Figure 8d. Number of years abroad (total sample) - Colombia



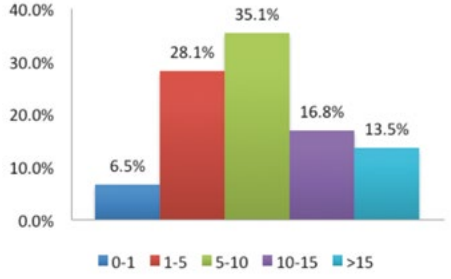
n = 311. *Source:* own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

Figure 8e. Number of years abroad (currently resident) - Colombia



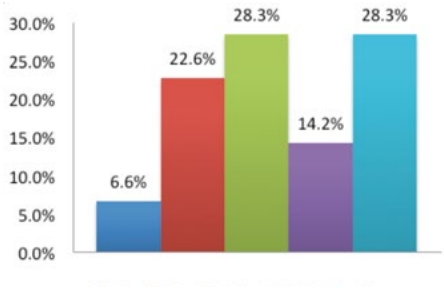
n = 126. *Source:* own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

Figure 8f. Number of years abroad (expatriate Colombians)



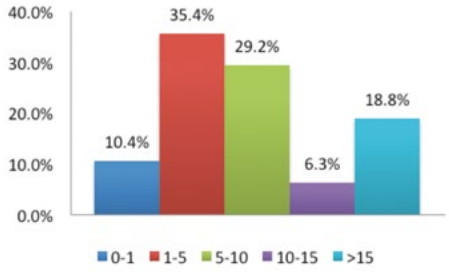
n = 185. *Source:* own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

Figure 8g. Number of years abroad (total sample) - Uruguay



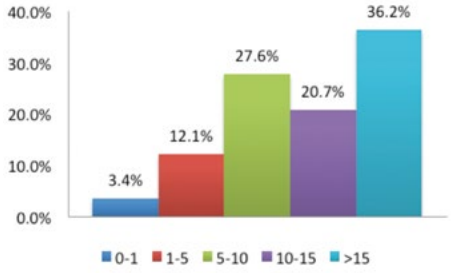
n = 106. *Source:* own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

Figure 8h. Number of years abroad (currently resident) - Uruguay



n = 48. *Source:* own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

Figure 8i. Number of years abroad (expatriate Uruguayans)



n = 58. *Source:* own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

Average stay abroad according to country

The average stay abroad in foreign countries differs significantly also between Argentina and Colombia. Argentines spend more time in America (especially Brazil but also Mexico, Canada and the USA). Except for Italy, their stays in Europe are shorter. Colombians stay proportionately longer in Europe (Switzerland, Germany, and France) even if Brazil and also Mexico, the USA and Chile are countries of unusual permanence. Regarding length of stay, respondents from Uruguay favour important destination countries: Brazil, Spain and the USA. A notable fact is the length of stay in Brazil in general but especially for expatriates from Argentina and Uruguay. For Colombians, this is the country where the length of stay is on an average the longest, for returnees. There also, different orientations prevail in migration trajectories. Some interesting observations follow: the USA is never the country, for any of the nationals, where they stay the longest, be it the returnees or those who settle abroad; but neither is Spain. It is especially Brazil (for respondents of all three countries) but also the United Kingdom (for Colombians and Uruguayans), Switzerland (for Colombians, in particular) and Canada (for Argentines) where permanent settlement (permanent residence) is the most frequent for respondents.

Migration sequences

The geographical mobility of researchers and engineers of these three countries can be characterized according to the number of locations.

Argentina

Nearly two-thirds of respondents from Argentina went to one country and stayed there; only a quarter went on to a second country of expatriation and less than 10 % to a third or even a fourth country. This proportion varies between returnees (overall less mobile, with two-thirds having stayed in only one country) and those who are still abroad in the diaspora (for whom the temporal multilocality is more pronounced, with over a quarter of them going on to a second country and 10 % to a third or even a fourth country).

Figure 9a. Number of host countries (from 1 to 5) and proportion in the Argentine population (%) – currently resident in Argentina

n = 227. *Source:* own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

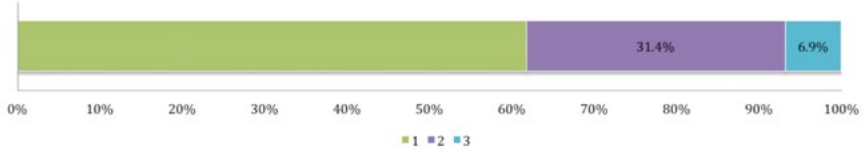
Figure 9b. Number of host countries (from 1 to 4) and proportion in the Argentine population (%) – expatriates

n = 313. *Source:* own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

Colombia

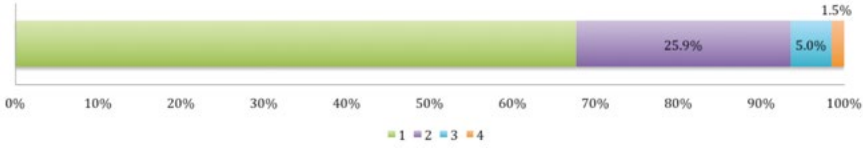
The proportion of Colombians who have stayed in only one country is equivalent (2/3) to that of the Argentine respondents, and those who went to a second country is slightly higher (28 %). However, when we separate out those who returned from those who were still abroad, the proportions are the inverse for those of the Argentine respondents. Those who are currently resident in Colombia were more likely to have been to at least two countries (nearly 40 %) whereas those who have settled abroad were more likely to have limited themselves to only one country (over 2/3).

Figure 10a. Number of host countries (from 1 to 3) and proportion in the Colombian population (%) – currently resident in Colombia



n = 102. *Source:* own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

Figure 10b. Number of host countries (from 1 to 4) and proportion in the Colombian population (%) - expatriates



n = 201. *Source:* own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

Uruguay

The overall majority of respondents from Uruguay was similar to that of the two other countries (about 2/3 had visited only one country). There was no marked difference between those who had returned and those who were still abroad. The low number of the sample population analysed does not permit a categorical generalization of this distribution between the two groups.

The comparison among the three countries underlines the stability in the characteristics of migration for these three population samples. In fact, the tendency to settle in one country and to operate there professionally/intellectually is practiced by the majority of respondents (2/3). However, there are also small variations among respondents from one country to another, showing that the phenomena of migration trajectories cannot be entirely generalized as they are marked by conditions that are specific to each country.

Migration trajectories and itineraries

We often speculated on the re-emigrations of highly qualified people. Are there territories of residence as opposed to migration transit countries-necessary steps on a journey aiming to go further? Is one region (North America) *in fine* the pole where migration candidates aspire to be on their departure? The questionnaire, recording the successive destinations of migrants, allowed for the detailed and precise analysis of their journey. For reasons of statistical relevance, we restricted ourselves to the study of the three major poles (USA, EU and Brazil).

Argentina, Uruguay

Nearly half of Argentine researchers/engineers who re-emigrate from Europe head to another country in the same region, while only a quarter re-orient to the USA and one-tenth to Brazil. In the case of a third migration (to a third country), Europe is the choice of the great majority, as much for those who come from the USA as those from the EU.

For those who first migrated to the USA, Europe is the following destination in over two-thirds of the cases. Canada and Brazil are the only other countries that are of any importance. The destination for a third migration is hardly to the USA but to another European country or to Brazil. The idea of a migratory process undertaken in several stages and ending in North America has not been verified from this data. Similarly, Europe, probably owing to its diversity of conditions and institutions, visibly offers options for multiple re-emigrations.

In the case of Uruguay, intra-European re-emigration has been verified frequently. Other movements (from the USA and Brazil to a third country) involve too few people to make an analysis possible.

The figures for Colombian respondents are less eloquent than those for Argentine but reflect a similar trend. More migrants to Europe re-migrate to

Europe than to the USA and more migrants to the USA re-migrate to Europe than migrants to Europe who re-migrate to the USA. Migrants to Brazil, far from rivaling the two other poles, preferentially re-migrate to Latin America and Europe.

In the course of multiple migrations, Europe thus appears to be more involved in the heavy circular migration movements than the United States.

Part 4. Circular migrations and diasporas

Countries of residence

Among the researchers surveyed who are or were migrating, slightly more or slightly less than half, according to the country, returned home and are situated as follows: 60 % of Argentine respondents reside in Argentina; 47 % of Colombian respondents reside in Colombia; and 51 % of Uruguayan respondents reside in Uruguay.

Table 3. Distribution of residence of respondents by major areas

Argentines (total: 769)

Argentina	459	59.69 %
USA	84	10.92 %
EU	141	18.34 %
Other	85	11.05 %

Colombians (total: 368)

Colombia	174	47.28 %
USA	65	17.67 %
EU	73	19.84 %
Other	56	15.22 %

Uruguayans (total: 118)

Uruguay	60	50.85 %
USA	20	16.95 %
EU	18	15.25 %
Other	22	18.64 %

Source: own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

Among those who are expatriates, the dispersion varies among respondents according to the country as follows: Argentina: 30 countries of expatriation (total number of respondents: 310); Colombia: 28 countries of expatriation (total

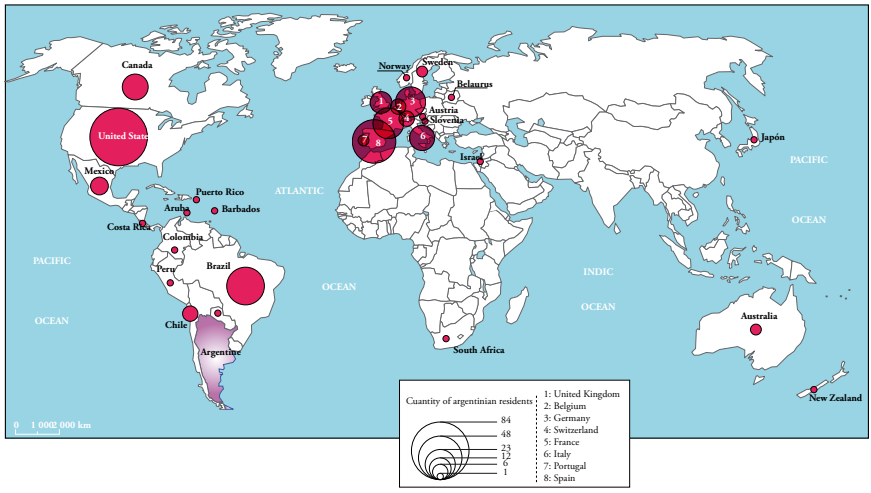
number of respondents: 194); and Uruguay: 13 countries of expatriation (total number of respondents: 58).

Europe and the United States still constitute the poles of concentration for expatriates. However, Brazil appears to be increasingly attractive: it rivals the European countries, taken individually, which it often even overtakes, in so far as respondents from Argentina and Uruguay are concerned (maps 4, 5, 6).

Asia is still significantly absent from this landscape. Oceania has a very minimal presence and Africa has even less.

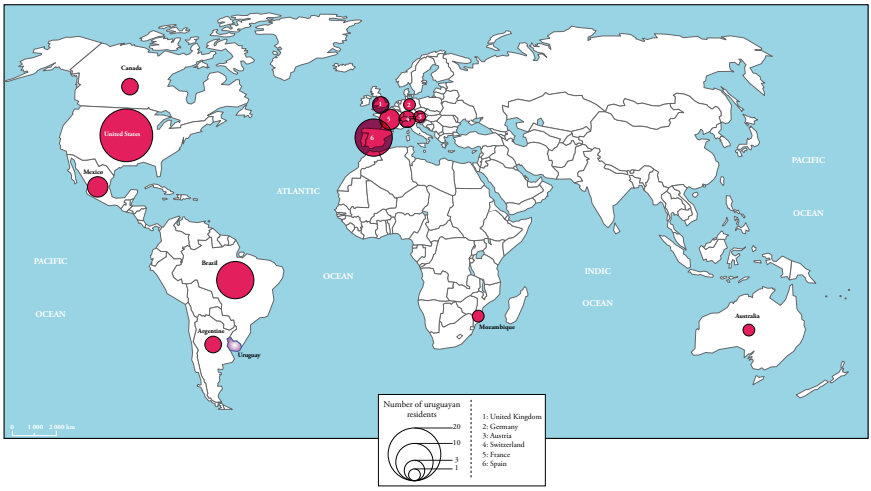
United States and Spain are still the two preferred host countries. In Europe, France has exercised a significant attraction for the three populations, while Germany and Switzerland attracted the Colombian respondents and the Argentines to a lesser extent. The United Kingdom and Italy have a low representation for the nationals of the three countries.

Map 4. Argentine diaspora



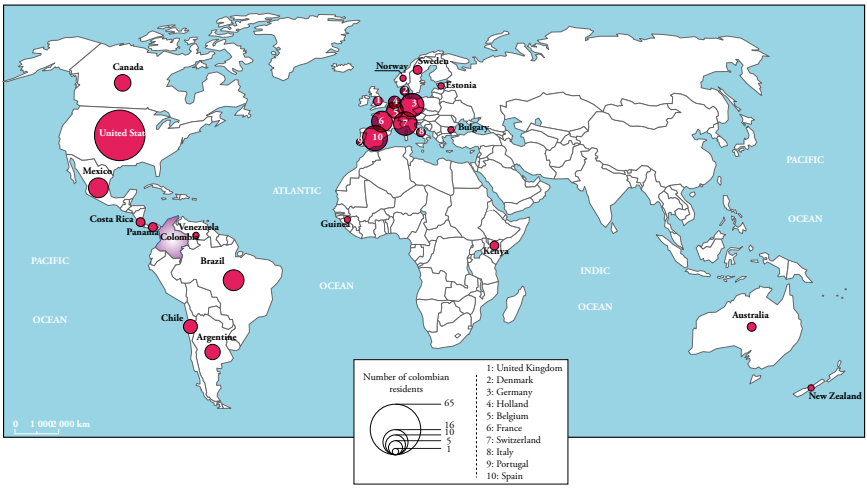
Source: Web of Science, February, 2011. © S. C.-ART-Dev-UMR 5281-CNRS, 2011

Map 5. Uruguayan diaspora



Source: Web of Science, February, 2011. © s. c.-art-Dev-umr 5281-cnrs, 2011

Map 6. Colombian diaspora



Source: Web of Science, February, 2011. © s. c.-art-Dev-umr 5281-cnrs, 2011

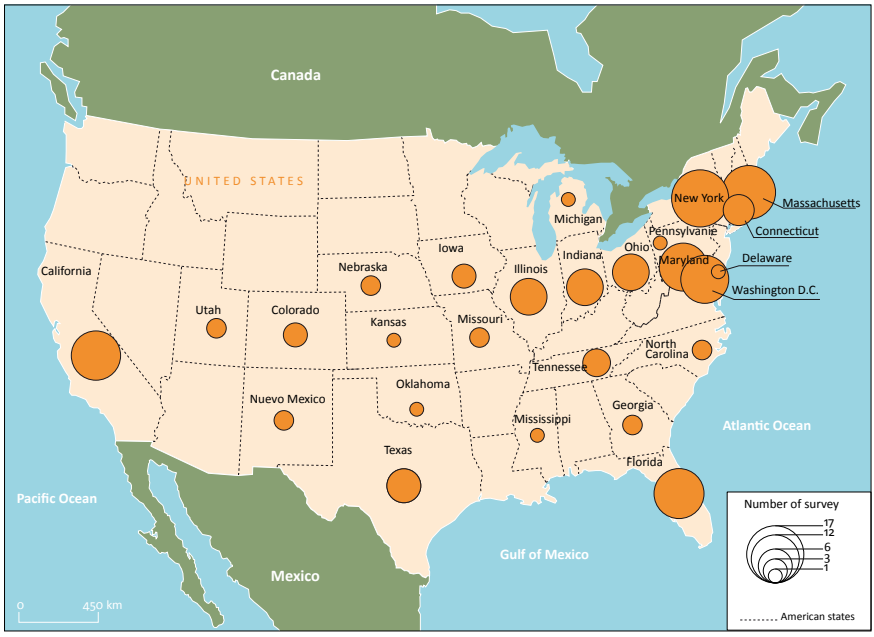
When we examine the urban poles that attract these Argentine, Uruguayan and Colombian diasporas in the main European countries more closely, we observe a major contrast between Spain and the others. Barcelona and Madrid attract most of the flows, while only Valence and Alicante compete with this dual pole from a distance. In contrast, Germany and France, as well as Italy and the United Kingdom to a lesser extent, show a more balanced landscape. No university pole monopolizes the Latin American scientific and technological diasporas. Their dispersion is thus very real (map 7).

Map 7. Distribution of diasporas in Europe

Source: Web of Science, February, 2011. © S. C.-ART-Dev-UMR 5281-CNRS, 2011

This dispersion is also high in the United States, although there are significant concentrations in New York and Boston. It is interesting to note that states known to be hispanophone (California and Florida) are not over-represented. There is thus a real decoupling of highly qualified migrants from those who are less specialized in areas where the Latin American presence is more pervasive. The first operate according to an academic territorial logic while the second base their movements on traditional migrant networks (map 8).

Map 8. Distribution of diasporas in the United States

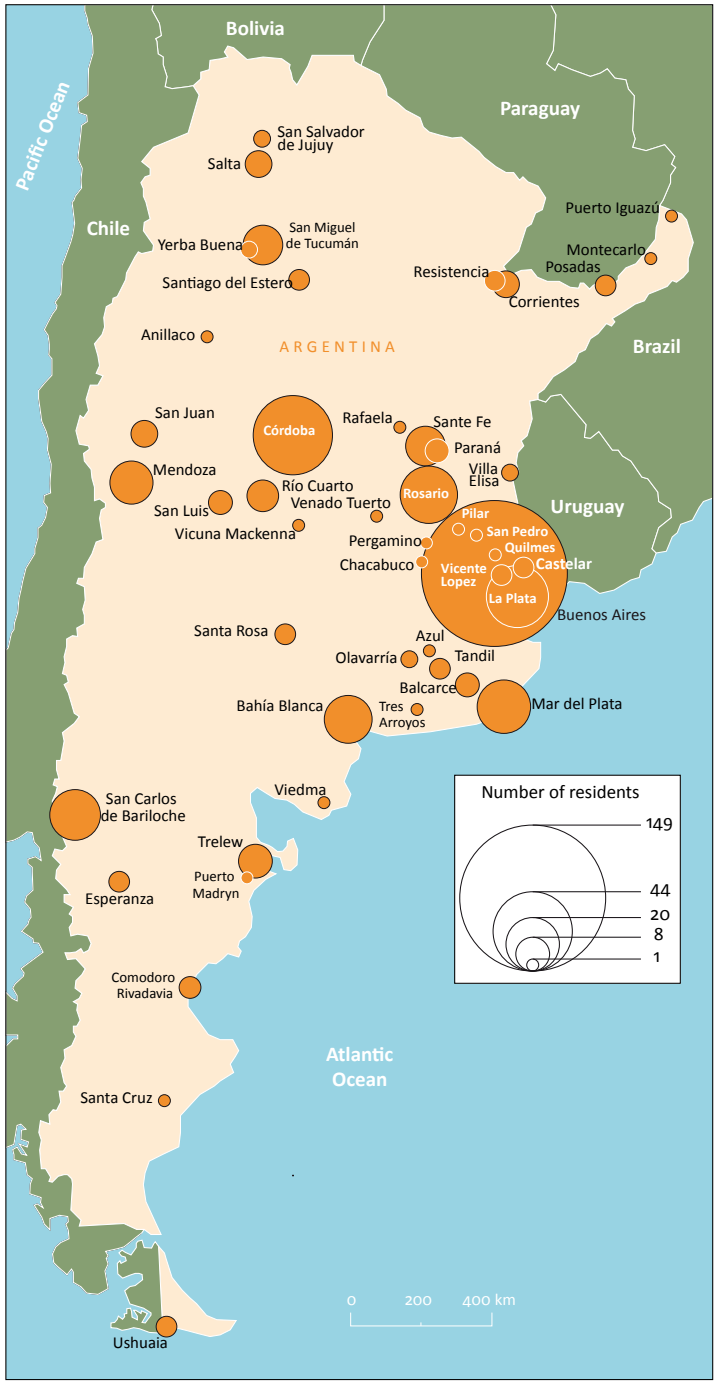


Source: Web of Science, February, 2011. © S. C.-ART-Dev-UMR 5281-CNRS, 2011

Places of return for migrants

What impact does migration have on concentrations of skills within countries of origin? We can visualize this by locating the places of residence in their country for those who returned after staying abroad. In contrast to the widespread idea that the capital city drains for its benefit these flows of relations from abroad, we observed a relative dispersion in the locations of the homes of people who had returned. This appears clearly in the case of respondents from Argentina and Colombia (maps 9 and 10).

Map 9. Locations of international migrants who have returned to Argentina



Source: Web of Science, February, 2011. © S. C.-ART-Dev-UMR 5281-CNRS, 2011

Map 10. Locations of international migrants who have returned to Colombia

Source: Web of Science, February, 2011. © S. C.-ART-Dev-UMR 5281-CNRS, 2011

In Argentina, the small towns accommodated people who have followed distant international trajectories for a significant period of time. In Colombia, these are essentially the regional cities but many are involved. The case of Uruguay is less convincing from this point of view but very special: the town of Montevideo largely dominates the knowledge-intensive activities in the country.

In general, it has been observed that this geographical dispersion of qualified international returnees tends to invalidate the idea of a concentration in a few global centres (Sassen, 2002). The hierarchy of urban poles of international appeal

appears here to be largely tempered by an effective participation of multiple medium-size towns in the globalization of flows of qualified migrants.

Very few of the people surveyed are employed by the same organization. This institutional dispersion is very high, especially among respondents in the diaspora. On the average, we found only one respondent per institution but rarely several nationals of one or another of these three countries. Even in such a case, they do not necessarily know each other. However, sometimes a group provides the opportunity for organizing an association. For example, the four members of the Colombian diaspora employed at the EPFL (École Polytechnique Fédérale de Lausanne) are all members of the ACIS (Association Colombienne des Chercheurs en Suisse). However, this is an exception. Moreover, for researchers who have travelled internationally and returned to their countries, the level of dispersion remains high. On an average for respondents from Colombia it is three people per organization and four for those from Argentina, but the majority of these organizations have only one migrant who has returned from abroad[5]. There are thus very few institutional poles which would be natural anchors for actions from or to the diaspora. Most of these organizations are public and very often form part of academic circles, with universities and institutes of scientific and technical research being particularly well represented.

Links with diaspora countries and associations (associativity)

Table 4. Link with countries of origin and membership in an association

Links	No	Yes	Association
Argentina (575)	14	461	44
Colombia (299)	96	203	24
Uruguay (104)	17	87	3

Source: own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

The proportion of respondents who maintain professional links with their home countries is in the majority: 84 % from Uruguay, 80 % from Argentina and 68 % of those from Colombia, respectively. It is slightly less among women respondents as opposed to men, according to the statistics on the relevant samples from Argentina and Colombia.

In contrast, the proportion of associativity is very low: 7.6 % for those from Argentina, 8 % from Colombia and less than 3 % from Uruguay. This means that among people connected to their home countries, only a minority do so through formal collective action (about 1/10). The rest maintain individual links, mediated by items exchanged and not through formal membership in a diaspora collective.

5 The case of Uruguay, with a marked pre-eminence of the Universidad de la República, is unusual.

This observation has several important limitations:

- A digital problem of quantification: when we attempted to draw out the diaspora from the memberships of formal networks that are constituted and visible, we missed – without knowing – the majority of the expatriate population.
- A theoretical or conceptual problem: can we term a diaspora this nebula the components of which are linked to its centre but are not inter-connected?
- A political problem: how should we act and interact with a dispersed population that has no spokesperson?

Moreover, the number of members per association is very low, often just one. The concentration is thus minimal and the dispersion maximal.

Only the Raíces program and the CEGA association in Argentina group together a significant number of the people surveyed (12 and 4, respectively). For Colombia, this is the case only for the ACIS association in Switzerland (4).

Circular migration and diaspora settlement

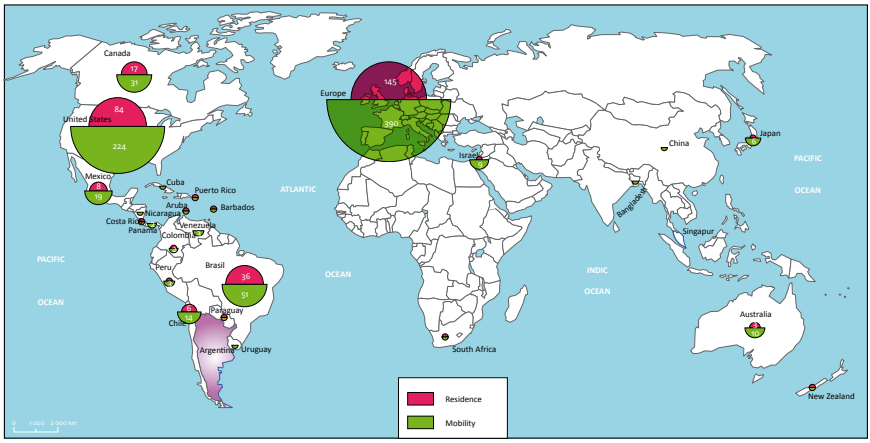
For the large contingents from Argentina, Europe and the United States are more the areas to circulate than places in which to settle down for good. The numbers of those who remain there represent one-third of the total sample population of migrants. In contrast, American countries such as Canada, Mexico, Chile and above all Brazil are places where they settle in large numbers.

The proportion of permanent expatriation among Colombian migrants is much higher than for Argentine migrants. Above all, the relationship between circular migration and diaspora settlement is more balanced with a ratio of 2:1 in general, without any one region or country standing out (see map 12, Colombia).

Uruguay tends to follow Argentina, the leader in migration, with moderate settlements abroad compared with circular migration, and with Brazil being the preferred destination country for expatriation (see map 13, Uruguay).

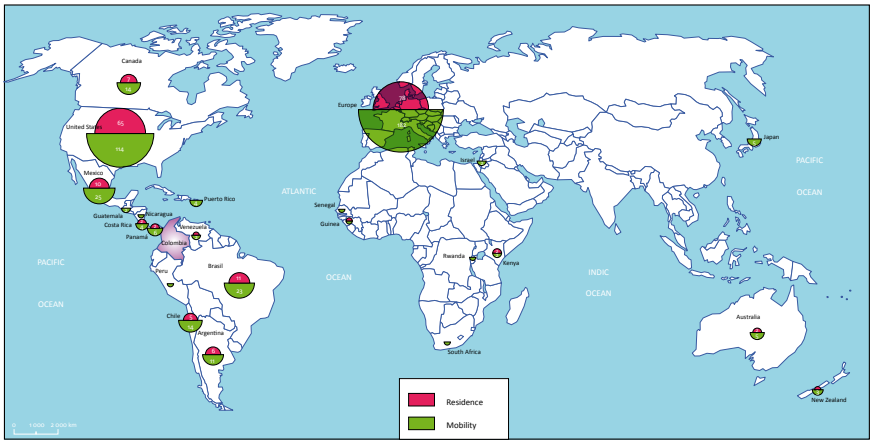
Finally, this general outline varies when we observe relationships within the European Union. Some countries held migrants more and others hosted them more temporarily. Whereas respondents from Argentina settled more often in Spain and Italy (traditional destination countries for nationalities and migration), respondents from Colombia looked beyond these two countries and were more likely to settle in Switzerland, Belgium and Germany (see maps 14 and 15).

Map 11. Circular migration and diaspora settlement – Argentina



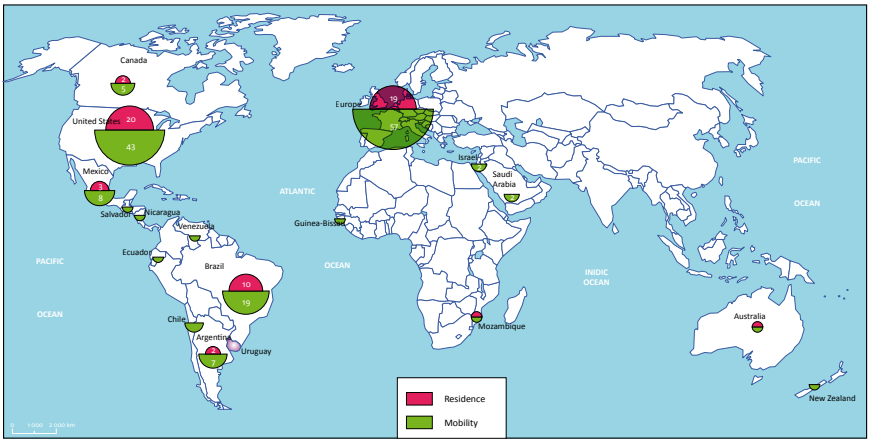
Source: Web of Science, February, 2011. © S. C.-ART-Dev-UMR 5281-CNRS, 2011

Map 12. Circular migration and diaspora settlement - Colombia



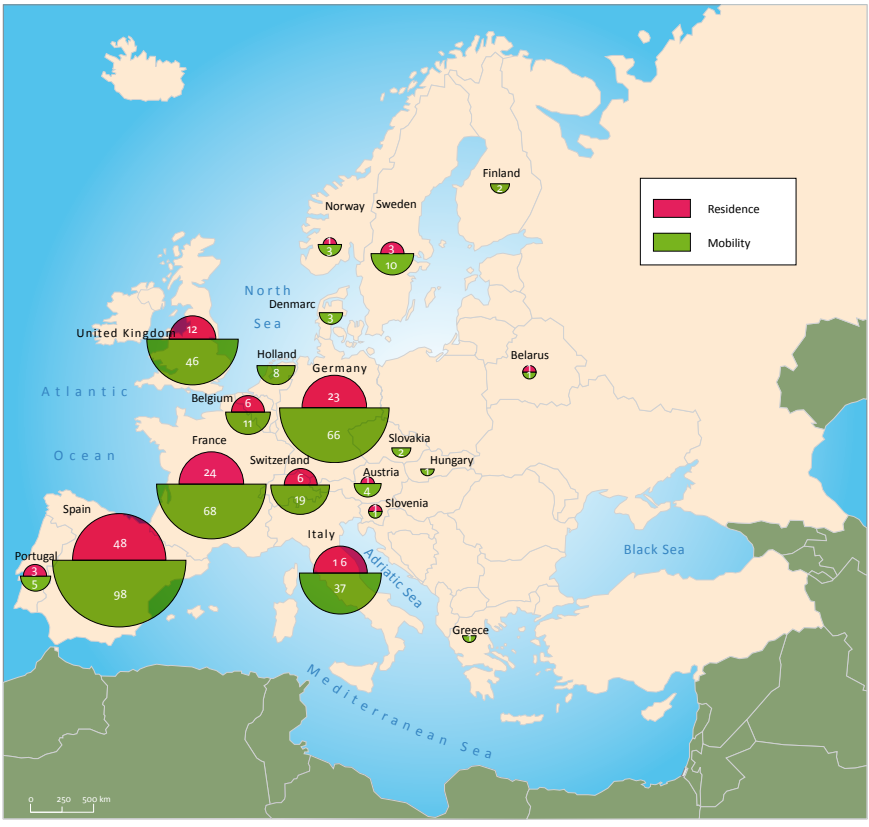
Source: Web of Science, February, 2011. © S. C.-ART-Dev-UMR 5281-CNRS, 2011

Map 13. Circular migration and diaspora settlement - Uruguay



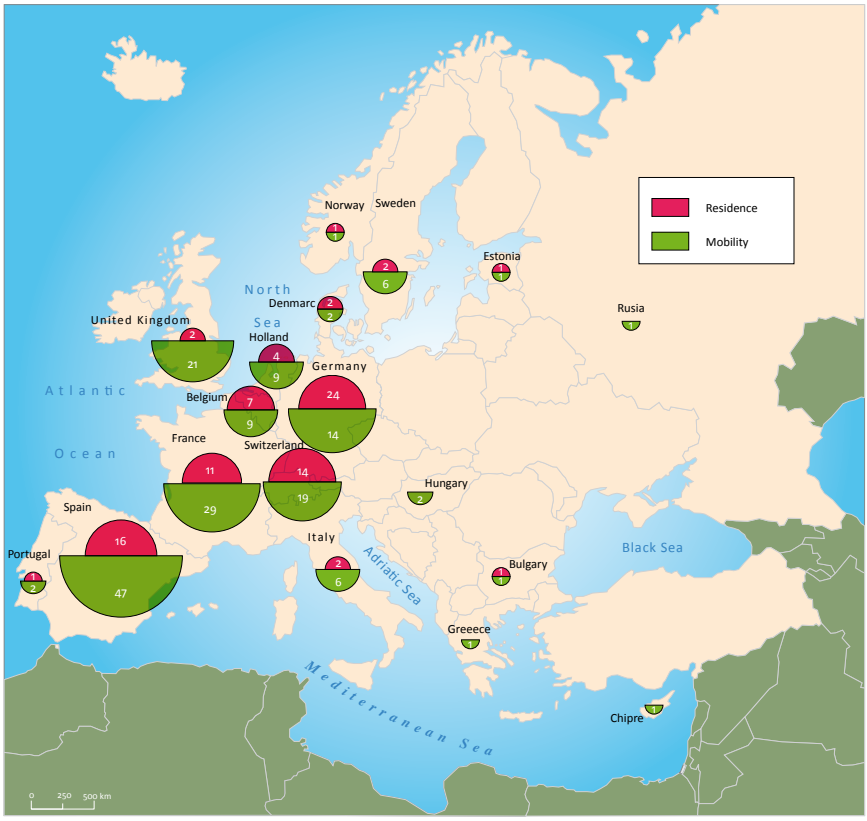
Source: Web of Science, February, 2011. © s. c.-art-Dev-umr 5281-cnrs, 2011

Map 14. Argentines in Europe



Source: Web of Science, February, 2011. © s. c.-art-Dev-umr 5281-cnrs, 2011

Map 15. Colombians in Europe



Source: Web of Science, February, 2011. © S. C.-ART-Dev-UMR 5281-CNRS, 2011

Part 5. New prospects for migrants and diasporas

Bibliometrics as a tool to study migrations?

The survey *Mobility by the WoS* opens up new prospects for the study of the migration of highly qualified people for the following reasons:

1. *Random selection of the survey population*, in contrast with the usual surveys, which access expatriates through networks that are institutional (consulates, embassies and ministries), organizational or associative (businesses and NGOs) or through internet links (social networks, web sites, blogs). However, these modes of access involve pre-existing relationships and communities from which a diaspora structure is naturally inferred. By surveying a sample population of researchers and engineers (and others), who produce knowledge, in relation to their

country of origin as well as abroad, no pre-existing structure or relationship is presumed. The population under study is thus larger and *a priori* has no special characteristics.

2. *Opening up contacts with a traditionally invisible segment* of the diaspora and the migrant community. Taking into consideration the largely individual choices that preside over mobility, in the decision to return as well as the decision to settle abroad permanently, the relationships between migrants and countries are difficult to trace and to mobilize, outside of partial programs that affect a restricted number of individuals. The systematic census conducted and contacts established through the WoS open up a new communication channel, which migrants and their counterparts are free to use.
3. *Comprehensive circular approach.* The survey *a priori* distinguished hardly at all between expatriates and returnees, considering that the first could one day return home and the second could one day go abroad. It also clearly forms part of a circular view, the relevance of which much of the recent empirical research has confirmed. It makes it possible to perceive contemporary migration outside of permanent emigration. On the basis of the same database that records expatriates and returnees, it allows us to draw comparisons that would not be possible at all with disparate samples.

The survey undertaken is of special interest for the original results that it provides; however, is it worthwhile? Is the information reported worth the efforts made to obtain it? Some lessons can be drawn from this first experience:

1. *Massive prospection for a fine collection.* Tens of thousands of references and co-authors are mobilized for a survey of this type, for one-tenth of the visits to the questionnaire and between one and a few tenths of the responses from among them. The information yield (of a total of a few hundreds to a few tens in the best cases) seems low, at least quantitatively. In reality, the logistics set up to contact people is identical for either a low or a high number. The only variation is in the capacity required of the servers and computers, according to the number of messages sent.
2. *Limiting factors to control for.* There are two in the present survey. First, all publications systematically have an email address. This was not the case up to 2005 but it is the case today. As a result, the capacity to contact by internet should now be multiplied by 2 in relation to our survey. On the other hand, we let the corresponding authors contact their co-authors, thus closing off the possibility of verifying the effective contact at the end of the chain as well as of an eventual reminder message in case of no reply. However, we found that the response rate for the corresponding authors was twice as high as for the co-authors, who

were contacted indirectly. There is thus definitely a high on-line loss in the transfer from the first to the second. Moreover, many visits to the questionnaire were observed, without any responses. This could reflect a capacity that could be mobilized as respondents (a reserve) for a second phase with a reminder message (frequently the case with web surveys). This reserve is about 5 times higher than all of the responses received. However, it appears that the reminder messages to respondents of survey questionnaires conducted by internet are particularly productive; much more so than for classic surveys. Traditional decreasing returns of mail surveys issues are to be contrasted with the increasing returns of internauts to questionnaires requested at different times.

3. *Potentially significant capture of the diaspora.* Regarding the case of Argentina, it is possible to estimate the proportion of the diaspora that could be contacted by the method used, improved by addressing the limiting factors above. The Argentine R&D diaspora is estimated to number about 7000 people (Albornoz, Fernandez Polcuch & Alfaraz, 2002). The survey enumerated and documented precisely 320 of them, or just under 5 %. If all the e-mail addresses had been available, 2.3 times more authors could have been contacted. Moreover, the number of visits to the Argentina questionnaire was 5.65 times higher than the responses. If these factors had been controlled, the potential for contacts and responses consequently would have been 60 % of the estimated population. Taking into consideration the fact that this latter necessarily includes non-publishing scientists or those whose production has a low profile, this rate is very high. It must be compared with the number of those who are registered formally in institutional or organizational initiatives, today visible, contactable or reconnected: 44 (in the survey) or less than 1 %.

Data mining and new technologies of investigation: the case of 'Unoporuno'

A survey such as *Mobility by the WoS* makes it possible to considerably increase the capacity to contact, to know and to mobilize the diaspora. Other techniques of *data mining* were also experimented with in the framework of the Cidesal Project.[6] This survey served to adjust the parameters of the tools while offering promising prospects for immediate application.

In effect, the Cidesal Project set up a system of information that made it possible to seek out individuals of the diasporas. A set of integrated programs, together with different databases, identify on the web people who likely share a common national origin. In detecting diachronic geographical locations for pre-selected corpus of

6 See William Turner, Jorge Garcia, Mathilde de Saint-Léger, Chapter 8 in this volume.

texts, the migration trajectories of the people concerned can be reconstructed. This complex program is called 'Unoporuno', as it seeks information, documenting one by one each of the individuals likely to belong to a particular diaspora. For those that it selects, a choice of five preferred links are offered for the researcher to examine, and then to confirm or reject the classification of the person in a diaspora. In case a decision could not be made, it is possible to widen the spectrum of study and to consult other references proposed by the program.

The database of the WoS lends itself well to such an exercise in prospection. It provides lists of names (those of the authors), geographical and institutional locations, as well as disciplines and scientific activities. 'Unoporuno' can be applied to these lists to observe the results of its selection of profiles including a high probability of migration or of belonging to a diaspora.

This exercise was conducted on a sample of 1138 out of 7122 co-authors of Uruguayan publications listed on the WoS.

Five categories were drawn up to classify the results:

- The foreigners are the co-authors for which 'Unoporuno' detected no trace of any obvious period of time spent in Uruguay;
- The locale residents are in contrast those for whom hardly any sign appears of a significant period of time spent abroad;
- The mobiles are, conversely, the co-authors who obviously originate from Uruguay and have spent a part of their trajectory abroad;
- These latter are then divided into two groups: those who are still abroad (linear) and those who are no longer abroad (circular);
- Finally, a small group is made up of people whom the program was unable to classify as belonging to a specific group.

Chart 5. Results delivered by the program on these 1138 co-authors are the following:

Foreigners	504	43 %			
Locale	343	30 %			
Mobiles	231	20 %	Linear	46	20 %
			Circular	182	79 %
N/A		60	5 %		

Source: own production based on Cidesal Survey "Migración internacional de profesionales de América Latina"

These results show that for respondents from Uruguay, the researchers who are or were migrants represent one out of five scientific and technical producers listed on the WoS and concerning this country. They are thus involved in more than one out of two publications, on an average. The link between mobility and production is thus important.

A comparison between these results and those of the survey is possible: the first notable aspect is the observation that the majority are circular migrants, that

is, researchers/engineers who have returned home after a period abroad. Although the survey questionnaire was filled in only by half of them, 'Unoporuno' – with its random sample – revealed to us that they represent over three-quarters of those who are mobile on an international scale.

Moreover, a more detailed analysis, case by case, name by name, revealed that 33 of those from the 'Unoporuno' extraction were also respondents in the Mobility by the WoS survey and they thus represented 40 % of the 82 respondents. The remaining 60 % formed a part of the 5,984 (7,122-1,138) authors outside this sample.

Ultimately, 'Unoporuno' supplied 7 times more results than the survey (231 versus 33). If we extrapolate the results of this sample, there should be approximately 800 Uruguayan migrant researchers – 140 linear and 660 circular migrants – involved in the 5,776 scientific and technical publications of this country during the first decade of the 2000s.

Conclusion

The use of new sources of information – such as the Web of Science – as well as new instruments of investigation – such as 'Unoporuno' – opens up new perspectives. They allow us to think that it is possible to increase the coverage of the diaspora population considerably and to bring to light a vast, invisible part of it. It also appears that the limited view we had up till now, through access to institutional records or formal associations, must change with these new techniques. A fundamental lesson of the exercise accomplished here with the Cidesal Project is that of the crucial importance of research in setting up a diaspora policy. Without the former, the foundations of the latter would be profoundly biased, taking into account only a small proportion of the population to reach out for. Finally, it appears clearly that one of the first steps, in order to set up a system of enlightened governance, consists of investing in the instruments which enable the most complete and precise access possible to this transnational and/or mobile population as a whole.

References

Agarwal, Ajay K.; Cockburn, I. M. & Mc Hale, J. (2003). *Gone but not Forgotten: Labour Flows, Knowledge Spillovers and Enduring Social Capital*. Cambridge, Massachusstes: National Bureau of Economic Research, Working paper n.º 9950, available at <http://www.nber.org/papers/w9950> (last accessed: 29/6/2014).

Alabornoz, M.; Fernández Polcuch, E. & Alfaraz, C. (2002). *Hacia una estimación de la fuga de cerebros*, Working paper 1. Buenos Aires: Centro Redes, available at <http://www.centroredes.org.ar/files/documentos/Doc.Nro1.pdf> (last accessed: 28/6/2014).

Berthomiere, W. & Chivallon, Ch. (2006). *Las diásporas en el mundo contemporáneo*. Paris: Karthal, msha.

Jin, B.; Rousseau, R.; Suttmeier, R. & Cao, C. (2007). *The Role of Ethnic Ties in International Collaboration; the Overseas Chinese Phenomenon, Proceedings of the issi 2007*, available at <http://eprints.rclis.org/10009/1/Jin-Rousseau.pdf> (last accessed: 18/6/2014).

Lowell, L. & Gerova, S. (2004). *Diasporas and Economic Development : State of Knowledge*, Washington: Institute for the Study of International Migration, available at <http://siteresources.worldbank.org/intprospects/Resources/334934-1322593305595/8287139-1327608098427/LowellDiaspora.pdf> (last accessed: 18/6/2014).

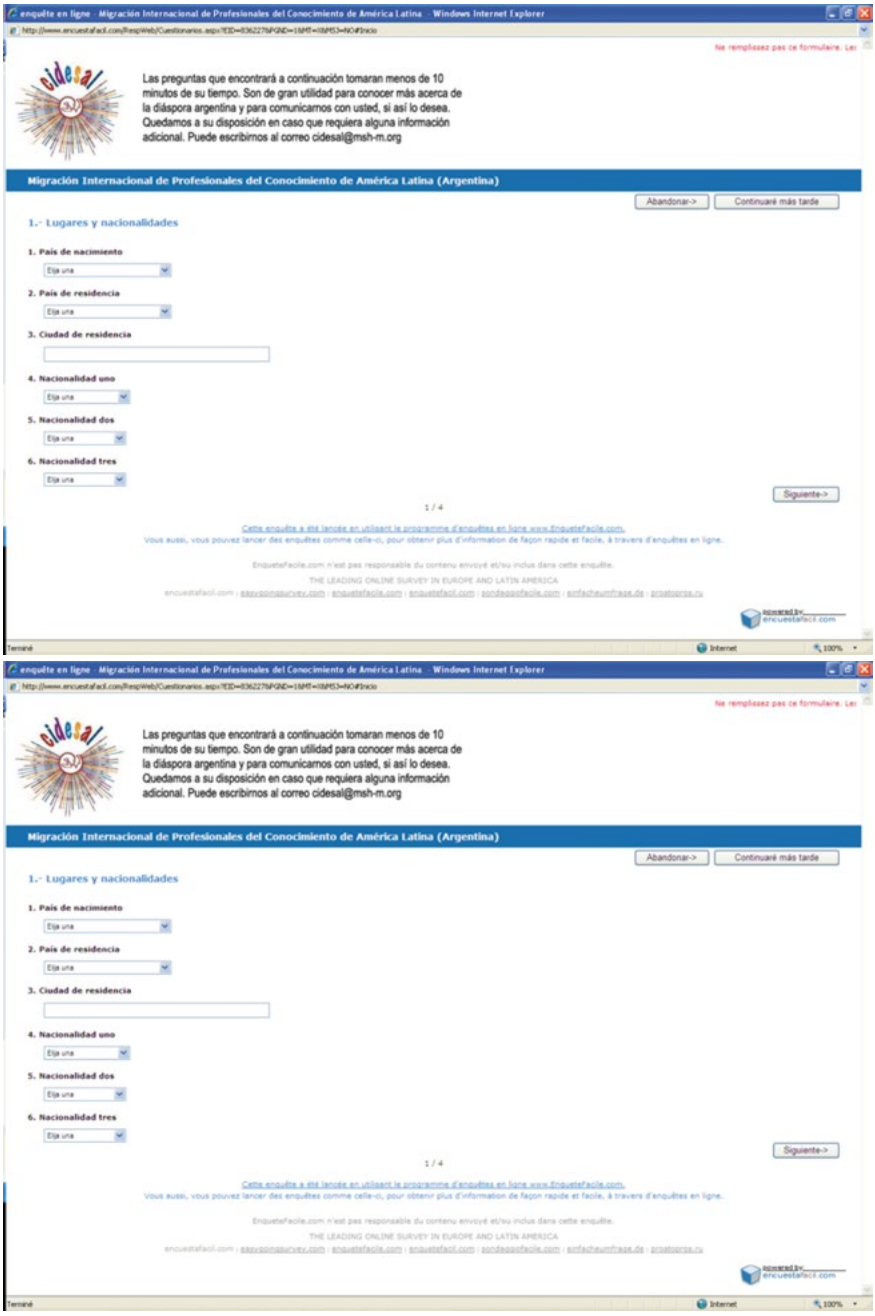
Meyer, J.-B.; Caplan, D. & Charum J. (2001). "Scientific Nomadism and the New Geopolitics of Knowledge". *International Social Sciences Journal,* 168: 341-354.

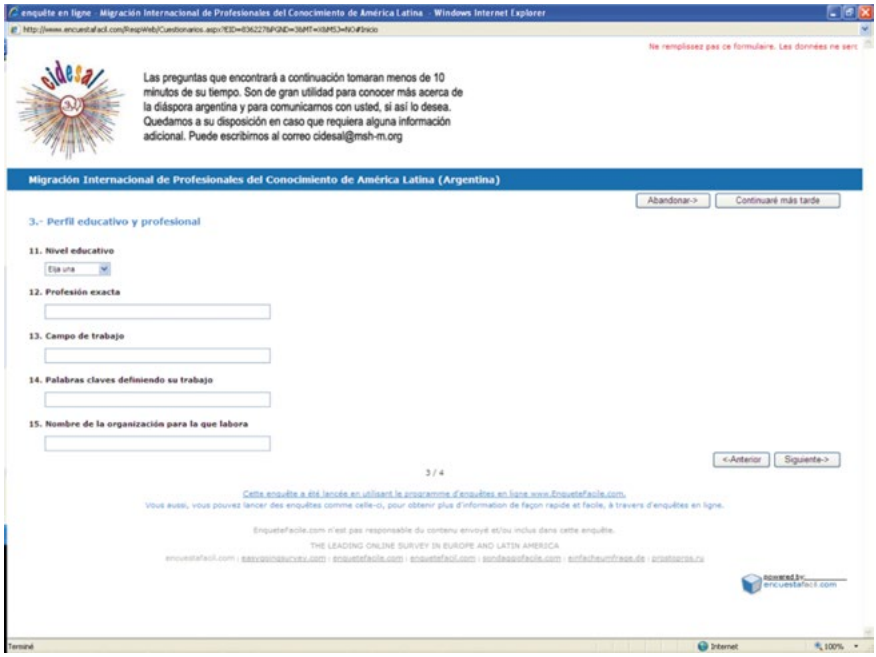
Organization for Economic Cooperation and Development (oecd) (2012). *Connecting with Emigrants: a Global Profile of Diasporas*. Paris: Organization for Economic Cooperation and Development.

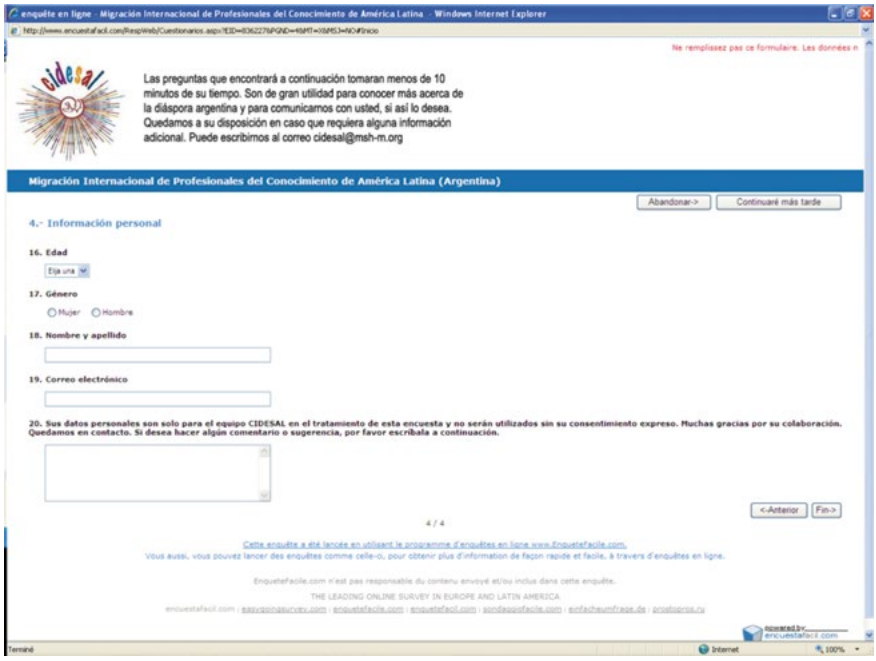
Regets, M. (2001). *Research and Policy Issues in High-Skilled Internationa Migration: a Perspective with Data from the United States*. Washington: National Science Foundation.

Sassen, S. (2001). *The Global City: New York, London, Tokyo*. Princeton: Princeton University Press.

Appendix 1.
Survey's questionnaire




enquête en ligne - Migración Internacional de Profesionales del Conocimiento de América Latina - Windows Internet Explorer
Ne remplissez pas ce formulaire. Les données ne serc
Las preguntas que encontrará a continuación tomaran menos de 10 minutos de su tiempo. Son de gran utilidad para conocer más acerca de la diáspora argentina y para comunicarnos con usted, si así lo desea. Quedamos a su disposición en caso que requiera alguna información adicional. Puede escribirnos al correo cidesal@msh-m.org
Migración Internacional de Profesionales del Conocimiento de América Latina (Argentina)
Abandonar->
Continuaré más tarde
3.- Perfil educativo y profesional
11. Nivel educativo
Elija una
12. Profesión exacta
13. Campo de trabajo
14. Palabras claves definiendo su trabajo
15. Nombre de la organización para la que labora
<-Anterior
Siguiente->
3 / 4
Cette enquête a été lancée en utilisant le programme d'enquêtes en ligne www.EnqueteFacile.com.
Vous aussi, vous pouvez lancer des enquêtes comme celle-ci, pour obtenir plus d'information de façon rapide et facile, à travers d'enquêtes en ligne.
EnqueteFacile.com n'est pas responsable du contenu envoyé et/ou inclus dans cette enquête.
THE LEADING ONLINE SURVEY IN EUROPE AND LATIN AMERICA
encuestafacil.com | easyonlinesurvey.com | enquetefacile.com | enquetefacil.com | sondagesfacile.com | einfacheumfrage.de | prostoprosy.ru
powered by: encuestafacil.com
Terminé
Internet
100%


enquête en ligne - Migración Internacional de Profesionales del Conocimiento de América Latina - Windows Internet Explorer
Ne remplissez pas ce formulaire. Les données n
Las preguntas que encontrará a continuación tomaran menos de 10 minutos de su tiempo. Son de gran utilidad para conocer más acerca de la diáspora argentina y para comunicarnos con usted, si así lo desea. Quedamos a su disposición en caso que requiera alguna información adicional. Puede escribirnos al correo cidesal@msh-m.org
Migración Internacional de Profesionales del Conocimiento de América Latina (Argentina)
Abandonar->
Continuaré más tarde
4.- Información personal
16. Edad
Elija una
17. Género
Mujer
Hombre
18. Nombre y apellido
19. Correo electrónico
20. Sus datos personales son solo para el equipo CIDESAL en el tratamiento de esta encuesta y no serán utilizados sin su consentimiento expreso. Muchas gracias por su colaboración. Quedamos en contacto. Si desea hacer algún comentario o sugerencia, por favor escríbala a continuación.
<-Anterior
Fin->
4 / 4
Cette enquête a été lancée en utilisant le programme d'enquêtes en ligne www.EnqueteFacile.com.
Vous aussi, vous pouvez lancer des enquêtes comme celle-ci, pour obtenir plus d'information de façon rapide et facile, à travers d'enquêtes en ligne.
EnqueteFacile.com n'est pas responsable du contenu envoyé et/ou inclus dans cette enquête.
THE LEADING ONLINE SURVEY IN EUROPE AND LATIN AMERICA
encuestafacil.com | easyonlinesurvey.com | enquetefacile.com | enquetefacil.com | sondagesfacile.com | einfacheumfrage.de | prostoprosy.ru
powered by: encuestafacil.com
Terminé
Internet
100%

Appendix 2.
Letter sent to the reference authors and from them to theirs coauthors

Dear colleague,
You are the reprint author of the article <Title of the article>, written by <authors names>.
For scientific reasons, we need to contact all the authors of this article (see below). Could you read and forward to these colleagues our contact message?
We thank you very much in advance for your cooperation and wish you the best for your work,

Sincerely,
Jean-Baptiste Meyer, for the Cidesal project
Institut de Recherche pour le Développement
<http://www.msh-m.fr/cidesal>

Letter to co-authors

Dear colleague,
The Cidesal research and development project is contacting all researchers of Argentina origin, in an effort to reconnect with the intellectual diaspora. If you are or have been expatriate of <Argentina>, please click on this link? <http://www.observatoriodiasporas.com/page/encuesta-cidesal-argentina>.
We thank you very much for your attention and remain at your disposal should you have any query,

Sincerely,
The Cidesal team
<cidesal@msh-m.org>

Chapter 3

Diasporas' associations and networks

Caroline Caplan

Introduction

Today, migration is receiving renewed interest at the international level as a lot of the recent literature has been contributing to the concept of migration as an enabler for development. This interest is developing, both in theory and practice, at all levels of governance. States are ensuring that the benefits of international migration are strengthened through programs to mobilize diasporas and through new institutional structures (GMG-UNDP, 2010; Gamlen, 2006), supported by the actions of international organizations which, since the beginning of the 21st century, are showing great interest in the linkage between migration and development (IOM & UNDP 2013, European Commission, 2013). At the same time, regional organizations too are consolidating around the issue of migration (free movement of persons[1] or consultation processes[2]). This enthusiasm for mobility, from which emerges the need for governance of migratory movements, cannot however overlook the criticisms which show, even recently, that migration remains a negative phenomenon (McKenzie & Rapoport, 2006). In this context, our work seeks to identify existing local dynamics that can generate transfers of skills between spaces of origin and spaces of dispersion of members of a national scientific community. In order to fully understand initiatives "from below", the Cidesal project teams undertook a survey of existing *professional associations* in the migratory space. Thus the analysis reveals all the actors who create and mobilize the *scientific and technical diasporas*.

Methodology

Studies on international migration soon led to identifying forms of communities and "new" practices sustained by migratory movements. In this way, studies on transnationalism opened up a field of research devoted to the study and description of the way in which people negotiate distance and include their practices in a transnational space (Tarrius, 2001; Guarnizo & Smith, 1998; Rouse, 1991). These

1 ASEAN, Mercosur, Caricom for example.
2 Dialogue 5+5, EaP (Eastern Partnership).

observations, expanding the lexical range of transnationalism, make it possible to question more broadly the idea of community and of the remote contributions of societies (Bernal, 2006). In this work the scientific and technical diasporas are considered according to their capacity to respond to the needs of institutional or individual actors by circulating knowledge or ideas, goods or financial capital. In effect, we assume that diasporas tend to form networks that respond to needs expressed from the outset. Moreover, these contributions seem to take shape from political strategies at the local and national levels (Mutersbaugh, 2002; Gamlen, 2011) and form a part of configurations that are hyper local as well as global. Our research has made it possible to capture these processes of multi-level social constructions of skilled and highly skilled migrants through the survey and analysis of diasporas. Also, in seeking the actors and spaces that invigorate the circulation of knowledge beyond state borders, the Cidesal project undertook a global survey of potential diaspora networks in Argentina, Colombia and Uruguay. Thus, with the aim of collecting as much data as possible, the study of the transnational sociability of skilled migrants was conducted to a large extent on internet, through the use of search engines and social networks. We will present in detail here the methodology used in order to be able to better assess its results.

Research on the web

New technologies of information and communication contribute to reconfiguring the territories of daily life (Boulin, Dommergues & Godard, 2002) and facilitate the participation of their users in global spaces. In this context, internet has become just as much a tool as an area of research. In migration studies, research on internet has made it possible to identify diaspora cores and to characterize them (Le Bayon, 2012), while others have shown that governments know how to use them in order to respond to their national development plans (Larner, 2007). Our work has been able to benefit from information available on internet by using the power of search engines that today have the capacity to identify the numerous diaspora networks from simple key-word requests. This methodology was used for Argentina, Colombia and Uruguay and was accompanied by the retrieval of government data (*Consejos consultivos* for Uruguay and the retrieval of the lists of the *Cancillería*[3] for Colombia through the program *ColombiaNosUne*[4]). The result of this exercise was an input of diverse data on formal and informal associative structures. Nevertheless, the development of social relationships *via the web* prompted the project teams to add the "virtual" dimension, by surveying the communities from the social networks. To do this, two of them were mobilized: Facebook and LinkedIn. It is important to note that in this case, the requests were

3 Ministry of Foreign Affairs.

4 For Colombia, two teams worked on the data: María Alejandra del Real for *ColombiaNosUne* and Caroline Caplan for IRD.

carried out directly on the exclusive search engines of these networks since certain groups do not emerge clearly with the standard search engines of the web.

The selection of data from the web and from institutional records

The lacuna in government records – notably consular – requires an additional survey effort. In this sense, the web is a tool that is particularly well adapted in so far as it is continually updated and the data can be verified by this same tool. From identification to characterization, the use of search engines was thus essential. The phases of the work were as follows:

i. The first phase consisted of a survey of the communities (formal and informal) of expatriates that could have a cognitive dimension.
ii. The second phase consisted of sorting this database by verifying the objectives and activities of these communities and keeping only those which were organized *around* the cognitive dimension and its contribution to development of (sharing of knowledge, transfer of skills, etc.) whatever may have been the geographic extent of these exchanges.
iii. The third phase, concurrently with the second, consisted of verifying the validity and timeliness of the information (association still active or not).
iv. The fourth phase consisted of selecting informal communities drawn from digital social networks and differentiating them from the rest of the corpus.

The selection of data from social networks

The complete and consolidated survey of the associative fabric on the social web was made possible by the collaboration of the teams and the homogenization of data. A final read-over was then given in order to ensure the same selection criteria. Two types of criteria were chosen:

- *Cognitive*: any associative structure under consideration should show evidence of such activities as scientific exchanges at the local, national and/or international levels.
- *Geographical*: the associative structure should have as its purpose, at least partly, to address the diaspora.
    - The "association of professionals of sector Z, nationals of country X and residing in country Y" can be incorporated into the database without any further verification.
    - In contrast, the "association of professionals of sector Z, nationals of country X" requires further information on the objectives and the social coherence that the association wishes to have.

This is why all the associations surveyed were subjected to meticulous verification, with the goal of retaining in the database only those addressing (partly or totally) – and acting on behalf of – the national or even regional scientific and technical diaspora as their purpose.

The aggregation of data and their presentation

In overcoming the heterogeneity of the information, the standardization of the data made it possible to have a more objective view of the corpus and to envisage a comparison among countries of origin as well as host countries.[5] However, it is difficult to visualize the associative fabric in the migration space. Indeed, to the existence of professional associations dispersed throughout an area is added a new kind of dissemination: the *diaspora spaces centered on institutional affiliation.* Each of them is made up of a network of nodes in different countries and/or cities. They are, thus, institutional initiatives, and affiliation is not founded on a shared national basis so much as on academic background, including the university of origin (networks of former students) and even the scholarship sponsoring institution (network of former scholarship receiving students). Consequently, these diaspora spaces, that could be termed *proto-diasporas,*[6] may be organized by institutions in their countries of origin and also in their host countries. Therefore, in order to be able to take into account the different initiatives, migrant and/or institutional, which have direct impact on the shaping of the associative landscape, it is necessary to make available as complete an information base as possible.

In this context, the list at the end of the report restates these proto-diasporas and introduces them according to their relationship with the decision making centre. If it is an initiative of the State and the government departments, these networks will be called "State-centered".[7] On the other hand, if it is an initiative sponsored by a university, the network will be called "non State-centered".

The aim of the Cidesal project was to make available the most up-to-date and complete information available to be used as a tool by all the actors in search of information. If this spatialization does not make it possible to produce an analysis, it at least makes critical information available. Geo-locatable data are in effect particularly useful for governments and migrants in search of data on existing associations in countries of residence and of transit. The ease of access to information constitutes the main advantage of this spatialization of data, since this mapping is available online for everyone. The challenge is to avoid duplicating initiatives and to benefit from those that exist before undertaking a constructive approach

5 The standardization was achieved by using a table for the aggregation of identical data within the different project teams that was based on the following criteria: the national collective concerned, the name, the link with the centre, the countries concerned, the structure (academic, professional or associative), the year of creation, the legal status, the inter- and intra-institutional structure (networks), the type of activities, the web site, the presence on social networks.

6 The definition that we have given is the following: the proto-diasporas are diaspora constructions which are built on affiliation criteria that are not exclusively ethno-national, where past cohabitation/socialization is a source for the maintenance of an ulterior remote link.

7 We must differentiate them, however, from the diaspora policies of countries of origin which are built on the criteria of ethno-national affiliation.

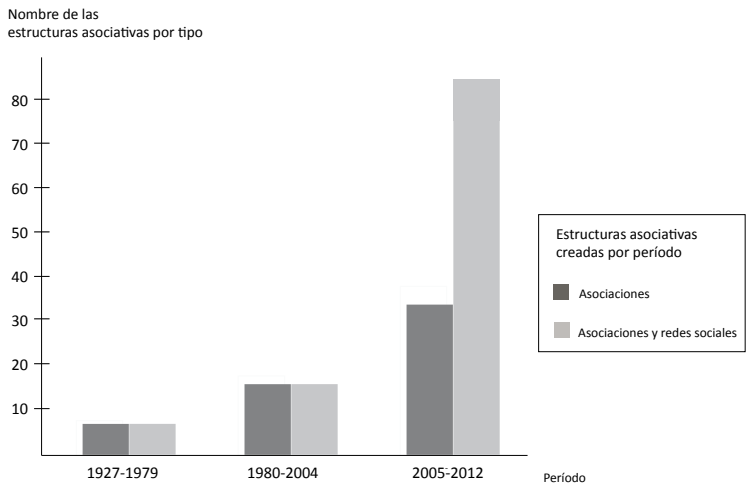
like the ones that were adopted in Colombia during the two initiatives to build diasporas (Red Caldas and ColombiaNosUne). In addition, in facilitating access to information, it is hoped that the duplication of efforts can be minimised and the investment reallocated, whether it be financial, institutional or human.

The settings of the links: new configurations

Observation n° 1: the recent increase in networks

The available statistics show that out of 51 associations (37 Colombian, 13 Argentine, 1 Uruguayan) 68 % – without taking into account the social networks – were created after 2005. This shows the challenge of constantly updating the databases of civil society organizations. Without this updating, many relevant actors would be left aside and only "dead stars" would be retained. In addition, there are the ever more numerous and all very recent social networks. According to the data available, all the groups hosted on LinkedIn or Facebook were created after 2007. However, it should be observed that at the height of this enthusiasm, the creation of associations on internet was particularly intense between 2009 and 2010. Thus we may conclude that the social networks contributed to the constitution of a diaspora social fabric, although this observation should be qualified, since many pre-existing groups took advantage of the creation of these social networks to get set up virtually, which explains the effervescence of the period of 2008-2010.

Figure 1. The creation of associative structures from 1927 to 2011



Source: own production

The dates of creation of the groups found on Facebook and LinkedIn make it possible to understand their evolution in greater detail over the period of six years between 2007 and 2012:

Table 1. Internet: new support for networks.

Creation of networks on Facebook and LinkedIn from 2007 to 2012					
2007	2008	2009	2010	2011	2012
3	7	9	14	9	5

Source: Cidesal

In general, the data confirm the upward trend in the number of professional associations, whether or not the social networks are taken into account.

In both cases, a high increase can be observed at the beginning of the 21st century, which confirms the growing trend of skilled migrants' desire to form associations. Nevertheless, this propensity for novelty also leads us to think that collective initiatives failed to be sustainable and the associative fabric was made up of links that were still loose, as they had not yet had the time to consolidate them. Lastly, this observation needs to be put into perspective by country: Colombia is heavily involved in this associative landscape while Argentina and especially Uruguay are retracting.[8] This confirms a decline in Uruguayan migrant associations. Consequently, it can be concluded that the dynamics differ considerably from one region and from one State to another.

Observation n° 2: the use of networks for North-South transfers of technology

Recent literature describes the way in which States contribute to the creation of diasporas (Meyer & Wattiaux, 2006; Dufoix, 2010; Dufoix, 2012). In effect, it is increasingly frequent for governments, in considering international migration as an enabler for development, to devise programs for the management of migratory movements. The migrant population, this new intermediary without borders, is thus being used by different levels of national government administrations as well as by the institutional bodies. Choosing Selecting knowledge ambassadors to carry the transfer of skills is the paradigm on which State-centered international networks are based. The case studies substantiate this view, notably for Colombia. In effect, successive initiatives since the beginning of the nineties have forged the image of a sovereign state beyond its geographical borders, capable of creating a transnational labour market.

8 Only one Uruguayan association in the corpus.

The mobilisation of human capital has recently been conceptualised as a form of diaspora option (Meyer, Barré y Hernández, 2003). Nevertheless, the empirical data in the case study show that:

- the diaspora networks mobilized by government institutions had no prior existence but were created by them;
- the organisation of the linkage is increasingly being set up prior to their departure.

This is why the mobilisation of expatriate talent, which is implied in the idea of the "diaspora", is closer to "strategy" than to "option". The design is in effect attributed to the government which by the medium of its institutional fabric develops policies that favour the dispersion of migrants and the re-focusing of scientific and technical links. Consequently, the skills recovery seems to be closer to the thinking of Larner, who referred to "diaspora strategies" as the constitution of groups that had no prior existence.

The "diaspora strategy" seems then to reflect an advanced stage of the diaspora option, a stage at which governments, conscious of the benefits to be drawn from the dispersion of human capital, encourage the departure of young talent by administering contemporary forms of "return".

This definition thus goes further than that of Larner (2007: 334), since it attributes the responsibility for dispersion to the State and to institutional bodies.

In Colombia the mobilization of the diaspora has been a State venture for twenty years. The "Caldas Network" or *RedCaldas,* the first experiment that is internationally renowned and widely documented, is a network steered by the Colombian Innovation Agency, the Colciencias, which is presently the Ministry of Science and Technology as of 1991. This was replaced in the middle of the first decade of the twenty-first century by a new experiment of the Ministry of Foreign Affairs, known by the name of the "ColombiaNosUne" program, the administration of which was thus handled by the government. Nevertheless, if the Colciencias lost its exclusive character, it should be noted that this Ministry is continuing its activities in this area and is also undertaking new initiatives such as developing networks of former scholarship students, who are increasing in numbers in view of the objectives set by this institution, by encouraging former scholarship grantees of the former Colciencias to contribute to national production from overseas[9] (Caplan & Fornale, 2014) and by strengthening skills transfers through the financial incentives of the PDAR program.[10] In addition, both the Ministries are committed to the objective of creating knowledge networks to promote the development of science in Colombia. For the first (the Colciencias), this objective was pursued by encouraging young researchers to study overseas in world-renowned institutions, while for the second, it was by facilitating the

9 Reformulation of the limitations on grantees of scholarships for advanced studies.

10 *Programa de Diáspora de Alto Reconocimiento*, for the creation of collaborative links in the sectors of science, technology and innovation (Energy, Water, Biodiversity, Agriculture, Technological Development and Innovation are the five main priority sectors of this programme).

re-connection of scientists with their country of origin, once they were settled abroad.

Lastly, the Raíces program set up in Argentina is the most recent of the programs presented above. Recognized as a government policy since the enactment of law 26.421 of November 11, 2008 (and in operation since 2003), the Raíces program contributed on one hand to the return of 822 scientists to Argentina and, on the other, to the creation of professional associations, including the scientific network of Argentines in Germany, which is the most formally organized of such networks.

In any case, if these diverse programs[11] have demonstrated an interest in creating associations, the return, permanent or virtual, is manifested mostly at the individual level.

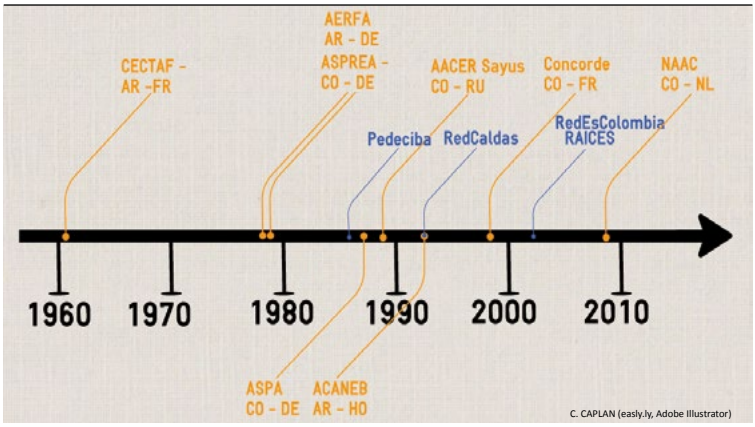
From the following examples, the Colombian case appears to be interesting since the Colombian Government seems to have explored different ways of organizing diaspora links. First, the creation of associations by the Caldas Network, *Red Caldas,* was initiated in the nineties and then again in 2003 with *ColombiaNosUne* (which created national groups of Colombian researchers and students). To this program was added the virtual network *Redes Colombia*, with the aim of promoting social integration of Colombian expatriates at the level of their geographical dispersion. Colombians then experienced the trend of using social networks to create diasporas of expertise. However, the Colombian case is particularly interesting for another reason, since the guidelines recently adopted by the Colciencias (now the Ministry of Science and Technology) reflect the more aggressive attitude of the countries of origin in their quest for scientific and technical knowledge. In fact, from then on it has been in the use of the diaspora as a strategy, by fostering departures and monitoring the socio-professional careers of expatriates that the diaspora option seems to have been overtaken. This use of expatriation can also be observed elsewhere in Latin America as the example of Ecuador shows. The Senescyt (the National Secretariat of Education, Sciences and Technology of Ecuador) follows a similar policy. For two consecutive years, the steady increase in the number of scholarships granted to nationals and the organization of meetings with students abroad (two forums were organized in Europe) are the distinctive markers of a diasporic strategy that combines dispersion with the maintenance of links.

However, the use of migration for the benefit of scientific and technical development is far from being a task for governments in countries of origin. In fact, the development approach, which suggests the use of migration as a lever for development, seems to have been first initiated in countries of the North. Programs to promote the creation of associations – of nationals from countries of the South – directed by countries of the North, were far ahead of those emerging in countries of the South (see time sequences, figure 2). By integrating technical cooperation into the migration issue, in some cases since the sixties, the countries of the North undertook to create *return diasporas*. It can be assumed that this

11 See the developments of these different programs in this book's Cchapter 6.

second focus – now that of the countries of origin – of the diaspora would create a bi-polarization of the association space.

Figure 2: Migrants' associations: the impact of government strategies of countries of the North and the South. The knowledge diasporas institutionalization



Cectaf: Centro de Científicos y Técnicos Argentino-Francés; *AERFA:* Asociación Argentina de exbecarios de la República Federal de Alemania; *Asprea:* Asociación de Profesionales con Estudios en la República Federal de Alemania; *Aspa:* Asociación Antioqueña de Profesionales con Estudios en Alemania; Aacer Sayus: Asociación Colombiana de Egresados de Rusia; *NAAC:* Netherland Alumni Association of Colombia. *Source:* own production

Observation n° 3: A bi-polar space

The practice of using international migration for the benefit of development has led countries of origin and host countries[12] to use their institutional expertise to create an associative fabric adapted to the requirements of cognitive transfers. In this respect, some European countries have taken initiatives in the creation and maintenance of scientific links with former migrants in Europe who have returned to their countries of origin. France, Germany and Holland are the most active in this area. From the practice of a circulatory approach to skilled migration since the seventies (for Germany and France), it expanded and took on an increasingly international dimension with the development of remote re-connection platforms, such as the Alumni portal Deutschland.

The case of Germany illustrates perfectly this evolution in the creation of a scientific community united by their experience of the migration space. Since it is also the most successful in terms of planning development through migration policies, we have chosen here to describe this case in detail.

As of the nineteen seventies, institutions – such as the German Academic Exchange Service (DAAD), the Brandt Commission, the Alexander von Humboldt

12 Here we again introduce the notion of proto-diaspora spaces since ethnic affiliation is not always the condition for membership in these networks.

Foundation (AvH) and Capacity Building International (InWEnt) – took up the issue of return migration by stimulating the creation of association branches in the large cities of developing countries, the leadership of which was held by returned migrants (see tables 2 and 3). Their purpose at that time was to maintain scientific and technical links and to promote the German sciences in their countries of origin. Today, some of these networks are very dense and active in most countries of the South. Nevertheless, the increasing complexity of the social fabric made it essential to reformulate the technical cooperation policy and to centralize tools for transfers (including the associations). This is why the Alumni portal Deutschland is endeavoring to re-focus institutional efforts in order to limit the effects of dispersion.

Government organizations and support for return: State-centered proto-diasporas

Table shows the role played first by the German Government in the construction of diaspora-type scientific networks. The financial incentives of the German Ministry for Economic Cooperation and Development (BMZ) results in the creation of associations of migrants and thus to international networks of returned migrants. They also play an inspirational role in their return since the program of their Centre for International Migration and Development (CIM), (which was also based on existing associations of returned migrants *in situ*) led to the return of migrants settled in Germany who were willing to return to their countries of origin. The financial incentives for a dignified return thus constituted a means for creating scientific links with institutions of the South and for proceeding with bilateral skills transfers.

Creation of complementary associations: the non centered proto-diasporas

This creation of associations was however much more complex. In fact, in this process which is dependent more on the migrants' host institutions than on a shared ethnic identity, the Government was not the only one to undertake the recovery and even the setting up of personal and scientific links which transcended international borders. This is why certain institutions such as the KAAD[13] and the KIT[14] were involved in the creation of networks of former students.

Whether or not they were sponsored by the Government, these initiatives consisted of sending funds, thus authorizing the associations to meet, organize activities and draw up plans. Consequently, they were dependent on the centre. The result was a proto-diaspora centered on the host space, a model that broke with the design of the *diaspora* up to then. If it was a dispersed community, the members were returned migrants, *returnees* for whom the links were dependent

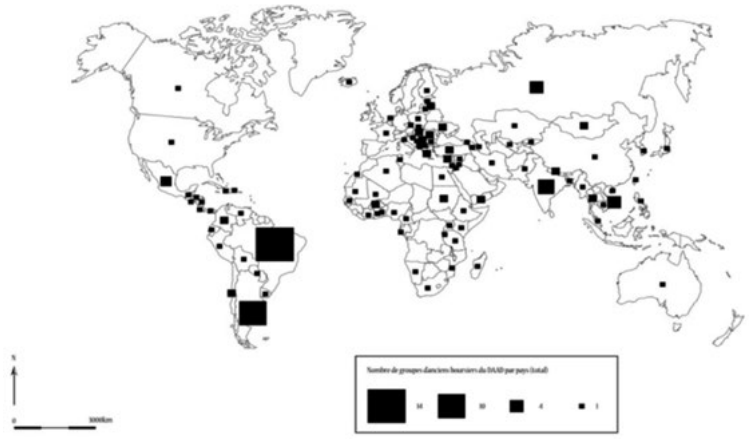
13 Katholischer Akademischer Ausländerdienst, a German scholarship organization.
14 Karlsruher Institut für Technologie, a German institute of technology.

on, or at least constituted in close relationship with the centre (see figure 3, the example of Germany).

Table 2. The State and its diaspora

Institution	Name of the program	Countries concerned	Additional information
GTZ-GIZ (GTZ+InWEnt +CDG)	Alumniportal Deutschland (APD) - GC21	About a hundred countries with a Latin American portal for the Global Campus 21 (GC21)	<http://www.alumniportal-deutschland.org/> and <https://gc21.giz.de/ibt/es/gc21/ opt/site/gc21/public/index.sxhtml>
DAAD	APD-AEBAS (associations)	Latin America: Argentina, Bolivia, Brazil, Chili, Ecuador, Colombia, Paraguay, Peru, Uruguay, Venezuela	World network (see the map)
Ex-InWEnt (GIZ)	Re@l	LA: Peru, Argentina, Ecuador, Venezuela, Chile, Uruguay, Paraguay, Brazil, Colombia, Bolivia	<www.gc21.de> (global campus virtual platform: courses for continuous learning for the alumni) Thematic Groups "communities of practice" Rades, Recall etc.
International Centre for Migration and Development (CIM) (GTZ and associations)	Return program for experts	LA: Argentina, Bolivia, Ecuador, Brazil, Chile, Colombia, Peru	Directed to all former grantees in Germany. Intermediary service and salary incentives (work in the priority areas of German Cooperation)

Figure 3. The return diaspora, an instrument of German technical cooperation



Number of ex DAAD's interns (by countries). *Source:* own design and production (Caplan, 2013)

Table 3. Institutional proto-diasporas

Institution	Name of the program	Countries concerned	Additional information
KAAD Katholischer Akademischer Ausländer Dienst	KAAD Alumni	KAAD Alumni Latino America (Tomas Kruggeler) Argentina, Ecuador, Colombia, Peru	
Alexander von Humboldt Foundation	Asociacion Humboldt		Activities in decline
Alumni Kit	Karlsruhe Institut Für Tecnologie, KIT Club and KIT Alumni	Argentina, Brazil, Chili, Ecuador, Peru, developing and developed countries	
Goethe Institute		Peru, Bolivia, Brazil, Venezuela, Colombia, Chile, Uruguay, Argentina	Regularly hosts the AEVAS, in collaborationwith the Re@l also
Brandt Commission			Its missions vary. In Peru it served to host the return program of experts who are today working for the GIZ

A space for multiple actors

Beyond bi-polar interest in the spaces of hosting and origin, an exponential rise in interest in diasporas can be observed in many decentralized government services. This interest was displayed in spaces of origin as well as hosting, the ambition of the universities or granting institutions being to construct semi-formal or formal networks of highly qualified migrants. In addition, throughout the corpus of associations studied, nearly 50 < % of the total formal and semi-formal associations examined are directed by institutions in countries of origin or host countries at the international level,[15] making the share of independent associations marginal.

Also, in the countries of origin, the diaspora option takes shape at the national and international levels through the intervention of:

- *Ministries, departments or specialized government agencies:* the ministry of foreign affairs (directly or by the intermediary of consulates and/or embassies), the ministry of science and technology, ministry of education, etcetera;

15 64 % if non-governmental institutions are added to the networks administered by governments.

- *Universities and university networks:* by organization of associations of former students abroad, and national (legislative provisions) and international incentives (internationalization).

In host countries, the levels remain the same but follow a slightly different meaning:

- *Consular:* efforts of consulates and embassies to create transnational links;
- *Ministerial:* scholarship institutions in charge of diaspora issues being reflected in the creation of international networks of former scholarship students in the host country (oriented generally towards countries of the South);
- *Academic:* some large universities create networks because they are encouraged to strengthen their international influence (internationalization).

The influence that host countries have on the migrant associations is very clear. In fact, of the total associations created by one of the two national poles (country of origin or host) 62 % had been created by an institution (governmental or otherwise) of the host country. Moreover, it should be noted that the non-governmental institutions clearly have less influence in the creation of the associative fabric (38 %).

The multiplication and diversification of actors thus leads to a phenomenon of multi-polarization of the association of skilled migrants, with nodes sometimes centered on the spaces of origin and sometimes on those of the host countries of migrants. In addition, the association of skilled migrants is maintained by actors from diverse political and social horizons.

Summary Comments: A failing model which challenges the governance of skilled migrants

This multi-pole pattern points to the interest of international agencies concerning civil society. However, civil society must agree on its broadest meaning and take into account all the actors which contribute to the creation of diasporas of knowledge. In this case, the role of academic and scholarship agencies should be reconsidered since they are promoting the circular mobility of diaspora strategies (exogenisation) or the diaspora option (endogenisation). States, migrants and institutions must consequently be considered together with the circulation dynamics; otherwise there is a risk of breaking up the diaspora space and as a result, fragmenting the social dynamics. On a migratory planet that is propitious for increasing exchanges and multiplying resource spaces, the diaspora seems more complex than ever. Efforts must therefore ensure respect for this complexity since the trend towards simplification by reducing the diaspora to a dispersed

ethno-national entity, which is very often the role model for government administrations, is hardly promising for sustainable and self-sustaining diaspora socialization. In this respect, the appropriation and the practical use of cyberspace resources by migrants must be adequately studied in order to promote an integrated model for the activation of diasporas.

Appendix:
List of associations
Argentine, Colombian, Uruguayan

Three categories are shown in this table and are explained below. They make it possible to understand the link with the centre as we perceive it.

- *State-centered:* Government initiatives: they come under a government initiative whether of the country of origin (Origin) or of the host country (Host).
- *Non State-centered:* Academic initiatives (public and private): they come under an institutional initiative of the country of origin (Origin) or of the host country (Host).
- *Independent:* Other, direct initiatives of migrants.

National collective	Association	Link with the centre
Argentina	Massachusetts Institute of Technology - Club de Argentina	Non State-centered (Host)
	Centro de Científicos y Técnicos Argentino-francés	Independent
	Anciens étudiants de l'École des Hautes Études Commerciales HEC	Non State-centered (Host)
	Argentine Association of Alumni in the German Federal Republic (AERFA)	State-centered (Host)
	Sociedad Medica Argentino-Estadounidense	Independent
	Asociación Argentino-Neerlandesa de Ex Becarios (ACANEB)	State-centered (Host)
	Association Franco-Argentine de Psychiatrie et de Santé Mentale	Independent
	Observatoire de l'Argentine Contemporaine	Independent
	Centro de Estudiantes y Graduados Argentinos (CEGA)	Independent
	Asociación de Abogados Franco-Argentinos	Independent
	Foro de Profesionales Argentinos	Independent
	Red de Científicos Argentinos en Alemania (Raíces)	State-centered (Origin)
	Asociación Franco-Argentine de Médecins	State-centered (Host)
Colombia	The Colombian American Association	Independent
	Asociación de Profesionales con Estudios en la Republica Federal de Alemania (Asprea)	State-centered (Host)
	Association France Amérique Latine (AFAL)	Independent
	Asociación Antioqueña de Profesionales con estudios en Alemania (Aspa)	State-centered (Host)
	ACER SAYUS	State-centered (Host)

National collective	Association	Link with the centre
Colombia	Asociación de Colombianos Investigadores en Suiza (ACIS)	State-centered (Origin)
	Concorde	State-centered (Host)
	Yo Creo en Colombia	Independent
	Fundación San Ezequiel	Independent
	Association of Colombian-Canadian Professionals (ACCOA)	Independent
	La Llave	Independent
	Universidad de Antioquia (3)	Non State-centered (Origin)
	Grupo de Accion y Desarrollo Solidario (GADES)	Independent
	Universidad de Antioquia	Non State-centered (Origin)
	Association d'Étudiants et Créateurs Colombiens en France (Colcrea)	State-centered (Origin)
	Universidad de los Andes (6 structures)	Non State-centered (Origin)
	Asociación de Estudiantes Colombianos en la URAP	Non State-centered (Host)
	The Swedish Colombian Chamber of Commerce	independent
	Universidad del Norte	Non State-centered (Origin)
	Nederland Alumni Association (NAAC)	State-centered (Host)
	Travailler Ensemble Jeunes et Engagés (TEJE)	independent
	Enlace Barcelona (Enlace BCN)	State-centered (Origin)
	Universidad del Norte (2 structures)	Non State-centered (Origin)
	Latinosoyuzniki	Independent
	Universidad Javeriana (6 structures)	Non State-centered (Origin)
	Asociación de Profesionales Colombianos en los Países Bajos (APC)	Independent
	Profesionales Colombianos en Holanda (PCH)	Independent
	Georgetown University Club de Colombia	Non State-centered (Host)
	Asociación Red Colombia	Independent
	Universidad Externado	Non State-centered (Origin)
	Servicio Doméstico Activo (Sedoac)	Independent
	Unión de Profesionales Iberoamericanos en Catalunya (UPIAC)	Independent

National collective	Association	Link with the centre
Colombia	Universidad de los Andes	Non State-centered (Origin)
	Massachusetts Institute of Technology Harvard Club	Non State-centered (Host)
	Massachusetts Institute of Technology Enterprise Forum Colombia	Non State-centered (Host)
	Graduate Business School of the University of Navarra Alumni Colombia (IESE Alumni)	Non State-centered (Host)
	Colombian American Chamber of Commerce of Houston	Independent
Uruguay	Psicólogos Uruguayos por el Mundo	Independent

References

Bernal, V. (2004). "Eritrea goes global: reflections on nationalism in a transnational era". *Cultural anthropology*, 19 (1): 3-25.

Boulin, J.-Y.; Dommergues, P. & Godard, F. (2002). *La nouvelle aire du temps*. Paris: Editions de l'Aube.

Caplan, C. (2014). *Réseaux transnationaux et diasporiques de la migration andine en Europe. Géographie d'un partage*, tesis de doctorado en Geografía, Paris: Université Paul Valéry.

Caplan, C.; Fornalé, E. & Panizzon, M. (2015). "A comparative analysis of development policies in Latin America: joint reflections of their impact on science mobility and diáspora". In: Fornalé, E.; Panizzon, M. & Zurcher, G. (2013), *Handbook of the law and policy of international labour migration*. Houndmills: Palgrave MacMillan Publishing.

Dufoix, S. (2012), *La dispersion. Une histoire des usages du mot diaspora*. Paris: Editions Amsterdam.

————————; Guerassimoff, C. & De Tinguy, A. (2010), *Loin des yeux près du cœur, les Etats et leurs expatriés*. Paris: Presses de la Fondation Nationale des Sciences Politiques.

European Commision (2013). *Maximising the Development Impact of Migration. The EU contribution for the UN High-level Dialogue and next-steps towards broadening the development-migration nexus*. Bruxelles: European Commision.

Gamlen, A. (2011), *Creating and destroying diaspora strategies*, Oxford: Oxford Diaspora Program, IMI, available at <http://www.imi.ox.ac.uk/pdfs/wp/wp-11-31-creating-and-destroying-diaspora-strategies> (last visited: 30/6/2014).

———————— (2006), *Diaspora Engagement Policies: What are they, and what kinds of states use them?*. Oxford: University of Oxford, COMPAS, available at <http://www.ssrc.org/workspace/images/crm/new_publication_3/%7B0a6ab151-8050-de11-afac-001cc477ec70 %7D.pdf> (last accessed: 30/6/2014).

GMG-UNDP (2010). *Mainstreaming migration into development planning. A handbook for policy-makers and practitioners*, Global Migration Group, available at <http://www.globalmigrationgroup.org/sites/default/files/uploads/UNCT_Corner/theme7/mainstreamingmigration.pdf> (last accessed: 30/6/2014).

Guarnizo, L. E. & Smith, M. P. (eds.) (1998). "Transnationalism from below". *Comparative Urban and Community Research 6. New Brunswick: Transaction Publishers,* 6.

IOM-UNDP (2013). *Making the case for including migration into the Post-2015 development agenda*, Background Paper, IOM-UNDP, February, available at <https://www.iom.int/files/live/sites/iom/files/What-We-Do/docs/Final_input_paper_IOM-UNDP_HLP_Stockholm_26Feb2013.pdf> (last accessed: 30/6/2014).

Larner, W. (2007). "Expatriate experts and globalizing governmentalities: the New Zealand diaspora strategy". *Transactions of the institute of British geographers,* 32 (3): 331-345.

Le Bayon, S. (2012). *Le web pour une approche qualitative et quantitative de la diaspora bretonne?*, E-diaspora Atlas, available at <http://www.e-diasporas.fr/working-papers/LeBayon-Bretons-fr.pdf> (last accessed: 30/6/2014)

McKenzie, D. & Rappoport, H. (2006). *Can migration reduce educational attainment ? Evidence from Mexico*, World Bank Policy Research Paper, 3952, available at <http://siteresources.worldbank.org/dec/Resources/Can_Migration_reduce_Educational_Attainment.pdf> (last accessed: 30/6/2014).

Meyer, J.-B.; Barré, R. & Hernández, V. (2003). *Diasporas scientifiques*. Paris: Expertise Collégiale, Ministère des Affaires Étrangères.

Meyer, J.-B. & Wattiaux, J. P. (2006). "Vanishing doubts and increasing evidences". *International Journal on Multicultural Societies*, 8 (1): 4-24.

Mutersbaugh, T. (2002). "Building co-ops, constructing cooperation: spatial strategies and development politics in a mexican village". *Annals of the Association of American Geographers,* 92: 756-776.

Rouse, R. (1991). "Mexican migration and the social space of postmodernism". *Revue diaspora*, 1: 8-23.

Tarrius, A. (2001). "Au delà des Etats-nations, des societies de migrants". *Revue Européenne des Migrations Internationales,* 17 (2): 37-61, available at <http://www.persee.fr/web/revues/home/prescript/article/remi_0765-0752_2001_num_17_2_1778> (last accessed: 30/6/2014).

Tejada Guerrero, G. & Bolay, J.-C. (2010), *Scientific Diasporas as Development Partners: Skilled Migrants from Colombia, India and South Africa in Switzerland: Empirical Evidence and Policy Responses*. Berne: Peter Lang ag.

Chapter 4

Highly qualified uruguayan migration: Connection experiences

Fernando Lema

Between 1960 and 2006 Uruguay saw the emigration of 15 % of its population to Argentina, Brazil, Spain, Venezuela, Mexico, the United States, Israel and Australia, as well as to other quantitatively less important destinations. These migrations were associated with a series of serious economic and political crisis: between 1960 and 1971, there was a crisis with Uruguay's agro-export model; this was followed by the period of dictatorship from 1973 to 1985; and between 1999 and 2004, the country's neo-liberal economic model consodilated. Communities of Uruguayan residents living outside the country have been organizing themselves in associations, cultural centres or sports groups. These organizations bring together migrants, students or professionals who left the country in the three aforementioned periods. The boundaries that these migrants have with their home country are usually of family or touristic nature, with scarce remittances, but during the dictatorial regime it had acquired a predominantly political character. Other than for the periods of political exile (1972 to 1985) and the return of democracy in the country, no other organizations of qualified Uruguayans living abroad are known about.

The consultation councils created through a government initiative in 2005 that were formalized by Article 74 of the Migrations Act 18250 of Uruguay, integrate qualified people living outside the country into them. Organizations of professionals who migrated during the 1980s played a very active role in collaborations with the university, the government and research bodies in Uruguay by making contributions for specialized training both within and outside the country, by driving policy developments in science, technology and innovation, and by establishing links with international cooperative institutions and networks of scientists. These organizations broke up towards the end of the 1990s with the return of a significant number of professionals to Uruguay and the resumption of scientific and higher educational university activities that had been significantly harmed by the dictatorship. Starting in 1998, migration flows reversed and the number of Uruguayans returning to their home country increased. As the country experienced economic, production and scientific growth, the demand for highly qualified personnel also grew. A deficit of qualified people particularly existed in

development sectors connected with infrastructure (energy, petroleum, mining, construction, and transport) and in the field of new technologies (biotechnology, communications and agricultural industries).

Migration, Knowledge, and Development: An Equation with Several Unknowns

Sustainable development in a society is associated with its capacity to transform, with the added value of knowledge to its natural, social and productive resources. Every country shares this development model, but countries are differentiated by the additional feature of whether or not they have knowledge about every stage in their productive chains. For this very reason, the socio-economic development of a nation depends on the human and material resources available to transform a country's social and productive matrix. Latin American and Caribbean countries have been providers of this raw material since their independence. Nonetheless, the fragility of the State in strategic planning, in regional integration, in the knowledge of its own natural resources, and the absence of strategic objectives to transform these resources, led to the detachment of scientific and technical information from development processes. These situations generated a chronic knowledge deficit in terms of educational factors linked to the generation of knowledge and with regard to the financing of scientific research and its correlation with the production system. In Latin American countries science, technology, and innovation were not vehicles for development. For this reason States did not define educational, financial, productive or social equity policies, nor did they create adequate human resources to access relevant transformative knowledge.

The knowledge deficit in developing countries produces an internal socio-cultural gap as well as a divide with developed countries. This divide is further widened by the productive leap produced in the world economy as a result of the application of new technologies (computer, robotics, electronics, nanotechnologies and biotechnologies) to productive chains. Moreover, a nation's degree of economic and social development and the strategic importance attributed to a national innovation system are determinants for the retention or loss of qualified personnel. Skilled migration is a selective process influenced by demand in receiving countries that generates diverse mechanisms of attraction (academic scholarships, selective migration policies, etc.).The migration process, together with the market expansion augments the need for qualified personnel, the strategic importance of knowledge and innovation, and productive and social demand for the latter. The lack of incentives for the development of scientific activities and political and social instability also cause migration of professionals. The expulsion process stops and starts up again with democratic consolidation, social equity, and changes in the new international geopolitical context, as happened especially

due to the impact produced by China and Brazil in the continent's productive development.

Faced with the need for highly qualified human resources, States adopt strategies focused more on people than on the causes of migration processes. In one perception, migration of professionals is considered a loss of national potential – "brain drain" –, while in a second one mechanisms are created for people, knowledge and technologies to return – defined as "brain gain". The former option generates regulatory policies for migration flows, establishing "quotas" for granting overseas scholarships, or imposing administrative or economic sanctions on populations that do not return. These policies have diverse and adverse effects. In general, they are poorly perceived by the populations in question which, unaffected by the policies adopted, encourage migration trends towards large centres of scientific attraction.. Some countries in the region create mechanisms for repatriation of qualified personnel, the success of these mechanisms being linked to the level of development in the national innovation system in the receiving country.

Activities that link qualified migrants with projects in their countries of origin emerge from the migrants' individual, university, or State initiatives in migrant-sending countries. Professional organizations related to development in countries of origin are formed to facilitate linkages with specialists and national institutions. These activities are boosted by the emergence of new communication technologies and by the emergence of international cooperation programs. This development of information and communication technology expands the forms and methods of professional linkage by identifying qualified personnel on offer and putting these people in contact with the technological and industrial demands of institutions in countries of origin. The creation of linkage project incubators seems to be an innovative and promising perspective for the development of strategies for return of expatriated knowledge. Recently, Latin American states have expressed their concern over the lack of qualified human resources required for productive and industrial developments as well as for value chains in exported raw materials. Linking a country's needs with emigrated qualified personnel can mitigate this situation. Nonetheless, no professional linkage strategies can prosper without applying policies that reduce migrant-sending tendencies and identify the needs of the qualified personnel. This could be achieved through development models that bridge the socio-educational gap and retain qualified personnel, thereby consolidating the national innovation system and its regional impact.

Qualified Uruguayan Migrants in France: From Civil Associations to Social Networks

The organization of Latin American and Caribbean professional migrants and their links with their countries of origin are associated with the migrants' political activism in the form of associations, discussion forums etc., as well as initiatives

from the countries of origin on return migration programs, linkage programs and meetings with professionals,, and with the availability of social and technological tools and their evolution (e. g., e-mail, thematic electronic forums, 2.0 Internet platforms, social networks). In the case of Uruguay, the first set of activities that the diaspora undertook pivoted around cultural matters (Casa del Uruguay or the Uruguayan House, exhibitions, meetings in cultural centres, etc.). The link between migrants, development, and the possibility of transferring technologies and knowledge to home countries began to be forged amongst Uruguayan migrants in 1990, who organized themselves motivated by the following factors:

- The damage done by dictatorial regimes in Latin American countries to culture, university life, and scientific systems.
- The impact of knowledge on development and the scientific-technological divide between developed countries and Latin America.
- The presence of highly qualified professional migrants working in scientific or academic institutions in Europe and the United States.
- The legal framework offered by France that facilitates the organization of associations of different natures.
- Cooperative programs from the European Union, SAREC (Department for Research Cooperation), SIDA (the Swedish International Development Cooperation Agency) for developing countries and links established between these associations and international cooperation organizations.
- Return of democracy to Latin American countries and to Uruguay from 1984 onwards that allowed a diagnostic study of problems existing in the national knowledge system, the identification of these problems, and the establishment of contact with cooperative organizations open to participating in the consolidation of the system.

Professional migrant associations are national in character, rarely regional, and have political, social and knowledge transfer activities in different forms as their important objectives. Professional uruguayans living in France have created associations with scientific cooperation objective (AFUDEST: the Franco-Uruguayan Association for Scientific and Technological Development) as well as objectives related to analysis, information and dissemination of the socio-political situation (CUDE: the Uruguayan Centre of Documentation and Studies), for cooperation with Latin America (ALAS: the Latin American Association of Scientists), and of a cultural nature (Casa del Uruguay). AFUDEST, created by 123 scientific professionals, orients its activities towards the Universidad de la República (University of the Republic) and public science institutes in Uruguay. This association propels scientific projects,[1] teaching activities, and meetings with government authorities

1 Programs in the European Union, the Swedish Agency for Research and Cooperation, the Swedish International Development Agency, ECOS SUD, the Foundation for Human Progress, and the Pasteur Institute.

for development of science. It also facilitates cooperation in the bilateral environment (between France and Uruguay) and the creation of scientific networks in Mercosur (Amsud-Pasteur), and sends equipments, books and related library collections that are donated by French institutions. It organizes training activities with the Pasteur Institute in Paris, the CNRS (the National Centre for Scientific Research), the INRIA (the French Institute for Research in Computer Science and Automation), and French universities. Afudest provides guidance for Uruguayan scholarship recipients in France and carries out activities to facilitate their return to Uruguay. Qualified Uruguayans living outside the country have participated in the evaluation of scientists in Uruguay and in the Basic Sciences Development Program (Pedeciba) since it was created in 1985. Sixty-nine scientists living outside the country form the Pedeciba (1985-2008) teacher-researcher pool and actively participate in tutoring science students and receive doctoral students at their institutions outside Uruguay.

Between 1987 and 1990, through an initiative from the Uruguayan Ministry of Foreign Affairs, meetings of qualified Uruguayans were organized to analyse the viability of developing biotechnologies in Uruguay. The Uruguayan Biotechnologies Association was created with the participation of these professionals. Afudest promotes, manages and participates in the homoderivatives laboratory established at the Faculty of Medicine (Universidad de la República) in Uruguay with the support of the Swiss Foundation for Human Progress.

Between 1987 and 1992 Afudest, with financing from SAREC and the Universidad de la República, actively participated in the establishment of the Immunodiagnostic Laboratory in the Faculty of Medicine in Montevideo, for research on Chagas disease. This project installs laboratories and accompanying equipments, and promotes Masters and Doctorate programs in Argentina, Brazil, Switzerland and France. It also provides developmental support to the Information Technology Institute in the Universidad de la República is, which is supported by the INRIA (the National Research Institute for Information Technology and Automation), with the participation of post-doctorate qualified Uruguayans who studied in France and returned to Uruguay in 1988. Afudest participates in preparatory activities for the establishment of the Faculty of Exact and Natural Sciences in the University of the Republic. The return of qualified Uruguayans living in France was generated in the framework of this project.

Afudest members initiated the Cooperation of the Pasteur Institute with the Latin America Association in 2000. This association participates in the creation of the AMSUD Pasteur network for training and exchange of researchers in Latin American countries and professional training activities, tutorials, or research activities with network members. Afudest participated in negotiations that led to the establishment of the Pasteur Institute in Montevideo and researchers living in France take on management responsibilities for this project in Uruguay.

The Centro Uruguayo de Documentación y Estudios (Uruguayan Centre of Documentation and Studies) undertook activities in Paris between 1981 and 1984, and with the participation of Uruguayan and French professionals continues to create documents, organize analytical meetings, and disseminate information about various aspects of Uruguayan culture and social life during the dictatorship.

Circulation, Linkage, and Return: Three Experiences of Knowledge Transfer

ALAS began its activities in the UNESCO Science Sector in Paris in 1991 by a decision at a consultative assembly meeting called by Afudest in the Maison de l'Amerique Latine (Latin American House), which brought together a hundred immigrant professionals. Its strategic objectives were oriented towards the analysis of Latin American science policy and its impact on development. ALAS defines its collaborative activities in accordance with the objective of assisting the organization of multidisciplinary groups capable of resolving scientific-technical problems in developing countries and, at the same time, by facilitating the circulation and exchange of knowledge and experience with European and Latin American specialists. It organizes a database of more than three thousand Latin American professionals residing outside their home region and Europeans interested in cooperation with the region. This information permits the organization of a cooperative program called the Inter-Regional Network of Latin American and Caribbean Scientists. In 1995 within the framework of this program was created Ecology-Medicine (ECOMED) – a network that brings together one hundred European and Latin American specialists from various disciplines who reside in France and Latin America. ECOMED conducts the study of two diseases transmitted by insect vectors that have a grave impact in the region: *American trypanosomiasis* (Chagas disease) and *leichmaniasis*.

These activities are financed by the Abbé Pierre Foundation, the Regional Council of Lorena, la Caisse de Depôts et Consignations (the Deposit and Consignment Office), el Groupe de Recherches et Echanges Technologiques (GRET or the Research and Technological Exchange Group), with the support of the Ministry of Foreign Affairs in France. The studies are undertaken in the Universidad de Antioquia (University of Antioquia) in Colombia, the Universidad Central de Ecuador (Central University of Ecuador) in Ecuador and the Universidad Nacional del Nordeste (National University of the Northeast) in Argentina, but its activities also extend to Panama and Venezuela. ECOMED's activities lead to scientific contributions and human resources training in Ecuador, Colombia, and Argentina, and the development of scientific documentaries produced by the Societé du Film de la Recherche Scientifique (Scientific Research Film Society or SFRS), la Fondation Nicolas Hulot pour la Nature et l'Homme

(the Nicolas Hulot Foundation for Nature and Mankind) (1999), and Médecins du Monde (Doctors of the World) (2000).

In 1999, under the auspices of the Inter-American Development Bank (IDB), ALAS carried out a meeting in UNESCO, Paris, on professional migrations from Latin America and the Caribbean. It brought together European and American experts and political actors with the purpose of identifying linked to the loss of qualified human resources. Based on a recommendation from this meeting, ALAS-UNESCO signed a convention by which information and experience acquired through professional links was transferred to the City Government and to the Universidad de Buenos Aires (University of Buenos Aires). This convention enables the organization of academic and governmental interest in the framework of the Cre@r Program (Create Program), the operative part of which was established in government headquarters in the Autonomous City of Buenos Aires. In 2001 the Secretary of Science, Technology, and Productive Innovation of the Argentine Republic organized a "Mercosur Experts Meeting Towards the Creation of Public Policies for Professional Migrations" with the participation of numerous Argentine professionals residing outside Argentina, and the ALAS Rapporteur. At the same time these activities are also found in the origins of the Secretary of Science and Technology's Raíces (Roots) Program. They aim to create low-cost linkage units designed to facilitate meeting between the external supply of qualified personnel and internal demand for knowledge in the production sector, the scientific system, and the academic world.

The first government initiative linked to repatriation to Uruguay was undertaken by the National Commission for Repatriation in 1985 which, with the support of the United Nations Development Program (UNDP) and the International Organization for Migration (IOM), organized the return of political exiles, among them being a number of important professionals. In two years the commission facilitated the return of 14,000 people, 2000 of whom had completed university education before being exiled and 1800 had completed their training outside the country. More than 2000 of the repatriated individuals held doctorate degrees. The National Commission for Repatriation signed a convention with the Economic Commission for Europe for the return of qualified Europeans. 113 researchers in the basic area returned to the country through this agreement and joined the Universidad de la República or the Pedeciba. The return of these scientists led to formation of the first nucleus of basic sciences postgraduates who, at the same time, formed an important diaspora participation network in local activities. Through direct or government management the Pedeciba researchers receive subsidies, to the value of USD 2,000,000.00 from the European Economic Community (EEC), the SAREC, the International Foundation for Science (IFS), and from various universities and research institutions.

The return of qualified personnel to Uruguay strengthens the development of academic projects. It acts as a retention agent for qualified personnel, strengthens

the development of highly skilled groups, and contributes to the consolidation of Uruguayan university and scientific institutions.

Qualified Personnel Linkage Dynamics

Associations of qualified personnel that were formed in the 1980s were created and carried forward by scientists, university professionals, and political militants. These organizations progressively disappeared once dictatorial processes came to an end in the region as interactions of a personal nature towards projects and programs were displaced, and as a result of the cut-down of funds from the projects under bilateral Franco-Uruguayan and European cooperation for Science and Technology in Uruguay. Currently, qualified individuals living outside Uruguay are not organized in groups and their connection with their home country are maintained through links established with colleagues from the same discipline or as a result of requests from Uruguayan university or scientific institutions. The organization of specialized personnel communities living abroad is no longer viable from a cooperation perspective once a political, social, and technical cycle has been completed and once the focus has been shifted from individual initiatives to Uruguayan institutions.

Associations that were founded in the 1980s fulfilled the function of identifying people and priorities for development, but at the same time they were triggers for cooperation processes at a time when the national Uruguayan innovation system was in a highly precarious condition. Subsequently, needs were institutionalized and directed through scientific and university level institutions. Recent economic and social dynamics have changed the forms and dimensions of the cooperation. Nonetheless, qualified migrants constitute an important and strategic knowledge reserve although their roles may not be the same as they were in previous organizational forms. Currently their main purpose, more than political-organizational in terms of cooperation actions, is to be carriers of specialized knowledge that is necessary for the development of institutions in their countries of origin. From this perspective, linkage activities can facilitate the transfer of knowledge once institutional needs in the national innovation system have been identified. Social networks and telematic platforms seem to open up new forms of linkage for organizing the participation of qualified migrants in international cooperation activities. The development of digital social networks, the emergence of Web 2.0, and the proliferation of content and long-distance communication tools change the forms and methods by which migrants communicate. On line platforms enable the organization of groups of specialists whose experiences help generate useful synergies for problem solving.

New times and challenges for professional linkage

Ten years ago, in a way similar to other Latin American countries, Uruguay has been experiencing a period of uninterrupted economic expansion that has generated new investments, industrial development, an important expansion in the National Innovation System (SNI), and growing needs for a technical workforce with varying degrees of specialization. Strategic projections of this growth and the actual deficit of qualified personnel reveal difficulties in meeting the demand generated by investment in production, development plans, and technological innovation.

Faced with this prognosis, the State, through its productive Cabinet as a government organization and the National Agency of Innovation and Research (ANII) as an executive body, drive the identification of needs through sectoral boards that analyse key innovation and industrial development sectors. This institution identifies the demand for qualified personnel by activity sector, an analysis that ought to lead to the adoption of measures that enable reining in the deficit of qualified personnel. It is relevant to point out here that Uruguay was a sending country from 1960 to 2006, a situation that has been reversed with recent socio-economic changes and the international crisis that has expelled significant contingents of professionals from Europe to other countries and Latin America in particular. In 2006, 55 % of Uruguayan migrants were under 29 years of age and had obtained higher levels of educational qualifications than the national average. At the same time, 30 % of Uruguayans living abroad in OECD countries have a tertiary level of education.

Although demand for qualified personnel increases, the national innovation system in Uruguay has still not conducted a survey regarding current and future needs for qualified human resources projections in the context of large national and regional transformations over the next 20 years. Nor are there any linkage organizations that put qualified migrants living abroad in contact with strategic areas of national development as defined in the Strategic Plan for Science, Technology and Innovation (PENCTI) or other State organizations.

Comments and general recommendations

a. One of the most relevant facts in recent history is the reality of transferring information and knowledge from a distance and in real time. This is made possible by:
   - propelling culture towards a knowledge society; improving management and social dissemination of knowledge reorganizing scientific education; developing pedagogies, tools, and distance education content and by improving technological training/education;

- organizing "intelligent packages" of information to resolve developmental needs in the national innovation system; organizing "intelligent management" of material and human needs in the national innovation system; and facilitating, systematizing and creating systems and data transfer and information analysis processes.

b. The SNI has growing technological and human resource needs. Current needs and future system projects are still not defined in different activity sectors. Therefore:
   - identifying human resources and technological needs by production sector;
   - being informed about actual and potential knowledge reserves in the educational system; and
   - promoting resource formation and knowledge transfer in accordance with identified needs, are important steps in this regard.

c. Profound global geopolitical changes transform production systems and qualified personnel migration dynamics. It is therefore necessary to:
   - identify new migration trends; create a new geography of mobility; and Study South-South, South-North and North-South migration dynamics.
   - learn about new knowledge dynamics and identify highly qualified migrants and their professional skills.
   - Create human resources needs observatories for regional innovation systems and for migration dynamics of highly qualified personnel.

d. Migrated human resources represent social capital that, when incorporated into the National Innovation System, enable the acceleration of scientific and productive transformation processes, thereby creating strong innovation dynamics. In Uruguay, there are recent examples of transformations produced by incorporating qualified individuals living abroad. The Pasteur Institute in Montevideo, new implementations in the Universidad de la República in the whole country.
   Managing links between supply and demand of knowledge through linkage structures that identify and put in contact actors in development for knowledge transfer in formation, evaluation, and consulting. Creating linkage units specifically for each productive sector.

Specific recommendations

Faced with a growing demand for qualified personnel, the State identifies needs by activity sector through sectoral boards, organizations that analyse key sectors in innovation and industrial development. This sectoral analysis enables identification of current needs to contribute to the adoption of measures towards

resolving problems created by the deficit of qualified personnel. Although the State should respond to the strategic objective of ensuring the training of human resources according to demand, the education sector has not responded to demands in the production and technology sectors. For this, as well as other reasons of an economic nature (lower costs to train highly qualified personnel, a temporary labour force), companies incorporate qualified personnel who have trained outside the country.

To ensure the availability of qualified personnel, the following are suggested:

1. Defining *migration policies* that facilitate the settlement of qualified foreigners, the granting of preferential visas for technical personnel who move to the country to undertake their activities. For example, there are important migration currents of young qualified Spaniards who are currently moving towards Argentina, Chile, Brazil, and Uruguay.
2. Facilitating *recognition of training undertaken and diplomas obtained abroad* and enabling development of these professions.
3. The promotion of *specialized resource training activities* aimed at resolving the problem caused by demand (technical, third party, high level, in new technologies). Educational structures susceptible to responding to strategic demand for qualified resources are found in technical schools, the Universidad de República, private universities that offer new courses in various parts of the country, and through continued training programs like Inefop organized by the Ministry of Labour and private organizations.
4. Developing *linkage activities* with trained personnel living abroad. These activities can be organized from a linkage unit that benefits tools organized by the Cidesal program database, the Redencuentro (the Network meeting) Platform, MICAL, 'Unoporuno', by identifying personnel needs at sectoral tables and by making adequate resources available to execute requested actions at the level of specialized training, consultancies, technical assistance (see chapters 7 and in 8 this volume).
5. The main source of qualified human resources in Uruguay is in the region itself (Argentina, Brazil, Chile and Venezuela). Uruguayan linkage programs should initiate regional agreements that facilitate the exchange of information concerning qualified staff, its circulation, the dissemination of skills, and training activities of common interest to countries in the region.
6. The implementation of pilot linkage experiences, "knowledge incubators", in strategic innovation sectors.
7. Contributions from the Ministry of Foreign Affairs and advisory boards operating from abroad regarding the organization of collectives of emigrant professionals with the intention of identifying skills, disposition

to collaborate with national institutions, and facilitation of links with foreign institutions.

8. The establishment of regional doctoral training programs that award diplomas recognized by countries in the region.
9. The facilitation of developing advanced professional qualification and regional training activities locally in key innovation sectors.
10. The positioning of Uruguay and its institutions as headquarters for conferences, symposiums, and international seminars that facilitates the circulation of high-level international scientists.
11. Conduct student, teacher and researcher circulations programs in Mercosur countries.

Periods of economic prosperity generate growing demands for professionals in all countries and regulate migration flows of qualified personnel. The State can respond to national innovation system's needs for qualified human resources through education, specialized training and linkage activities with emigrated personnel. Social networks constitute a potent tool for the identification of emigrated human resources and linkage with the needs of academic, scientific, and business organizations. Management of links between the demand for qualified resources in the national innovation system and knowledge pool can be undertaken from interactive on-line platforms with skills databases and automatic search mechanisms to find people. This activity already has a predecessor in tools, information and results obtained by the Cidesal program, the Red Uruguay Encuentro (Uruguayan Meeting Network), databases of qualified personnel, 'Unoporuno', for establishing links. The systematization of the use and dissemination of these tools at the state, university, or business levels can contribute to resolving the national innovation system needs in terms of training, consultation, or technical support.

References

Association franco-uruguayenne pour le développement scientifique et Technique (Afudest) (s/d). *Informes anuales de actividades, 1985-1994*. Paris: Afudest.

Auriol, L.; B. Felix & E. Fernandez-Poluch (2007). "Mapping Careers and Mobility Doctorate Holders". *oecd Science, Technology and Industry Working papers*, 2007/6, oecd Publishing.

Badie, B.; Brauman, R.; Decaux, E.; Devin, G. & Wihtol de Wenden, C. (2008). *Pour un autre regard sur les migrations. Construire une gouvernance mondiale*. Paris: La Découverte

Barre, R.; Hernandez, V.; Meyer, J.-B. & Vinck, D. (2003). *Diasporas scientifiques: comment les pays en développement peuvent-ils tirer parti de leurs chercheurs et de leurs ingénieurs expatriès ?* Paris: Institut de Recherche pour le Developpement (ird) éditions.

Barrere, R.; L. Luchilo, L. & Raffo, J. (2004). "Highly Skilled labour and international mobility in South America". *oecd Science, Technology and Industry Working papers*, 2004/10, oecd Publishing.

Buti, A. (2008). "Movilidad de investigadores uruguayos". *Ciencia, Tecnología y Sociedad* (cts) *Magazine*, 4 (10): 33-60.

Cabella, W. & Pellegrino, A. (2005). *Una estimación de la emigración internacional uruguaya entre 1963 y 2004*. Serie Documentos de Trabajo n.º 70. Montevideo: Unidad Multidisciplinaria, Facultad de Ciencias Sociales, Universidad de la República.

Dávalos, C.; Plottier, C. & Torres, S. (2009). *Fuga de cerebros: el caso uruguayo. Migración y políticas sociales en América Latina*. Rio de Janeiro: Fundación Konrad Adenauer.

Koolhaas, M. & Nathan, M. (2013). *Inmigrantes internacionales y retornados en Uruguay. Informe de resultados del censo de población de 2011*. Montevideo: Instituto Nacional de Estadística.

Koolhaas, M.; Prieto, V. & Pellegrino, A. (2007). *Emigración de personal calificado: el caso de los profesionales de la salud formados en Uruguay*. Montevideo: Programa de Población, Facultad de Ciencias Sociales, Universidad de la República.

Leipziger, D. (2008). "'Brain drain' and the global mobility of high-skilled talent". *prem notes*, 123, The World Bank.

Lema, F. (2011). "Migraciones y desarrollo. El empedrado camino de la independencia". In: *Circulación de saberes y movilidades internacionales: perspectivas latinoamericanas*. Buenos Aires: Biblos, Investigaciones y ensayos.

———— (2009). *Migraciones de personal calificado de Uruguay hacia los países desarrollados*. Informe realizado para la Agencia Nacional de Investigación e Innovación. Montevideo: anii.

———— (2007). "Migraciones calificadas y desarrollo sustentable en América Latina". *Educación superior y sociedad*, 12, 1: 109-123, Iesalc-unesco.

Lema, F. (2003). "Professional migration from Latin America and the Caribbean". In: *Diasporas Scientifiques. Comment les pays en développement peuvent-ils tirer parti de leurs chercheurs et de leurs ingénieurs expatriés ?* Paris: IRD Editions. Collection Expertise collégiale.

———— (1997). "Redes inter-regionales de científicos: nueva propuesta para el desarrollo del sistema científico y técnico regional". In: *La educación superior en el siglo XXI Visión de América Latina y el Caribe*, t. II, Caracas: Cresalc, UNESCO.

Macadar, D. & Pellegrino, A. (2007). *Informe sobre migración internacional en base a los datos recogidos en el módulo migración*. Informe temático, Encuesta Nacional de Hogares Ampliada 2006. Montevideo: INE-UNFPA-PNUD.

Meyer, J.-B. (2004). "Les diasporas de la connaissance : atout inédit de la compétitivité du Sud". *Revue Internationale et Stratégique*, 55. Paris.

Novik, S. (comp.) (2008). *Las migraciones en América Latina*. Buenos Aires: Clacso.

Olivera, M. N.; Lema, F. & Dávalos, C. (2013). "Redes transnacionales: Red Uruguay Encuentro. Nuevo espacio tecnológico, geográfico y social". *Revista de Ciencias sociales. Desigualdades y oportunidades en la Sociedad del Conocimiento*, 26 (33): 121-136, december.

Organisation for Economic Co-operation and Development (OECD) (2008). *International Migration Outlook*: Sopemi. Paris: OECD Publications.

Pellegrino, A. & Vigorito, A. (2005). *La emigración uruguaya durante la crisis de 2002. Serie Documentos de Trabajo*. Montevideo: Instituto de Economía, Facultad de Ciencias Económicas y de Administración, Universidad de la República.

Pellegrino, A. / Koolhaas, M. (2008). "Migración internacional: los hogares de los emigrantes". In: Varela Petito, C. (coord.) *Demografía de una sociedad en transición. La población uruguaya a inicios del siglo XXI*. Montevideo: UNFPA-Programa de Población-Ediciones Trilce.

Pellegrino, A. & Pizarro, J. (2001). *Una aproximación al diseño de políticas sobre la migración internacional calificada en América Latina*. Serie Población y Desarrollo, n.º 23. Santiago de Chile: Celade-CEPAL.

Solimano, A. (2006). *Movilidad internacional de talentos en América Latina*. Santiago de Chile: CEPAL.

Chapter 5

A Story of Many Stories: The Caldas Network

Valentina Pellegrino

This chapter presents an analysis of the Caldas Network aimed at linking Colombian scientists and researchers residing outside their home country with the Colombian scientific community. The program was conceived, managed, and financed by Colciencias and put up diverse strategies for the repatriation of knowledge.

A number of analyses of the Caldas Network contemplate both the correct decisions and errors made. Nonetheless, we believe that a vacuum exists, in that the aforementioned previous analyses have failed to take into account network interactions that took place via the email list that was in place from 1993 to 2006. These studies focus on the list's first stage (1993 to 1996). Additionally, while there are some allusions made to network members' interaction, there is no in-depth inquiry as to the way in which diverse actors may have understood this interaction. We have attempted to fill these gaps, basing our research on the use of primary resources, such as: messages sent within the Caldas Network's email list, Colciencias' files, and interviews with relevant actors.

This report consists of two parts: the first focuses on various actors' testimonies while the second is an analysis of the aforementioned documentation.

Story one: Or the Caldas Network Experience from a protagonist's retrospective viewpoint

In this section we analyse the Caldas Network using various testimonies: those of the person who was directing Colciencias when the program was created, the longest serving coordinator, two returned migrants who were part of the Network, and a Network user.

The problem with the weight of the subject on the object's notion in this case, as well as being a problem of position, is that there is also a marked temporal problem given that we are talking about a government program that finished almost a decade ago. Hence, what we gathered were not the representations of these actors that were applicable when they were members of the Network.

In this context, it is important to mention the malleability and selectivity of human memory, not to question the validity of testimonies obtained from these actors but rather to clarify that, while valuable, the information gathered should

be analysed taking into account the subjects' position, as well as the time that has passed between the program and the present day.

Having cleared up this matter, we can begin to identify the main themes that emerged from the testimonies of some of the Caldas Network participants.

The ambiguous notion of success in the Caldas Network

If there is one point that the testimonies agreed upon it is that they all affirmed that the Caldas Network was successful to some degree. The criteria for assessing success ranged from the creation of a sense of community, to the establishment of connections of different types or the partial resolution of the perception of isolation from the home country, and the idea that the program served for the social appropriation of new technologies.

The individuals who identified the most convincingly successful features of the program were those who worked on it in an institutional capacity, that is to say, its managers and coordinators. For Clemente Forero, ex-director of Colciencias, the creation of the network was based first on the creation of personal relationships, which were focused not on creating links between large groups of people but rather on closer "one-to-one" connections.

Forero affirms that multimillion-dollar contracts were signed between companies where Colombian members worked, thanks to these members having met through the network. Equally, it is worth mentioning that many internships were made possible due to connections made between network members and that these internships, in turn, generated exchanges at an institutional level.

In the same way, Blanca Riascos (network coordinator from 1994 to 1998) also considers that success may be evaluated by examining the degree to which the network fostered connections between Colombians both within and outside their home country. In addition, the coordinator indicates that another great achievement of the program was the repatriation of numerous Colombian researchers.

Although repatriation may be quantified thanks to the documentation kept in Colciencias, it is impossible to track contracts and other exchanges that may have been generated via the Network. Given these circumstances, it is difficult to evaluate the accuracy of the aforementioned observations. Having said that, another notion of success is that presented by the previous coordinator of a node in Europe as well as that put forth by the engineer who helped to compile the network's email list. For them, a common element of success had more to do with overcoming isolation and creating a community. What these actors refer to is not so much the effective results of links (projects, internships, exchanges) but rather qualitative through the creation of these links themselves. Both, in their situation as migrants, emphasize achievements that may be placed in the symbolic field: the importance does not lie in the fact that knowledge was exchanged, but rather in that members came to know about the existence of other migrants.

Thus, the engineer in question told us that in the initial years of the Caldas Network, when a person left the country there was an immediate perception of distance from the national reality, in the sense that international news did not move at the same speed which it does now. Hence, the establishment of a medium that facilitated the circulation of information regarding the national future was something that was hugely appreciated by qualified migrants. The other migrant highlighted the ease with which one could find out where other people were and what they were doing. For those actors who were not professionally linked to Colciencias, but who made up part of the diaspora at some point, success lay more in connection itself rather than the effects of the said connection.

Lastly, for Ligia Parra (network email list user), success consisted of the use of new technologies for communication, as there were no tangible results of the email list mediated interaction among Colombian scientists. Moreover, there was no consensus among the interviewees regarding Caldas Network users' profiles.

"The Caldasians" (members of the Caldas Network)

When we asked interviewees about whether they thought more intern students from Colciencias or more researchers residing outside of the country had participated in the network, we encountered four conjectures. Firstly, the director of Colciencias during the network's first stage pointed out that there had been considerable participation from both groups, although there were dominant region specific tendencies (for example, in the United States there were more students than researchers).

Moreover, the network coordinator from 1994 to 1998 highlighted that she did not consider the influence of postgraduate intern students to be significant, and that, in fact, one of the network's achievements was its power to connect people with doctorates, a profile which was scarce in the country at that time.

For the professor and engineer who participated in the compilation of the program's e-mail list it was important to highlight that although there was a significant number of students, the types of studies they were undertaking as well as the academic centres where they were enrolled placed them in a position beneficial to the network. It may be conjectured on the basis of their testimony that there was significant room for their movement and a considerable social capital could be mobilised even from their status as students.

Finally, the e-mail list user and national scientific community member that we interviewed signaled that in their opinion, the Caldas Network population was relatively young and still in training.

There was no common idea amongst the actors regarding whom they were talking about when they referred to Caldas Network members. Of course, some members had connections to science (whether through study or work) and all members had their Colombian nationality in common. It is understandable that

there is no single united vision of the members and it could be assumed, at least hypothetically, that the Network's population may have varied over time.

While for Colciencias employees the email list was part of the program, for some users the email list was the entire program. The Colciencias employees were emphatic in clarifying that the Caldas Network should not be considered an email list but a program that sought to repatriate knowledge. This accounts for how the Caldas Network meant different things to each actor who was involved, although the actors interviewed about the Network each held a positive view about it.

Story Two: Or the view provided by contemporary sources

It is important to see how the Caldas Network was created on the basis of documentation produced within the Network itself during its operational phase. We used three sources of information: periodic publications from Colciencias and some Caldas Network reference nodes, the organization's records, and messages sent via the R-Caldas email list between 1999 and 2006.

The first source is the one that has focused most on analyses of the Caldas Network. We will not get caught up on this source, given that a good part of what could be extracted from the aforementioned information has already been investigated in previous studies.

The Colciencias files, as well as the messages from the previously mentioned period, have not been analysed before. This documentation is very unique, as in the Colciencias archives these files were allocated program themes that do not resonate greatly in the constructed memory of the network. Additionally, the email list messages facilited the regaining, at least partial, of the network's diverse actors' voices.

The information could not be more varied: some cover the period from 1993-2001 while the others cover from 1999 to 2006. Moreover, regarding the documentation's authorship, the Colciencias archive represents the institution's voice, while the R-Caldas files contain the voices of the email list users. Finally, some files correspond to the repatriation component of the Caldas Network program and others are part of the virtual communication as a component of the knowledge repatriation mechanism. For this reason, we believe it is more useful to analyse these two sources separately.

An in-depth analysis of the Caldas Network's return component

The majority of the documents still available in Colciencias pertain to individual cases of people who requested access to the return program. The sources indicate that 59 people returned to Colombia thanks to the program.

This return involved the presentation of a, on an average two-year, research project and the explicit intention of a Colombian research institute to connect with the interested party. The projects and curriculum vitaes of the applicants

were evaluated by Colciencias, which then decided if it was pertinent to support the applicants' return with airplane tickets, furniture transport, and a sum of money to cover establishment costs. In return, beneficiaries committed to sharing the final results of the research projects they had proposed.

This strategy principally benefited people who returned to Bogotá, Cali, Medellín, and Bucaramanga. It appears that financing ceased in 1997 as after this year no more return processes are registered in the entity's files.

As well as being the program component with greatest need for resources, according to Colciencias employees who were interviewed, return migration was also one of the most effective components in terms of knowledge repatriation. Paradoxically, it seems to be the one most forgotten in literature about the program which emphasizes the diaspora option.

Perhaps an explanation for the imbalance between the importance of this component and its mention in literature on the topic is due to the fact that the return of qualified individuals to the country is much less both in absolute terms as well as relative as compared to other countries. Also, the novelty of the Caldas Network consists precisely of the stakes placed on knowledge circulation via long-distance links.

Moreover, it can be seen that the return component was connected to Colciencias' financial state as when the budget was used up the initiative came to an end. In contrast, as we will see with the R-Caldas component, the shrinking up of money or of the interest of the Colciencias in the email list did not have a major influence on its continuity.

R-Caldas

We believe that the email list component gradually became more important, as is demonstrated by the fact that the Colciencias interviewees insisted that, in their opinion, the mistaken impression that the Caldas Network was limited to an email list, needed to be corrected.

If this mistaken perception exists, it may be explained in two ways: one, the program was so unimportant that the email list was the best known feature about it, or two, the said list was of such magnitude that it overshadowed the reach of the Caldas Network itself. In any case, the fact that it assumed so much importance as a mechanism to satisfy the program's goals warrants an analysis of the network.

The email list (known as R-Caldas) was activated in 1993 as a means of communication for Caldas Network members, the network having been established by Colciencias in 1991. The email list was considered by Colciencias as one aspect of the Caldas Network, along with internships, the return of researchers, and a database of researchers.[1]

1 Colombian Network of Researchers Living Outside of the Country, Pamphlet, Caldas Network, Published by Colciencias.

This list is an example of the use of technology to create and consolidate the link between national scientific communities with members living outside of their country of origin. However, there are difficulties involved with studying the list, mainly in terms of availability of information. There is a gap in documentation between 1993 and 1998. This vacuum is partially filled by some emails that circulated in R-Caldas which are still published at <soc.culture.colombia> and can be consulted there.

Meyer & Charum's study (1998) on the list between 1993 and 1996 that analysed the frequency of message sending, senders, messages' use categories, and the thematic groups to which the messages pertained is about this missing period. This study enables us to compare information with those found in the list from 1999 onwards.

The R-Caldas study has two main axes: firstly, a quantitative analysis of message sending and typology, in which temporal variation in these categories is taken into account; this provides an image of R-Caldas' dynamics during these years.

The second core idea attempts to present, on the one hand, the online interactions that took place via the list: the tone that dialogues and discussions took on, motives for frequent discussion, R-Caldas users' perceptions, and what these individuals used the Caldas Network for. On the other hand, it highlights the technological aspects that resulted in both positive and negative list interactions. Matters such as the scope for or difficulties encountered in sending attachments, the speed with which messages arrived, or the repetition of messages, in a certain way helped to shape R-Caldas.

The R-Caldas list from 1993 to 1996: Meyer and Charum's studies and remains left on the Internet

According to Meyer and Charum's study (1998), more than 1000 messages were sent between 1993 and 1996. In their publication they point out that the number of messages sent doubled each year. Additionally, they indicate that the list functioned more as a daily news source than a forum and that the majority of messages were sent from Colombia.

The main institution responsible for sending messages was Colciencias, as the list made up part of their institutional program. Nonetheless, Colciencias was not responsible for hosting the R-Caldas list (which, during its first years was hosted by the Universidad de los Andes (Andes University) and later by ACIS (The Colombian Association of Systems Engineers) towards the end of 1998.

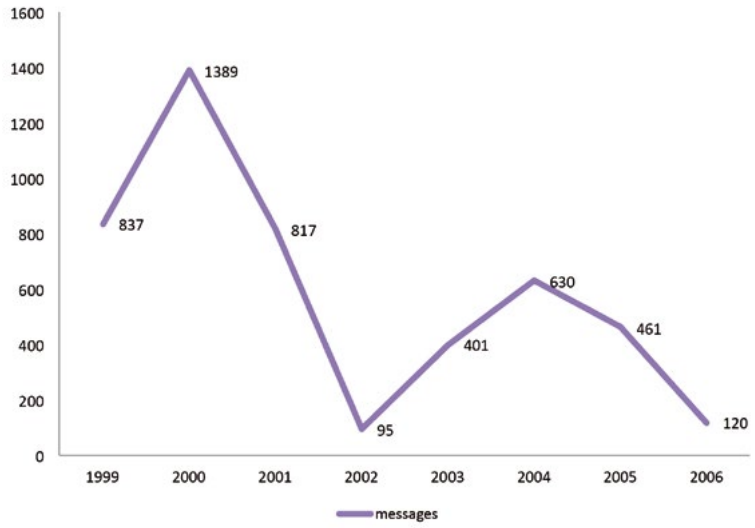
Meyer and Charum assert that the list served especially as a means of dissemination, and that one third of the network use was functional and, in large part, academic in nature, a characteristic that was reinforced seeing that while there were discussions and controversies, these never originated from recriminations, violent exchanges, or complaints. Moreover, they indicate that the messages were fairly well thought out.

There are no files on records of messages from this period, apart from some messages that were sent to other lists (such as <soc.culture.colombia>) and other messages that remain in Google Groups files. Amongst the scarce messages that we found from this period, we traced two controversies. The first concerned where the list would be hosted after the Universidad de los Andes stopped hosting it. The second was generated by a letter sent by Colciencias scholarship students sent to the institution itself, in which the students complained about Colciencias' failure to pay scholarship money.

The messages that we recuperated from Google Groups allowed us to see two aspects: first, the list members were not passive when confronted with problems concerning the list. In fact, several people looked for solutions to the lack of server issue, amongst which the solution of hosting the list on members' work servers was proposed. The second aspect is that yes, while a complaint from Colciencias scholarship students did circulate, this was because there were postgraduate scholarship students living outside the country. As we indicated previously, there is a difference between the potential resource mobility that a postgraduate scholarship student has when compared to that of a researcher already established in their field.

Quantitative analysis of the R-Caldas email list

Graph 1: Number of messages sent to R-Caldas

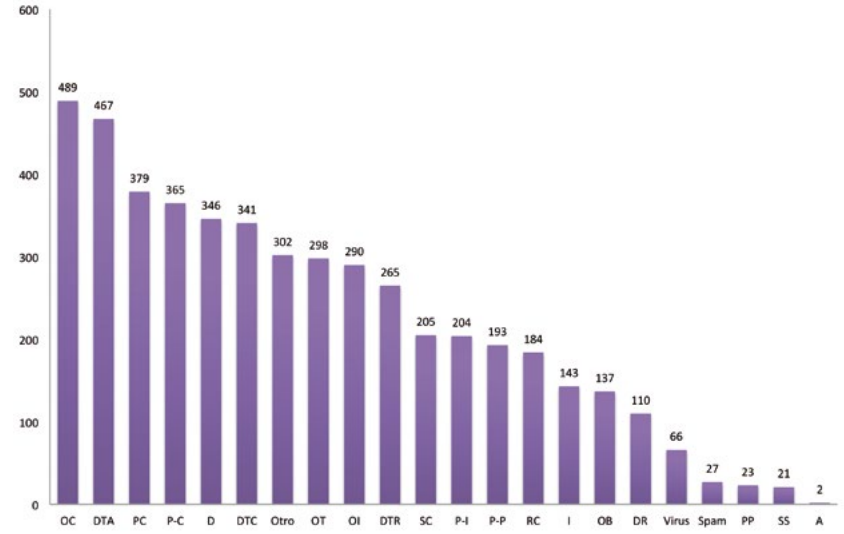


Source: own production

The question remains open, while many list users did not publicly participate in it (due to which it is impossible to know who they were), nonetheless, we can see with the scholarships controversy that scholarship holders did use the list as

a means of communication amongst themselves at that time. The question of whether they represented the majority of the list members remains unanswerable.

Graph 2: Number of messages by category in R-Caldas.



Courses on offer (OC): also includes conferences, seminars, masters, competitions, and magazine content. *Dissemination of current texts (DTA):* articles and columns taken from the national and international press about the political, economic, and social situation in Colombia and the world. *Science policy (PC):* messages about the conditions for practicing science in Colombia and outside the country, as well as messages about science-financing policies. *Scientific controversies (P-C):* messages from discussions about particular themes in science; scientific debate messages in R-Caldas. *Demand (D):* messages in which users could request information about scientific matters or daily life (accommodation in a particular city, specific information about a topic, etcetera). *Dissemination of scientific texts (DTC):* scientific or newspaper articles about debates, discoveries, and scientific research. *Others:* Messages that were mistakenly sent to the email list. These also include joke messages, chain messages, etc. *Job offers (OT):* also includes postdoctoral positions. *Information offers (OI):* refers to links to libraries and other online information sources. *Dissemination of network texts (DTR):* messages that originally appeared on other lists and that make up part of discussions outside of the Caldas Network. *Colombia's situation (SC):* messages that users sent regarding the country's situation at the time. *Individual controversies (P-I):* messages characterized by attacks directed at a particular person on the list, but that were sent to the entire group. *Political controversies (P-P):* messages with discussions about national politics or geopolitics amongst group list members. *Caldas Network (RC):* messages in which the Red Caldas's operations, objections, proposals and program were discussed. *Collective initiative (C):* proposals that were generally letters or protests regarding particular topics. *Scholarship offers (OB). Request response (D-R):* messages that were public responses to concrete requests made by list members. *Virus:* messages that warned members about viruses in the network. *Spam. Personal introduction (PP):* messages in which new users gave a brief description of themselves, their interest, and their academic situation. *Exit requests (SS):* messages in which users publicly requested to leave the list.

Source: own production

In general, the number of messages sent to the list slowly decreased over time. This may be seen as an indicator of the list's decline as the decrease in the number of messages is a clear indicator that it was being less frequently used to exchange information.

Nonetheless, this could also be indicative of an increase in "selectivity" in messages: that is to say, there may have been less of them but they may have been more relevant to Caldas Network users. To examine this possibility we have analysed the messages as per their content and classified them in categories, according to their content and meaning. In Table 2 the total distribution of messages that circulated in R-Caldas between 1999 and 2006 according to the categories previously mentioned is seen.

The majority of messages was about conferences, courses, and seminars on offer; followed by messages about current affairs and political science texts. The problem with this graph is that it provides a "fixed" image, similar to a photograph, of email list behaviour.

A diachronic analysis of message sending is necessary, as it enables a vision of what types of messages were continuously sent, and which increased and which decreased on the list over time. With this analysis we seek to coordinate the results offered by the graph with the message distribution according to categories.

Disaggregation of message categories over time

The graphical analysis does not include the year 2006 as in this, the last year for which R-Caldas records are kept in Mail Archive, a drastic fall in all types of messages is noticed. Moreover, it is seen that in 2002 the sending of all types of messages decreased drastically, due to which we may divide the list in two stages, the earlier period (1999-2001) and the later period (2003-2005). It is probable that list participation decreased due to the fact that in November 2001 Colciencias announced its "Strategic Colombian Dialogues", digital forums about five specific themes. It is also possible that some R-Caldas users moved to other sites to develop concrete themes, in contrast to R-Caldas.

The political situation and its representation on the list

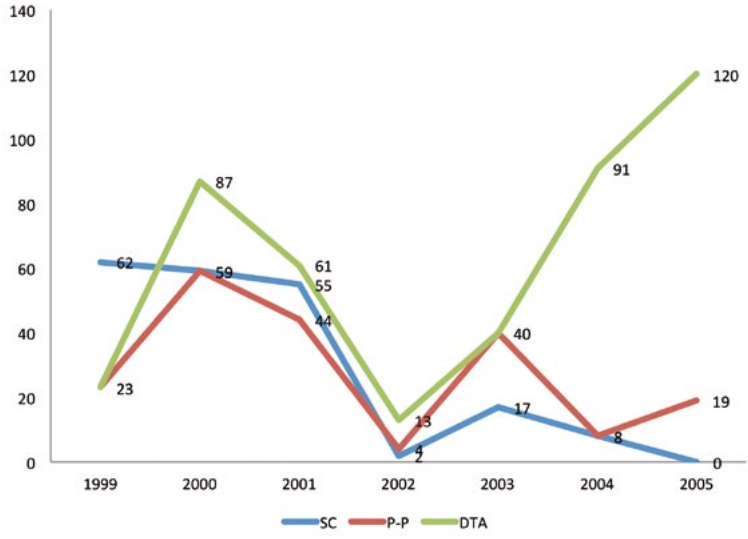
In graphic 3 we can see three categories of messages concerned with current affairs in terms of both the national and international political situations. The "DTA" line refers to messages that distributed current texts, principally magazine and newspaper articles that referred to Colombian and the world situation.

The "P-P" line refers to messages that made up part of political controversies involving list members. These messages were arguments and counterarguments about matters concerning Colombia's political and social situation.

The "SC" line refers to messages sent about particular national situations. These differ slightly from the P-P messages in that they did not generate controversies or

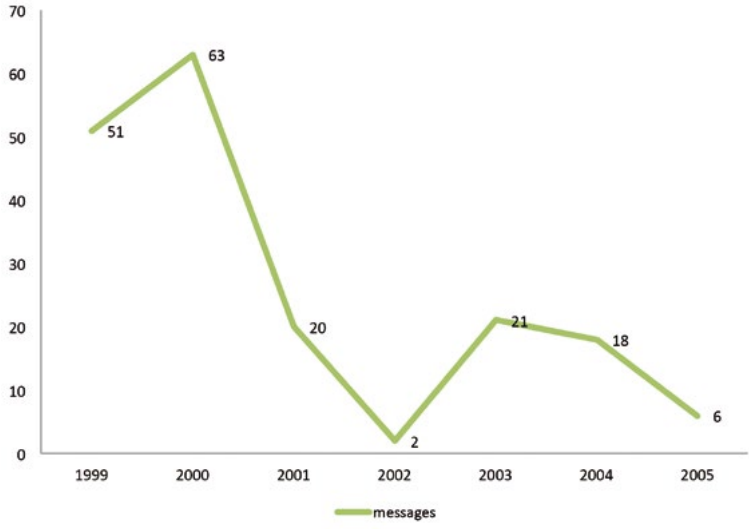
replies, and that they were mainly complaints or positions regarding Colombia's social and political situation.

Graphic 3: messages regarding current texts, Colombia's situation, and controversies about politics in R-Caldas



Source: own production

Graphic 4: Number of messages about the Caldas Network in R-Caldas



Source: own production

Although the information flow about current affairs was on the rise (particularly between 2002 and 2005), discussion about the political situation and especially about demonstrations regarding the same decreased drastically.

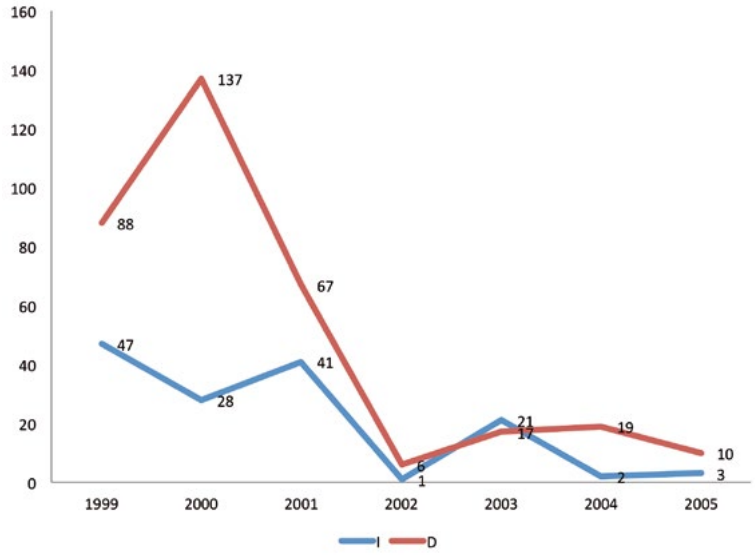
Discussions about R-Caldas and the Caldas Network within the list

Graphic 4 analyzes the diachronic behaviour of messages that made reference to the Caldas Network itself. We can see how in 1999 and 2000 there were quite a few messages in which list duties and nodes as well as the Caldas Network program were discussed. Matters that members saw as problematic as well as suggestions regarding the operations of the same were aired. From 2003, a drastic decrease in the email list topic was noted.

Connecting people: initiatives and requests made on R-Caldas

In graphic 5 we have two types of messages: "D" messages refer to requests that list users made. Requests were generally specific questions about scientific matters or mobility. Between 2002 and 2005 requests decreased considerably. The red "I" line refers to initiatives that circulated amongst list members. As can be seen, there were many more requests made than initiatives suggested on the list. Initiatives also decreased over the years.

Graphic 5: Number of Requests and Initiative messages in R-Caldas



Source: own production

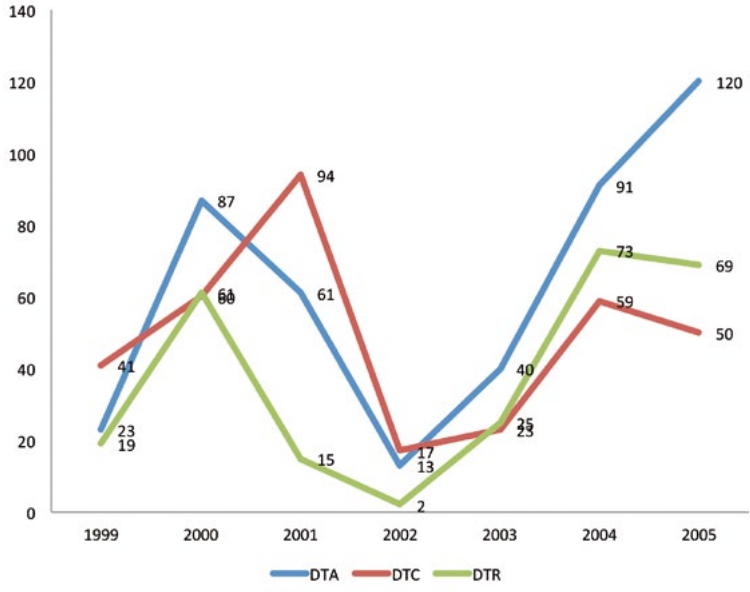
Information circulation on the list: current affairs texts, scientific texts, and texts from other lists

In graphic 6 the "DTR" line refers to circulated messages from e-mail lists. The criteria to choose these messages were not only that they had been "re-sent" but that their content was from other lists' discussions. The graph shows that in the R-Caldas's last stage (2002-2005), these types of messages increased significantly.

The "DTC" line indicates messages that distributed scientific articles or scientific press. While at the beginning we see that these types of messages were on the increase, in the list's last stage, although they still increased, they were not as numerous as before. That is to say that, while messages from other networks – DTR – were continuously on the rise, DTC messages increase less, and in fact, they decrease in comparison to the first stage (1999-2001).

Finally, we have the "DTA" messages; messages that referred to press articles and columns. As we can see, the growth in these types of messages was continuous, notably exceeding messages about scientific articles, which were fewer even than messages with content from other email lists.

Graphic 6: Number of messages about network, academic, and current affairs texts on R-Caldas

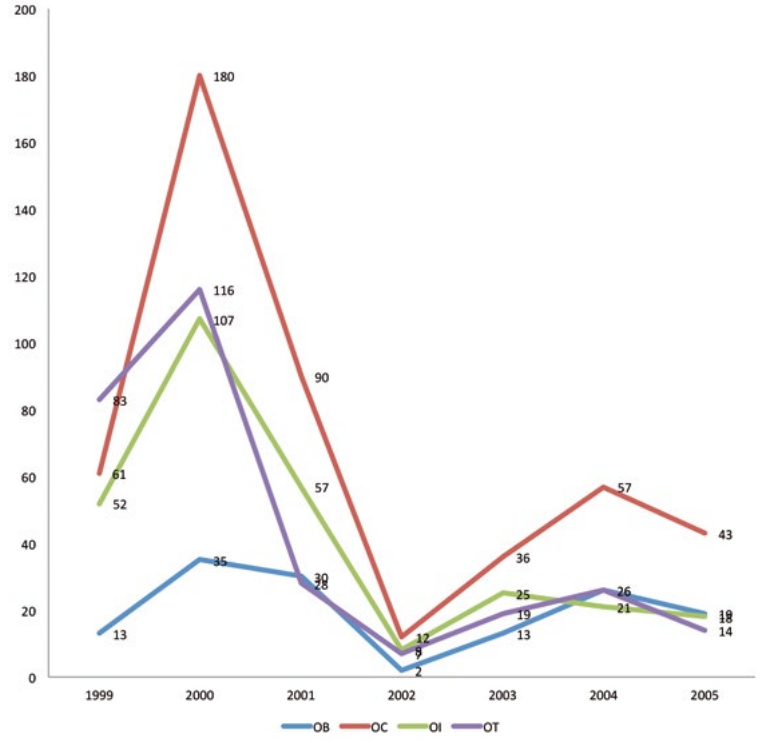


Source: own production

Inviting opportunities: scholarship, course, seminar, and work offers

In graphic 7 offers made via R-Caldas messages are analysed. The categories are: "OB" for scholarship offers, "OC" for course, conference, magazine content, masters, and competition offers; "OI" for general information: web page content of interest to members; and "OT" refers to work and postdoctoral offers. Information about scholarships, conferences, courses, information, and work decreased drastically in most of these areas and never returned to levels seen in 1999 to 2001.

Graphic 7: Number of messages with scholarship, course and conference, work and information offers in R-Caldas

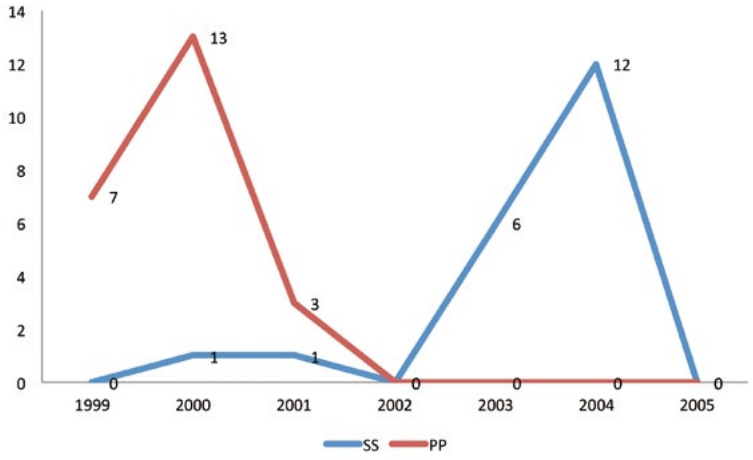


Source: own production

Joining and leaving the Network

In graphic 8 we see two types of messages; "PP" refers to Personal Introductions that new list members made following suggestions to do so from network administrators. The blue "SS" line indicates public requests made to leave the list. These requests were made public as people could not unsubscribe from the list using normal mechanisms.

Graphic 8: Number of messages regarding leaving the network and making personal introductions on R-Caldas



Source: own production

Given that we do not have information about how many people made up R-Caldas during these years, the closest that we have to approximate from as to how many people became members and how many left the list is this type of messages. We can infer from the graph that starting in 2001 there was a tendency by members to leave the list, and additionally, less people were joining the list.

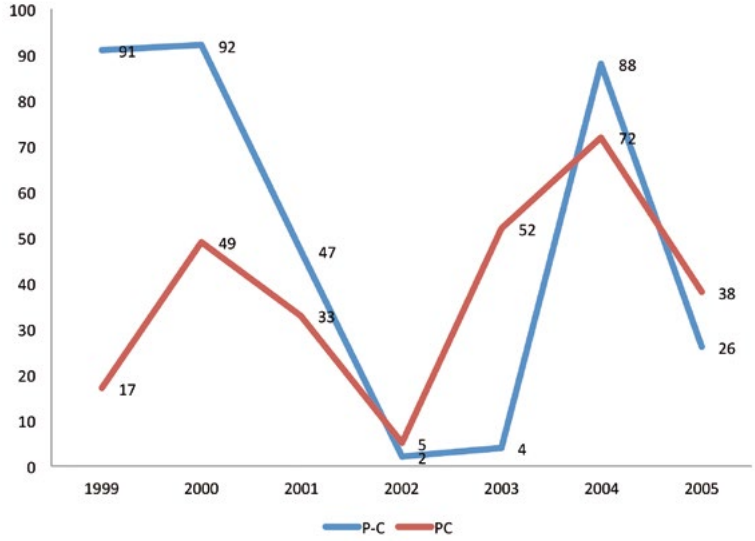
Discussing science and discussing scientifically in R-Caldas:

In graph 9, "PC" represents messages sent in R-Caldas where the theme was political science, specifically, Colombian political science. Topics such as research projects financed in the country or Colciencias' policies were recurrent in this category of messages. "P-C" messages pertain to the scientific controversies in R-Caldas. Messages with these themes fell in 2002 (as with the rest of the message types: it was a year with overall little message circulation) but later on, both types increased considerably.

In short, what we can see is that messages that progressively increased were those dealing with leaving the list, network text distribution, scientific text distribution, and current affairs text distribution. Messages about political and scientific

controversies, the country's situation, requests, initiatives, and scholarship, conference, work, and information offers decreased substantially over the years.

Graphic 9: Number of messages concerning scientific and political controversies in R-Caldas



Source: own production

R-Caldas users: 1999-2006

It is necessary to clarify that we do not have access to all the voices that participated in the e-mail list, which at some point in time had more than 800 members. This is because the majority of messages were sent by only a few people (in fact, 37 % of all messages sent in R-Caldas between 1999 and 2006 were sent by one person).

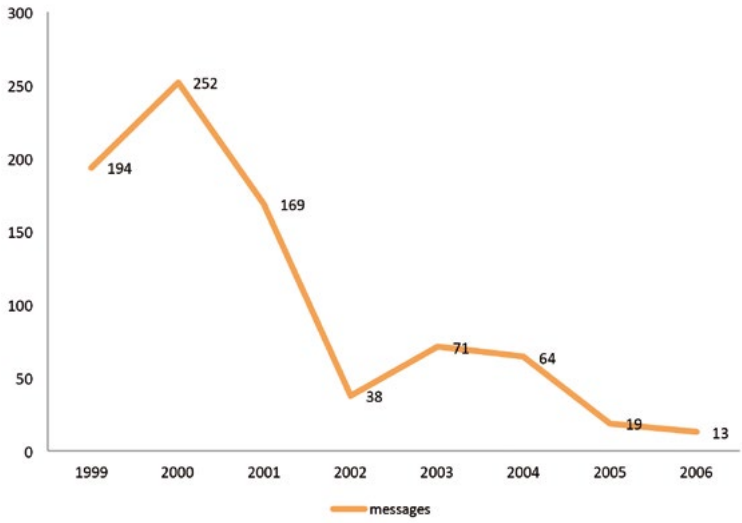
Thus, we cannot be certain as to the representation of voices that spoke on the Caldas Network and about R-Caldas on the list. Nonetheless, it seems reasonable, given that there was no list moderator during the period analysed, to think that the opinions recorded on the list were not revised before being published. Therefore, we believe that the records allow us to read everything that users wanted to say online about the list and the Network in general.

The lack of total list records (messages from between 1993 and 1999 are missing) cannot be underestimated as a problem given that, according to studies on the Caldas Network, it began to suffer from a crisis around 1998[1]. Thus, we witness the Network's debacle through its e-mail list. Therefore, it is of great importance to try to understand what the aforementioned crisis consisted of.

1 This is suggested by Chaparro in his two studies on the topic. The details of these studies can be found in the bibliography of the present report.

R-Caldas Message Senders

Graphic 10: Number by R-Caldas message-sending users by year



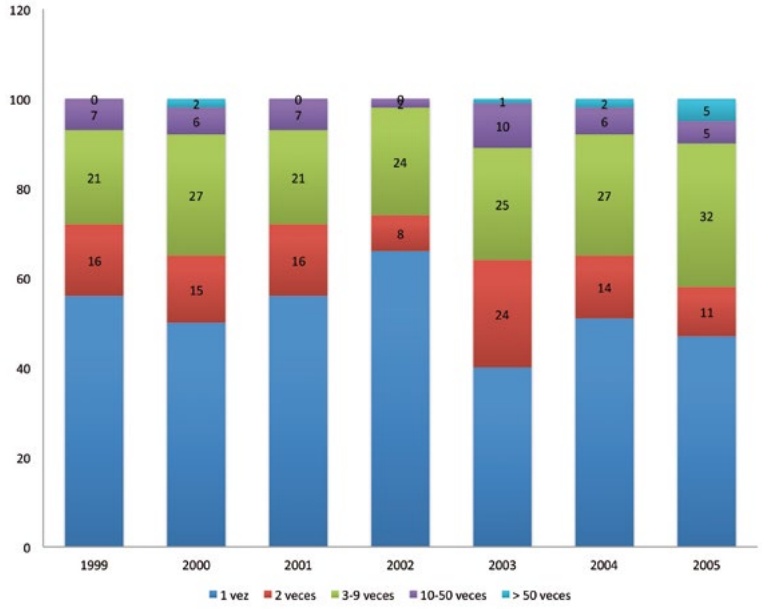
Source: own production

As in the case of messages sent, the number of message senders progressively decreased. At the beginning more than 200 people participated in the network by sending messages. In the final stage, only 19 people continued to send messages to the list. While we are not able to find out whether this silence was due to people having left the list, we can see that dialogues increasingly occurred between fewer people.

Having said that, if we analyse senders' behaviour according to the yearly number of messages they sent we find that, in the majority of cases and during the entire period analysed, most of the senders sent one message per year, followed by those who sent between three and nine messages.

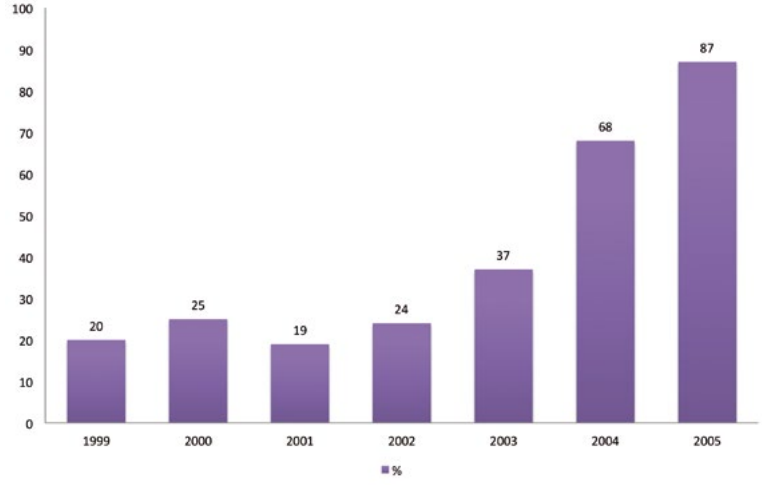
Nonetheless, there were users who sent significantly more messages than the average number. This is the case with user L, as we can see in graphic 11.

Graphic 11: Distribution by quantity of messages sent per user between 1999 and 2005



Source: own production

Graphic 12: Proportion of messages sent by L in R-Caldas



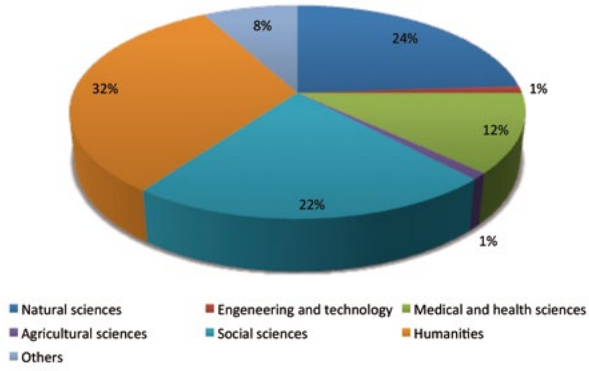
Source: own production

The proportion of messages sent by L was considerably high from the beginning. In 1999, L sent 20 % of all messages (that is to say, 167 of the 837 messages sent that year), while 56 % of users sent one message, representing 0.1 % of all messages; it is therefore evident that L's voice dominated the list. However, given the fact that L's messages represented 85 % of all messages in 2005 (403 of the 463 messages that were sent) in the final proportion, it leads to a belief that the list had become a monologic space.

Knowledge that circulated on R-Caldas: What were the articles that circulated on the list about?

We have ranked the variety of thematic scientific texts that circulated on R-Caldas in accordance with the scientific classifications proposed by the OECD. So, we see in graph 13 how, from afar, the list had better circulation in terms of humanities articles, followed by natural science and then by social science articles.

Graphic 13: Texts sent to R-Caldas divided according to OECD Science classifications



Source: own production

Clearly, R-Caldas was not a circulation space for agricultural sciences, or for engineering and technology. Nonetheless, we can see that there is almost a balance between social sciences and natural sciences. This fades when the overlap between humanities and social sciences is considered, which together form a majority in terms of areas in which knowledge circulated on the list. This reflects the fact that R-Caldas was an extremely open space in terms of scientific interests: everything could circulate here because there were no topic limits.

Through diachronically analysing the messages sent on the list, we see that this space ceased to be interactive. By interaction, we mean that the list was used to discuss diverse topics, request information, and propose and complete initiatives. The situation with dialogues that is reflected in messages concerning initiatives, political debates, or scientific debates gradually disappeared from R-Caldas. In

addition, the space was used more to request specific information than to propose or circulate scientific collaborative projects, which was the spirit of the program in the context of which the list was created.

Moreover, the list progressively moved towards the dissemination of current affairs messages from other email lists and from scientific texts, in that order. Current affairs messages were texts copied from the national and international press. For the years that we are covering, this information could already be obtained from magazine and newspaper web pages, for which reason, the information circulating on R-Caldas at the end was not difficult to find in other digital spaces.

In addition, there was a decrease in messages with all kinds of offers (scholarships, conferences, courses, jobs, etc.). This decrease was perhaps the most significant of all, since we consider it to be more difficult to obtain than that of scientific or current affairs texts.

Finally, a topic that was able to bring users together (taking into account the number of messages sent on the topic, as well as the constant sending of the same during the period) was science policy; this topic was of interest to people in both social sciences and natural sciences, which perhaps explains for the large number of messages sent with regard to this topic.

We know, therefore, that the list experienced a rapid decline from 2002 onwards, a decline that is evidenced both by the dramatic decrease in messages and the decrease in "active" users (that is to say, the number of users sending messages) on R-Caldas. The space slowly ceased to be an exclusive one of relevant information exchange (information about work, scholarships, and conferences) and started to become a space where the information circulated could, without difficulty, be found in other places.

A quantitative analysis of the messages sent reveals that there was a transformation between 1996 and 2006 in terms of the types of messages sent, given that at the beginning messages with information about scholarships and job offers abounded, and at the end messages that were re-sent from other e-mail lists and "forwards" from national press articles dominated.

Additionally, Colciencias ceased to be the protagonist in terms of message sending; in fact, of the 4750 messages sent over the years, only 27 of them were sent by Colciencias, which represented 0.005 % of the total messages sent. In contrast, in the period Meyer & Charum studied, Colciencias sent 23 % of the messages.

Paradoxically, the period that Colciencias hosted the list on their server is when it participated least in the list. This is symptomatic of the loss of importance that Colciencias placed on R-Caldas in this period, which is not to say that they withdrew importance from the program as such, since, as we can see in another section, there was in fact an effort made between 1999 and 2001 to transform and revitalize the program.

This first observation about how Colciencias passed from being a central agent in the e-mail list to being a marginal agent is important when it comes to explaining the turn that R-Caldas took during the period we are studying. It is of equal importance to see the importance that users inside Colombia assumed as message senders.

R-Caldas as a technological device

In the section concerning the list between 1993 and 1996 we have seen how it was created in 1993 and was hosted by the Universidad de los Andes until 1996, when after various changes it was hosted by the ACIS in Switzerland. Meyer and Charum point out that the list began with 90 users and in the period covered by their study it had more than 500 users. In records from the year 2000, they speak about 856 users.

The Caldas Network coordinator assured us in an interview that the list was not the principal tool of communication, since it was easier to communicate by phone, fax, or even by mail. In fact, email was such a new form of communication that workshops on how to use it were organized both in Colombia and in some nodes outside the country. Nonetheless, email was declared as one of the program's banners, due to the technological novelty that it represented for the era. But for the period that we are studying, there was a greater move towards mass use of the Internet, and users requested new tasks from the list.

In fact, the R-Caldas files that we found in the Mail Archive practically started with a matter directly concerned with the technological component of R-Caldas: the request, signed by more than 60 users, that the list have some kind of regulations and that there be a file with records of all the communications made in the network.[2]

At the same time, in the same period, doctor Álvaro Mendoza, the director of Colciencias, announced the Caldas Network's launch in Colciencias. According to the director, the aforementioned page would have spaces for virtual forums, areas for nodes, databases, and thematic networks and email lists (within which R-Caldas appeared). According to the explanation given, this change was due to the fact that R-Caldas had fallen short in terms of the number of tasks it was supposed to perform.

However, we do not know how this web page functioned and in the year 2000 a user complained about how difficult it was to locate the site, insinuating that Colciencias was trying to hide the page. Faced with a similar complaint, Colciencias responded by declaring that the page had moved from <www.

2 It is worth clarifying here that the original message was not found in Mail Archive and therefore, these two requests are known about from inferences made from the response letter from Colciencias as well as earlier responses from the request signatories.

redcaldas.org> to <www.redcaldas.org.co> and that they were only responsible for technical administration of the site.

What is left of the records from this period about the Caldas Network website, apart from the two aforementioned complaints, are two points. The first point was a request made in 2002 that at least some messages be sent from the Strategic Dialogue in Science, Technology and Society while the second refers to technical difficulties.

This dialogue referred to in R-Caldas was the result of a reform that the Caldas Network carried out in 2001, in which it planned to re-orient its efforts towards four strategic themes, which would be called dialogues, and in which Colombian scientists could begin to converse. These dialogues were meant to be implemented between the end of 2001 and the beginning of 2002, and to this end, the aforementioned R-Caldas user request was for conversations to be had in this dialogue space, which was not a theme unknown to discussions about the same. A forum moderator, who sent three or four messages in which readings that had been recommended in the aforementioned forum were summarized, attended to the request.

It seems that in the Dialogues there was a moderator who posted readings and was then responsible for "fanning" discussions about these. Apart from this request that we have just mentioned, there do not seem to have been any exchanges between the R-Caldas list and the thematic forums or "Strategic Colombian Dialogues".

Moreover, in 2003, one of the list users, who occupied a directorial position at the National University of Colombia (Fernando Ruiz), maintained that one of the things that list members ought to do was:

> ... negotiate a truly free space (this is the nature of the Internet) within what is known as the "Caldas Network", which Colciencias has been trying to design for months and in which the email list does not have a place. The reality is that the so-called thematic networks served specialized and standardized knowledge without having a space where scientific management issues could be aired and even less where science policy calls could be addressed. Each time an effort had been made in the past it had been standardized and socialized in the most aseptic and/or inconsequential way possible in reports that have rested on these very dreams.

Thus, there were suspicions regarding the thematic networks, at least amongst R-Caldas users such as Ruiz. Additionally, the fact that Colciencias would host the R-Caldas list (as well as include new technological tools on the web page) was not well received. This is because the service offered was often deficient.

There were complaints about delays (up to three weeks) in sending messages. One of the people who frequently complained about delays sent messages about postgraduate scholarships and postdoctoral offers. Time is an important factor when it comes to this type of information, given that there are deadlines

to submit applications. Nonetheless, especially in this case, the list administrators sent no responses.

In addition, the list had at least three electronic directories, so if people sent a message to all three addresses, the list members received the message in triplicate, which congested users' inboxes.

Finally, there were problems with leaving the list. It seems that people followed the procedure established to leave the list, which was to send an email with request to "unsubscribe", but nothing happened. For this reason, users had to send public messages to R-Caldas to ask to be removed from the list, and it was in these public messages that they explained that the procedure did not work. One user tried to leave the list for two years but was unsuccessful.

With respect to electronic viruses, R-Caldas users tended to send messages warning others about viruses that were circulating.

At the same time, one user made a call that was interesting in terms of understanding Internet dynamics during the period in question. The said individual asked that messages on the list not include attachments, as attachments were more likely to contain viruses. For this reason, the message asked that people "paste" the text that they wanted to share within the body of their email.

In fact, users often did this (there were very few attachments sent in the period that we studied), which meant that many messages sent were long. The majority of the messages were resent from other sources (competition calls, articles, even book sections) but the users themselves did not produce them. Thus, we cannot agree with the previous researchers who suggested that, at least in the latter period, there were many pre-prepared messages.

In summary, the R-Caldas email list suffered from the following problems during the 1999-2006 period: delays in sending messages, messages sent in duplicate or even triplicate, and user problems with leaving the list. At the same time, there was a concern regarding responsible list use, which is seen in people's efforts to "paste text" to avoid spreading viruses through the network.

Finally, we would like to point out the issue of R-Caldas' archives. As we have seen, the creation of a message archives was a result of one of the requests made by Colciencias' users. Although Colciencias did not attend to this request (an issue which itself caused trouble, as we will see in another section), the users themselves thought of a solution.

Aníbal Monsalve, a Colombian researcher who lived in Australia at the time, found the Mail Archive website and created an account so that R-Caldas could archive its messages online where anyone could access them without difficulty. It is thanks to this user's management that we have access to the messages that were sent during R-Caldas's final stage.

To conclude, we can see that the list became an unstable space at some point in time due to problems of technical support. Additionally, although there was sustained growth during the list's existence, t there is no clarity regarding which

users were behind the different nicknames (in terms of whether the majority of them were scholarship recipients living overseas, Colombian researchers living in Colombia, or Colombian researchers living outside the country).

Moreover, the list users made requests for technological solutions that do not seem to have been difficult to solve: for example, in the case of the archives, the solution that Aníbal Monsalve found proved to be sustainable, as well as free. In fact, it continues to work to the present day. Other requests that do not seem complicated are those that had to do with the management of withdrawals from the list and the delays concerning sending messages.

It does not seem exaggerated to say that a certain neglect of R-Caldas on the part of Colciencias can be seen, not only in the sense of the entity's silence on the list, but also in the list's technical administration.

In contrast, the examples of archive creation and the care taken with regard to virus spreading, added to the fact that in 1996 and 1997 there were various user initiatives launched to resolve the lack of server problem, show us that there was a certain amount of user appropriation of the virtual space that was R-Caldas.

The type of communication varied over time; the focus moved from messages containing information about work opportunities and training to messages containing re-sent newspaper articles and discussions from other lists. This time period coincided with that in which public requests to leave the list were being made. As a hypothesis, we propose that once the list stopped providing information about opportunities, people of all types began losing interest in participating in the list (this is evident when we see that the level of concentration of message sent by only one person rose significantly), which led to the list's ultimate disappearance.

R-Caldas users in the face of R-Caldas and the Caldas Network

The relationship between R-Caldas and the Caldas Network in general (as a Colciencias program and as the facilitator of nodes of Colombian scientists outside Colombia) offers an idea of what R-Caldas users thought about the Caldas Network. Thus, there was no consensus about R-Caldas's role within the Caldas Network program. Equally, there was some questioning regarding the nodes' functionality, although there were also proclamations made by node members about their initiatives.

The first time that the distinction between R-Caldas and the Caldas Network came up as a subject was in 1999 in response to a letter sent by 60 R-Caldas subscribers. In response, the Colciencias director said that more than making changes to the list, changes needed to be made to the program. The users' reply sparked off a debate regarding the relationship between R-Caldas and the Caldas Network amongst the users themselves, .

Various users pointed out the need to differentiate between the list and the Caldas Network for several reasons, which were:

- Many list members did not belong to the Caldas Network (this is understood as not being a member of any node or being a Colciencias scholarship recipient).
- This list did not belong to Colciencias scholarship recipients.
- The fact that Colciencias hosted the list did not mean that it was Colciencias' property: "although the list is currently hosted on Colciencias' server, this does not mean to say that the list *belongs to* Colciencias. It *belongs* to the Colombian scientific community. Nothing more, nothing less".
- •The list departed from its original role of being a communication forum within the Caldas Network program and (in this period) it worked free from Colciencias' bureaucratic vicissitudes.

Other users, nonetheless, pointed out that the list was a Caldas Network tool. Confronted with this, someone responded that this argument was weakened when it was revealed that 99 % of the communications sent from nodes did not pass through R-Caldas, which is why it does not seem to have been a Caldas Network tool as a program.

So, for some people R-Caldas was part of the Colciencias program while for other users R-Caldas was an e-mail list independent of the aforementioned program. The deeper problem had to do with the independence that would be exercised before Colciencias in one setting or another, although specific matters regarding what this autonomy represented do not seem to have been discussed.

So, we can see that there were R-Caldas users who did not see themselves as Caldas Network participants, but rather as members of an e-mail list that brought together Colombians living outside the country. We also have users who made up part of the local nodes that saw the list as part of the Caldas Network program, as well as members of local nodes who indicated a separation between the e-mail list and the Colciencias program. Finally, there were users for whom the list itself was the Caldas Network, in the sense that for them there was nothing more than the e-mail list; and everything else was Colciencias' responsibility. As we can see, for R-Caldas members, "caldasianos" as they called themselves, there was no greater clarity regarding what the Caldas network was than there is for us researchers in the present.

With regard to the nodes' workings, there was a discussion regarding their accessibility, in fact one person asked many times if they could join the Madrid Node and did not receive an answer. Additionally, many people questioned the fact that several nodes existed only in name and that no work was seen from these nodes. No answer was received from the Madrid Node's administration, which generated a controversy about what the nodes did.

R-Caldas served as a space to question node functionality, but at the same time, it was a space in which some nodes (the Brazilian, Belgian, and Argentine nodes) held competitions for journals and posted notifications when journals were published. Additionally, nodes such as PECX used the list to disseminate news about their conferences and events. This also happened in the Boston node (whose competition was held via the node).

Nodes were e-mail list users, although scarce, who used the space to circulate information beyond members of their own particular nodes. Nonetheless, official systematic interventions in the list nodes cannot be spoken of, therefore the multitude of positions regarding the relationship between R-Caldas and the Caldas Network are understandable, more so if we take the scarcity of list interventions made by Colciencias into account.

Another aspect of R-Caldas worth highlighting in the period studied is the perception that users had of the list itself. This refers specifically to the fact that, through R-Caldas members' complaints and proposals we can see, by contrast, what it was that they hoped to achieve through the list.

Proposals that circulated on R-Caldas

Several messages circulated on the list seeking a public proclamation from the community of Colombian scientists living outside the country regarding matters, such as the fumigation of illicit crops with glyphosate and the failure to pay Colciencias scholarship recipients. Added to this, at one point a significant proportion of users mobilized themselves in support of a march for Colombian peace that would take place simultaneously in various countries. This indicates that there was a certain sense of national identity amongst the members.

These initiatives did not exclusively come from R-Caldas members, but rather from many Colombians living outside the country who came together on other email lists or collectives who contributed to these initiatives, or in fact started them. It makes sense to ask, therefore, which initiatives promoted in R-Caldas were directly related to the scientific labours of its members?

We have only found two proposals that sought to promote Colombia's scientific development in some way. Although there were enthusiastic responses to both proposals, they were also criticized for "not solving the country's problems". Additionally, they do not seem to have prospered on the list; in fact after a couple of days of circulating emails related to the theme, it was abandoned.

The first proposal, made in 2001, consisted of asking members to carry out simple actions from their various locations in order to support the country from a distance. These actions were:

- If a person worked in a company outside the country or was owner of a company outside Colombia, she/he was asked to complete processes in order to offer internships to Colombians.

- If a person worked or studied in a university outside the country, she/he was asked to complete the necessary paperwork for Colombians to link up with the institutions in question. These individuals could also give talks in Colombian universities to teach the "know how" necessary to enter these institutions.
- To involve scientific peers in research projects.

If in fact there were individuals who responded positively to the proposal, it also generated a debate about how insignificant these mechanisms were compared to other, potentially massive, mechanisms.

The second proposal, put forward in 2003, was that of "repatriating knowledge", generated by Colombians outside the country or by Colombianists. The mechanism was equally simple:

i. Location and standardization of texts.
ii. Obtaining a copy of the material.
iii. Localization of material for public availability and the creation of a strategy to stimulate growth in the consultation of the material.

If in fact the proposal obtained a positive answer, there were people who declared that this was not repatriation, given that the knowledge in question had not necessarily been generated in Colombia due to the individuals in question being Colombian, as some of these individuals had in fact left the country in order to generate the knowledge in question.

To repeat, there was a sceptical voice in the context of the proposal that pointed out that Colombia had many problems (and very urgent ones at that) and that this initiative was not doing anything to help ameliorate the country's critical situation. Later on, the topic was not touched upon again.

These proposals involved the use of simple, concrete mechanisms to channel the potential of researchers living outside the country back to the country. This was in fact the exact objective of the Caldas Network program. The fact that proposals such as these came from R-Caldas users and not from Colciencias draws attention here. Colciencias would have had a greater capacity to, for example, locate, standardize, and group together the work produced by Colombians living outside the country but, in fact, the only proposal that we found from Colciencias that circulated during this period was that concerning Strategic Colombian Dialogues. Apart from the invitation extended to R-Caldas members for participating in these dialogues, this initiative stayed on the margin of the aforementioned email list.

An uneasiness remains therefore as to what purpose R-Caldas served apart from congregating a significant number of Colombians living outside the country who, with some regularity, sent information (competitions, articles) they thought might be of general interest. In fact, the users themselves questioned several times the usefulness of a list such as R-Caldas:

RC's objectives are not fulfilled (according to RC, these objectives are: to channel information from foreign research projects to Colombia and to maintain regular contact between these researchers, to make research advances public via the network, and to strengthen the national and international scientific communities) (Mary Luz, 1999).

I hope that the list improves and that it ceases to reflect an antiquated and backward academy. I hope that the list ceases to be a setting for individualisms and that the nodes cease to be so anonymous and so difficult to access. It was easier to get into the Templars than to find out what nineteenth-century rituals rule the network nodes. Ladies and gentlemen of the list, for the love of God, tell us what you work on, share your research results! Post the articles you've written so we can read them and so that people here in Colombia can benefit from them. Ask questions. Have conversations about the things you study. Ignore messages from cowards like me. And finally, believe that an academic community outside of the country can be useful for something, instead of always being occupied with personal questions. I know it's difficult to ignore VOC noise, but please, do not give up. Ah! And never stop being modest. Because if we don't sort this out, nobody else is going to. If we don't manage to sort out this problem that's been going on for a long time, this is going to end or if it doesn't end, the list will end being completely useless (Cavernícola, 1999).

I ask myself what Francisco José de Caldas would have done in a world where an action that lasts a few seconds can provide you with knowledge about anything from the human genome map to the constituent particles of the universe. I ask myself how he would have used this knowledge when he saw that the nation he helped to free, and for which he lost his life, continues to be controlled by egocentric groups who, from their same position, control the majority of the pauperised inhabitants in a subjugated position with the same tactics and weapons as Morillo the pacifier and Samano the executioner did: exclusion, hunger, terror, and premature death. I ask myself if the list interactions reflect the spirit and attitude of the wise man Caldas, because if not, I fail to see the connection and perhaps it would be more sensible to dismantle this pretension of communication between privileged academics. Thus, a false official justification that considers this list as one of its science and technology achievements could be eliminated; it would avoid providing evidence to new generations with the idiosyncratic, modern, Colombian inability to channel knowledge to fully develop and have an impact on the country with a renewing spirit that might produce a society that shows the best side of human beings. It would also stop pestering people like many of us who are apparently unworthy of sharing the same virtual space, so we deprive ourselves of the opportunity to contemplate imposing of intellectual stature and genuine intellectual humility that true knowledge produces (Jorge, 2004)

Various users openly complained about the fact that the Caldas Network did not achieve its objectives, and about the lack of knowledge exchange on the list. They asked that list members talk about what they studied, that they share their research results, and make comments about their publications.

The lack of this type of exchange is evident when the types of messages sent are quantitatively analysed. Moreover, the previously cited messages were not controversial, that is to say, no one openly said that they disagreed with the "diagnoses" that the aforementioned individuals made about R-Caldas. In fact, people wrote to say that they agreed with these observations.

The proposals that circulated on R-Caldas paradoxically provide evidence of the failure to attain the Caldas Network's program objectives; in fact, if they had been attained these proposals would have been platitudes. Besides, R-Caldas users effectively wanted the list to be a space for knowledge exchange (and perhaps a space for knowledge construction) but this did not happen.

R-Caldas: Complaints and Demands

In addition to the complaints and demands that we addressed in earlier sections such as those of the "technological" variety, there were various disputes between users. In particular, there were arguments with a female list user who we will call "L" (see graph 12). Disputes with L covered various topics: requests to make her research on R-Caldas public, that she not use the list as a space for "non-scientific" issues that were her personal issues, not send articles from magazines and newspapers that were in national circulation to the list, send messages and posts from other lists to R-Caldas, not revive old R-Caldas debates, rather that she say what her research was about and share her methodology, and requests that she give her opinion about the discomfort that she caused on the list.

Faced with many of these types of requests, L opted for silence; in fact, in terms of investigation and methodology, she said she did not see the point in talking about these on R-Caldas. In terms of messages from network members, L claimed that, in the same way that you do not ask permission from a newspaper to reproduce something they have published but rather you simply take a quote and cite it accordingly (giving information about the authors and the date published), messages sent on R-Caldas were public and therefore, there was no need to ask for permission to publish them although authors did need to be given the appropriate credit.

The explanation that the list came to an end due to the ever-noisier presence of L seems to be making her a scapegoat. The list had occasional problems with the receipt of messages, there were expectations related to knowledge exchange that were not fulfilled, and there was no list administration, the latter being understood as a planned direction for the list to take and people working to make sure that this path was followed. Additionally, the ability to block L's messages and

her presence on the list do not seem to be the list's greatest problem, taking into account everything else that has been mentioned.

In fact, the 1999 letter that the users sent to Colciencias seemed to be a request for some kind of regulation and "rules", as we can infer from the reply given to the letter:

> With regard to the adoption of general statutes and regulations for the list, we agree to jointly analyse a proposal that addresses main points proven to be effective in other networks, and we will take responsibility for some tasks that are required for optimal functioning. Nonetheless, we consider it useful to frame these definitions within a new Red Caldas Program structure (Letter from Álvaro Mendoza, Colciencias director, dated August 3rd 1999).

In our opinion, the problem is that the list was not a space with a clearly defined meaning. The purpose of bringing together Colombian academics and scientists both inside and outside the country is laudable. This objective was in fact achieved if we think about the fact that the list had more than 800 subscribers. The question lies in knowing that people come together and why they are attracted to a (in this case virtual) space.

If an answer cannot be found to this question, two things may happen to a space: it may be gradually abandoned as people do not understand its purpose or meaning, or it may be colonized by a person (or by several people) who impose their own meaning on a space. We believe that this is what happened with R-Caldas.

Story Three: The Caldas Network from Cidesal's point of view (conclusions)

We decided to make explicit, with this section's title, that the conclusions we can draw from the different perspectives on the Caldas Network are, in turn, part of a situated perspective.

This analysis of the Caldas Network has been undertaken with the intention of understanding both good and bad practices in the program, with the idea of strengthening the Cidesal project that seeks, as did the Caldas Network, to remedy the skills exodus that the country suffers from. To this extent, the conclusions that we have drawn undoubtedly also show us the path for Cidesal and its realization .

References

Chaparro, F. (2004). *Aprovechamiento de la diáspora en inserción en redes globales de conocimiento: El caso de la Red Caldas*. Informe preparado para el Banco Mundial, Bogotá [unpublished].

————————; Jaramillo, H. & Quintero, V. (2006). "Promise and frustration of diaspora networks: lessons from the network of colombian researchers abroad". In: *Diaspora networks and the international migration of skills, how countries draw on their talent abroad*. Washington dc: World Bank Institute.

Charum, J. (2001). "La opción diáspora científica, una nueva posibilidad de recuperación de las capacidades emigradas". *Colombia, Ciencia y Tecnología*, 19 (2), april-june.

———————— (1998). *Hacer ciencia en un mundo globalizado, la diáspora científica colombiana en perspectiva*. Bogotá: Tercer Mundo Editores-Colciencias-Universidad Nacional.

Granés, J. (1996). "Una contribución al desarrollo de la ciencia y la tecnología del país en forma deslocalizada: la Red Caldas". In: *Memorias del primer coloquio sobre Ciencia, Tecnología y Cultura*. Colección Memorias n.º 6. Bogotá: Academia Colombiana de Ciencias Exactas, Físicas y Naturales.

———————— & Meyer, J.-B. (1998), "Internet y la globalizacion de la comunidad cientifica nacional: un estudio empirico". In: Charum, J. & Meyer, J. B. (eds.), *El nuevo nomadismo cientifico: una perspectiva latinoamericana.* Bogotá: Ediciones esap.

Meyer, J.-B. (2006). *Towards sustainable knowledge diasporas: the rationale for an appropriate technopolicy*. Report to the unesco Diaspora Knwoledge Networks Project

———————— (2006). "Diaspora Knwoledge Networks: Vanishing doubts and increasing evidence". *International Journal of Multicultural Societies*, 8 (1).

———————— (2001). "Network approach versus Brain Drain: lessons from the Diaspora". *International Migration*, 39 (5).

———————— (1996). "Premisas para un nuevo entendimiento de las migraciones científicas internacionales. El estudio de la Red Caldas". In: *Memorias del primer coloquio sobre Ciencia, Tecnología y Cultura*. Colección Memorias n.º 6. Bogotá: Academia Colombiana de Ciencias Exactas, Físicas y Naturales.

———————— & Brown, M. (2001). "El auge de las redes de la diáspora intelectual: identificación social y asociaciones cognitivas". *Colombia, Ciencia y Tecnología*, 19 (2), april-june.

———————— & Charum, J. (1998). *El nuevo nomadismo científico, la perspectiva latinoamericana*. Bogotá: ean.

————————; Charum, J. & Caplan, D. (2001). "El nomadismo científico y la nueva geopolítica del conocimiento", *Revista Internacional de Ciencias Sociales*, 168: 341-54, june.

———————— *et al.* (1997). "Turning brain drain into brain gain: the Colombian experience of the Diaspora Option". *A journal devoted to the developing world*, 2 (2): 285-315

Montenegro, Á. (1996). "Encuesta Redes Colombia". In: *Memorias del primer coloquio sobre Ciencia, Tecnología y Cultura*. Colección Memorias n.º 6. Bogotá: Academia Colombiana de Ciencias Exactas, Físicas y Naturales.

Chapter 6

Argentine Return and Linkage Policies: Shifts and Continuities

Lucas Luchilo

Introduction

In this chapter, the policies and programs of different Argentine governments to promote the return of researchers and other highly skilled professionals residing abroad as well as programs to facilitate these individuals' connections with productive and academic institutions in Argentina will be analysed. These policies have been closely related to specific historical circumstances and to the predominant perceptions in these circumstances regarding the situation in question and perspectives on the national scientific and technological system.

It is of interest to note that the first initiatives concerning this topic were early, contemporaneous with the emergence of the "brain drain" as a theme. This initial impression of a concentration of programs in the researcher area was maintained through time. In other words, beyond some slightly larger initiatives, skilled migration has tended to focus on the emigration of researchers and consequently, policies have been directed at this group of Argentineans residing abroad.

Democratic governments have carried out policies aimed at researchers living abroad – whether these policies are to encourage researchers to return to Argentina or to strengthen their bonds with the country. The dictatorships that governed the country from 1966 and 1973 and from 1976 to 1983, did not take initiatives in this area. Among other reasons, this was because a significant proportion of emigrant researchers had left Argentina as a consequence of these dictatorships.

The promotion of return during the Argentine scientific system institutionalization years: Bernardo Houssay and the "Repatriation of Scientists Living Abroad Program"

In the second half of the 1950s, Argentina initiated a process of institutionalization of its scientific and technological system. The creation of the National Agriculture and Livestock Institute (INTA) and the National Institute of Industrial Technology (INTI), the reform of the National Atomic Energy Commission (CNEA), the reorganization of national universities and the creation of the National Scientific and Technical Researchers Council (Conicet) were outcomes of this process. Conicet – an institution inspired by the French model *Conseil National pour la Recherche Scientifique* (National Council for Scientific Research) – was presided over by Nobel Laureate Bernardo Houssay. The vice-president of Conicet, meteorologist Rolando García, had studied in California and returned to Argentina after Perón's fall.

Conicet had a very concrete vision about what a modern scientific system should be. One of its concerns was to increase, as rapidly as possible, good resources for researchers. To do this, Conicet placed particular emphasis on supporting researchers' development through a scholarship system. Additionally, the group leading the science faculties and Conicet promoted the expansion of full-time teaching positions in national universities and the creation of the Conicet Scientific Researcher Degree.

Within this policy, the training of researchers abroad as well as the return of trained researchers living abroad was the main focus of Conicet initiatives. Houssay developed his ideas with regard to both of these aspects with a lot of clarity. In the case of scholarships, basic ideas were put together in the 1930s. In 1939, Houssay had published a detailed study in which he systematized diverse types of scholarships that Argentina should consider and proposed some concrete initiatives. A point of interest lies in the particular reference to the need for adequate working conditions for the development fellows abroad so that they could rejoin the Argentine scientific community productively (Houssay, 1989a).

The emigration of Argentine scientists was also a major concern for Houssay. Pioneer studies completed at the beginning of the 1960s on the subject of skilled migration had been put on the agenda of national science policies. Apart from these studies, for a small but dynamic and interrelated community of researchers the information about Argentine researchers living abroad was accessible and the loss of very valuable human resources was immediately perceivable (Albornoz, Alfraz & Fernández, 2002).

Also in this case, Houssay's ideas had been put forth years before his participation in Conicet. From his perspective, the return of Argentine scientists from

abroad had a double dimension. On the one hand, it was a question of individual patriotism. In a letter sent to Froilán Ludueña in 1943, Houssay signaled that "despite the fact that all scholarship holders should return and fight, their duty is to change the atmosphere in their country and their mission is to be useful to their homeland" (Houssay, 1989: 323-325). But he did not ignore the fact that the return of researchers depended on the country's ability to offer adequate work conditions and professional development opportunities.

The creation of the Repatriation of Scientists Abroad Program was an alternative designed to facilitate the return of researchers residing abroad. The program had an interesting and complete idea and design. It included the payment of transport for the researcher and his or her family, provision of equipments, strengthening of the laboratory where the researcher would work, and updating of libraries so that the researcher could continue his or her projects. In other words, the program duly considered the combination of conditions necessary for adequately reinstating the researchers, who mostly lived in the largest countries of Western Europe and the United States.[1]

In accordance with Conicet's main thrust at this time, researchers were recruited in the field of natural sciences, particularly in the areas of hydraulics, biophysics, astronomy, chemistry, molecular biology, oceanography, applied mathematics and physics. The Repatriation Commission was created within Conicet. The purpose of this commission was to study each particular case to evaluate the optimum return potential of the individual in question and to facilitate agreements with national universities to be able to crystallize reinstatement and permanence.

As has been mentioned earlier, international linkage was an important component in Conicet's policy management. From this perspective, the amicable relationships between the body and scientifically prestigious international institutions – such as the Royal Society, UNESCO, and the Deutsche Akademischer Austauschdienst (DAAD) –, support for foreign professors' visits, agreements with American foundations, or support for young researchers for the attainment of foreign scholarships, were important initiatives. In other words, the repatriation program was written with a very active internationalization strategy for Argentine world of science in mind.

The Program received support from the Ford Foundation from 1958 to 1963, during which time it awarded 22 subsidies for repatriation. While this support was in place, 30 researchers successfully returned. Although the number is small, it should also be considered that the Argentine scientific community was small and something similar was to be expected with its diaspora of researchers. But the program was also highly selective, prioritizing the quality of the researchers that it hoped to support. The design of the program itself involved a relatively large investment for each researcher.

1 A detailed analysis of this program can be found in Leiva, 1999.

The program's impact was however limited, also due to a brusque change in political conditions. The intervention of national universities decided by the military dictatorship installed in 1966 – named as the "Night of the Long Batons", in allusion to the political repression – led to a mass emigration of researchers. More than 1300 teachers at the Universidad de Buenos Aires (University of Buenos Aires) quit, among them more than 300 Exact Science Faculty members and a similar number from the Faculty of Humanities who had been the main focus of the university's academic renovation. This series of resignations was followed by a wave of researcher emigration. 301 teachers and researchers emigrated, more than half of whom went to universities and research centres in other Latin American countries, above all in Chile and Venezuela. The rest of them split up between the United States and Canada (32 %) and Europe (15 %) (Slemenson, 1970; Luchilo, 2007).

A complementary initiative – prior to the military coup of 1966 – which provides an evidence of the interest that the theme of brain drain provoked – was the Special Study Commission into the Migration of Scientists, Professionals, Technicians, and Highly Skilled Workers, initiated by the National Executive Power through Decree 7558/65 in 1965 (Calvelo, 2008).

The following years saw a worsening in researchers' emigration trends, especially after the university intervention of 1974 and the brutal repression unleashed by the 1976 military take over. In this context, many scientists made the decision to emigrate.[2]

The transition to democracy and Raúl Alfonsín's government policies

The transition to democracy involved further impetus to initiatives and policies designed to repair the effects of the dictatorship. This trend was a general feature of Raúl Alfonsín's government and had a particular implication in the case of migrants, though not exclusively for those with high skill levels.

Emigration had continued to grow as a phenomenon throughout the 1970s, partly following a prior rule regarding economic emigration – aimed at the United States more than anywhere else – and in part as a consequence of political and social persecution. The main destination countries for exiles were Spain, Mexico, Brazil, Venezuela, France, and Israel.

While towards the end of the dictatorship the hypothesis concerning the magnitude of emigration that was upheld estimated that a million Argentines had left the country – with a more conservative estimate placing it at half a million – evidence currently available shows a much more abrupt pattern, as can be discerned in chart 1.

2 For the impact of the dictatorship politics on the scientific sector, see Hurtado de Mendoza, 2009.

Chart 1. Distribution of Argentines abroad according to destination patterns (1960-2000)

Destination pattern	1960	1970	1980	1990	2000
Total	93.594	183.195	307.700	400.111	603.721
Regional	57.337	92.473	153.913	175.346	212.539
North America	14.397	47.539	75.713	89.096	137.235
Europe	11.138	21.630	39.470	87.430	193.668
Rest of the world	10.722	21.553	38.604	48.239	60.279

Source: Calvelo, 2007

Probably the Alfonsín government's initiative that had the most symbolic impact on migration was the enactment of Law 23059/84, which repealed Law 21795. This law – sanctioned by the military dictatorship – established in Article 7 that "Native Argentines will lose their nationality when they are naturalized in a Foreign State, apart from the relevant provisions in International Treaties in force in the Republic". That is to say, any Argentine that adopted a foreign nationality lost their Argentine nationality. Law 23059 restored the previous judicial order – in which no legal grounds for cancellation or loss of the Argentine nationality were considered. In addition, Article 3 established that "losses or cancellations of the Argentine nationality are declared invalid and without legal effect as are losses or cancellations of Argentine citizenship". Article 4 determined that those individuals affected by Law 21795 recovered "their nationality and citizenship automatically upon entry of this Act, except with respect to citizenship, which requires an express request on the part of the interested party via judicial remedy that will be submitted by summary channel".[3]

Some complementary measures facilitated returns. For example, resolutions 1660/84 and 3073/84 and circular 19/85 from the Ministry of Education aided the recognition of complete and incomplete studies carried out by those Argentines who returned. A regime of customs exemption was also put into action. Also, measures to facilitate the reintegration of people who had lost their jobs and had been exiled were adopted. For example, Article 10 of Law 23068/84, regarding the standardization of national universities, established that:

> Within sixty (60) days of enactment of this Act, each university will ensure the existence of a scheme providing for the reinstatement of teachers and other staff who had been laid off, disregarded, and forced to resign for political, union, or related grounds, recognizing their categories at the time that they were made redundant and calculating them until the time of the concerned staff members' reinstatement,

3 See <http://infoleg.mecon.gov.ar/infolegInternet/anexos/25000-29999/25463/norma.htm>.

which will not be more than ninety (90) days after the passing of the present law.[4]

Also at the outset an advisory body of the Executive Power, Comisión Nacional para el Retorno de los Argentinos en el Exterior (National Commission for the Return of Argentines Abroad), was created by the government, which had as its mission the dissemination of information about facilities for returnees: discounts for transportation of personal effects by the Empresa Líneas Marítimas Argentinas (Argentine Marine Line Company or ELMA), recognition and validation of studies completed abroad and degrees earned abroad, amnesty for deserters of compulsory military service, and the tax-free entry of personal and household effects (Calvelo, 2007).

Beyond these general initiatives, the Secretariat of Science and Technology (Secyt) and Conicet – in whose office various scientists who had been exiled prior to 1966 worked –, with the institutional support of the Ministry of Foreign Affairs, embassies, and consulates abroad, adopted a series of measures aimed at promoting the return of and linkage with highly skilled emigrants. This political strategy was formulated in a document called *Guidelines for Scientific and Technological Policies* published by Secyt in December 1984. This piece of writing enunciated the link between research and production, the recovery of lost prestige and Argentine science's continental responsibility that had been promoted by Bernardo Houssay. Argentine associations abroad played a certain role in promoting social and professional linkage and eventual return channels.

The initiatives adopted included a variety of aspects related to the promotion of return and linkage (Leiva, 1999). In terms of linkage, the main initiatives were:

- *The Argentine Scientific Heritage Abroad Program*: organized by Secyt to sponsor visits from Argentines living abroad for no less than two weeks. The Program was organized to overcome the institutional and scientific activity deterioration suffered during the dictatorship. It proposed the teaching of courses and organizing seminars, setting up of laboratories and research centres, execution of research projects, and the development of co-participants abroad. Scientists were invited as jurors and active participants in the design and evaluation of training and research programs. While the initiative could not take advantage of all its potentials, amongst its main positive impacts were: the creation and strengthening of new international links between advanced students, professors, and researchers and, (at a moment on need in terms of postgraduate course development in Argentina, the induction of experienced academics for the construction of the same in national universities).
- *Equipment and book donation*: from collaborative actions between foreign institutions and various national agencies such as *Aerolíneas*

4 See <http://www1.hcdn.gov.ar/dependencias/ceducacion/leyes/23068.html>.

Argentinas, Secyt, Conicet, and Argentine embassies. The beneficiaries of these donations were national universities and research institutes.

- In 1987 the "Conicet Membership System" was formed through Resolution No. 1636, for researchers abroad who were in a position to make significant developmental contributions, through formalized professional relationships with Conicet from abroad.
- *Creation of Argentines Abroad Associations*: despite the existence of some networks of qualified Argentines abroad, initiatives from residents themselves in countries like Germany, the United States, and France began to receive strong support from the Ministry of Foreign Affairs. As a result, they began to be active with local governmental recognition. These were: the Association of University Professionals in Germany (APUA), the North American Argentine Association for the Advancement of Science, Technology and Culture (Anacitec) in New York, and the Association for Franco-Argentine Scientific Exchanges (AESFA) in France.

Initiatives related to return and reintegration of Argentine researchers residing abroad were:

- *European Community Cooperation-Secyt Program*: with the aim of promoting the reintegration of Argentine scientists dwelling outside the country, offering stays in the country for an annual period within the framework of cooperation projects.
- *The Conicet Support and Reintegration Programme for Researchers*: this program reinstated almost 100 scientists and teachers who had been dismissed for ideological reasons in previous years. Eighty scientists returned by entering the Researcher Degree Program through Resolution No. 03/84.
- *Housing Credits*: at the request of Secyt, till April 1987, the *Banco Hipotecario* (Mortgage Bank) granted 500 mortgage loans for the construction, extension, acquisition, and/or repair of housing for scientists, professionals, and technicians who were reintegrated into the Argentine scientific community.

The expansion of teaching staff at universities also favoured the reintegration of many researchers, especially in the early years of the transition. As the Alfonsín government advanced, persistence of the economic crisis and worsening of the political situation from the time of the military uprising in Easter of 1987 probably dissuaded many Argentine researchers living abroad from trying out a return to the country.

Initiatives during Carlos Menem's government

The change of government, with the arrival of Carlos Menem, involved a dramatic shift away from the direction taken by the previous government, which was very evident in the science and technology policy area. Albornoz and Gordon identified two main stages in Menem government's scientific policies. The first of these (1989-1995) was one of "traditionalist reaction", and the second (1996-1999) was characterized by bureaucratic modernization, closely following from recommendations and financing from multilateral credit bodies (Albornoz & Gordon, 2011).

With regard to policies promoting return and linkage with Argentine researchers living abroad, the Alfonsín government's programs were abandoned. This did not mean that the new government put the topic aside, but it meant that the actions that it took lacked a general framework and sufficient continuity. From this perspective, during the 1990s, various initiatives were implemented that did not manage to establish a consistent strategy.

In defining objectives and policies set for Secyt and Conicet, the importance of strengthening international cooperation on the basis of endogenous needs to promote inter-American integration, establishing horizontal and bilateral cooperation agreements with foreign agencies looking to increase the budget resources available to encourage scientific and technological updates, and updates on international meetings and events were referred to. Additionally, a decision was made to create the Red Científico-Tecnológica (Scientific-Technological Network or Recyt) to facilitate the exchange of information between sectors of S&T development at the local, provincial, and international levels (Leiva, 2011).

Raúl Matera was the first secretary of Science and Technology in Menem government and under his management, *Programa Nacional para la Vinculación con Científicos y Técnicos Argentinos en el Exterior* (National Program for Linkage with Argentine Scientists and Technicians Abroad or Procitex) was started up. Procitex's activities were supported by the Organization of American States (OAS), the United Nations Educational, Scientific and Cultural Organization (UNESCO), and Argentine Consulates.

The Program's main aims were to:

- Promote research, study, and activities to advance cooperation with Argentine scientists living abroad.
- Facilitate the Return of emigrants human resources who had the express desire to return home.
- Create a registry of emigrated researchers and cooperation projects.
- Provide advice to institutions interested in this proposal.
- Encourage establishment of linkage with experts in the production sector with mechanisms for their reintegration into the workforce.

Organize scientific, academic, and business cooperation activities with the production, market and service sector institutions.

- Provide information about Argentina's scientific-technological system.
- Invite international experts to offer advice and organize meetings with representatives from organizations that represented Argentine scientists and technologists living abroad.

Under Matera's management, the program put emphasis on the promotion of return. Participation in the return project began with what was called an open registration. The minimum period for candidates to commit to the project was three years. The program had a Scientific Director and a scientific advisory committee, who were responsible for evaluating return applications. Reintegration rested on the possibility of placing selected individuals in full time positions. Therefore, as Lewis points out, "it was a strategy that depended on the researchers' individual contacts and not on agreed development plans with universities, research centres and the productive sector" (Leiva, 2011: 145).

Benefits for returning researchers included the payment of tickets for researchers and their families and the payment of moving costs to a value of up to 4000 dollars. According to available information, the program received a good response from researchers. Between September 1992 and June 1994, 286 specialists registered. 178 of them returned, most of whom were from Western European countries and the United States. Of the total number of returned specialists, 31 % began to work in the private sector (mainly in experimental laboratories and stations), 26 % entered Conicet's Researcher Degree, another 26 % were employed by national universities, and barely 2 % of them established themselves in private universities.

Procitex began to decline in 1994 due to budgetary constraints (Albornoz & Gordon, 2011: 87). Matera died in 1994 and was succeeded by Domingo Liotta. Under Liotta's management, the program – probably due to financial restrictions – focused more on linkage activities with emigrants who preferred to remain abroad.

In terms of linkage activities, from the end of 1993, short visits from Argentine scientists residing in the USA and in Europe were promoted nationally in order to encourage reintegration opportunities in priority areas: technological innovation, global change, food, biotechnology, natural resources, environment, information technology, and electronics. In accordance with the linkage aim, "Conicet Outside the Homeland" was created through Resolution No. 242/95 that founded the "Emeritus Researcher" category within the Conicet Researcher Degree, in which researchers abroad began to be included.

Collaboration with Argentine Consulates facilitated the survey instrument called "Registry of Procitex Researchers Residing Abroad" (created by Secyt Resolution No. 334/92), which involved a survey of backgrounds from résumés, job expectations, and locations proposed by individuals interested in participating in the program.

Until 1994, in terms of a regional geographical distribution of skilled diaspora, the greatest concentration was seen in the Western European countries, mainly in Germany and France (44 %); in South America – the first place was occupied by Colombia with Brazil being in second – (29 %); and in North America excluding Mexico, main concentration was in the United States – (19 %). In terms of different fields of knowledge, the majority belonged to Natural and Exact Sciences (32 %), followed by Engineering and Architecture (20 %), and then Health Sciences (14 %). In summary, at that time, the countries with the majority of emigrated Argentine talent were the United States and Germany: in the former case, these individuals were from the Exact and Natural Sciences area, and in the latter, from the Engineering area.

Some non-government initiatives joined the effort to survey the population of researchers resident in foreign countries. Following this line of action in the 1990s and with the support of the Universidad Nacional de San Martín (San Martín National University), Anacitec in the United States (founded in 1984 and which was recognized for its substantial number of members and its influence on public policies regarding human resources) launched a project called PROAR on the Internet to create a directory of Argentine professionals living abroad.

The directory was designed alphabetically and thematically to establish a benchmark of opportunities and professional searches: the database sought to provide information on donations of equipments, books, magazines, and also, information about people indexed by their scientific, academic, productive, and cultural profiles. The project's achievements were modest: at the end of 1999, the directory had 100 registrants. The most highly represented countries were the United States, Canada, and Brazil, and with respect to training areas, those most represented were biology, medicine, and engineering, in that order.

In the second stage of the Menem government's science and technology policies – the "bureaucratic modernization" stage –, the topic almost disappeared from Secyt's agenda, which was then dominated by an institutional re-engineering program. In the 1998-2000 National Multi-Year Science and Technology Plan – the most important policy document in secretary Juan Carlos del Bello's management – there is only one marginal reference to the topic of researcher emigration.[1] An event that provoked interest was the repatriation of Enrico Stefani – a prominent medical researcher resident in the United States – who returned to take on the position of president, Conicet. Stefani lasted less than one year in the post and then returned to the United States.[2]

1 Scientific Technological Cabinet, 1998-2000 National Multi-Year Science and Technology Plan, Buenos Aires, 1997. To see the reference to researchers residing abroad, see page 73.

2 See <http://edant.clarin.com/diario/1998/03/20/e-05001d.htm>.

From the UNESCO to the Raíces Program

Another proposal also initiated outside of the Argentine government sphere had a greater impact. From an ALAS initiative, a Database of Scientists in Latin America and the Caribbean Project was started in 1991 within the UNESCO sphere with the support of the region's ambassadors. This initiative came to an end in 1994 with the creation of the Inter Regional Network of Scientists in Latin American and the Caribbean Program. The program represented an innovation in the traditional approach to "brain drain", proposing a broader approach based on the concept of network. The aim was to promote the circulation of knowledge through people, technology, and agreements, integrating return options as well as linkage with diasporas.

- The program's objectives were to: Create links between regional demands and external scientific-technological development proposals.
- Equitably distribute the benefits achieved by the network and its nodes.
- Reflect on new forms of cooperation in the framework of the internationalization of scientific, educational, and technological activities.
- Generate multidisciplinary thematic networks for the dissemination of knowledge.
- Promote the creation of S&T National Re-linkage Offices to enable the organization and identification of endogenous demands.
- Undertake comparative analyses of re-linkage experiences and of new cooperation channels and instruments.
- Promote the organization of associations of expatriate scientists with the support of international organizations.

This program had a direct impact on Argentina with the creation of the Cre@r program in 1999, a joint initiative of the Buenos Aires City Government, the UBA, and the UNESCO Inter Regional Network of Scientists in Latin American and the Caribbean Program. This program's aim was to generate databases of professional Argentine emigrants living abroad and of urban needs in technical cooperation. One of the main points of interest of this initiative was its emphasis on the potential of using virtual dimension of exchanges (Lema, 2003).

From this initiative, in 2000 – under Fernando De la Rúa's government – the Raíces Program (Roots Program) was created within the framework of the Ministry for Science, Technology, and Productive Innovation. Set up under the management of Secretary Dante Caputo, the program gained further momentum under his successor Adriana Puiggrós. The ministry itself highlighted the origin of the project. In its newsletter it said that:

> Raíces is a project – imported from the City Government of Buenos Aires and the Universidad Nacional de Buenos Aires – that works with a different paradigm from those that governed earlier attempts

> to repatriate researchers and that recorded more failures than successes in the country.[3]

The program advanced some initiatives, such as building a database of Argentine researchers living abroad, visits by Argentine scientists living abroad, and an international seminar on skilled migration.[4] The fall of De la Rúa's government and the subsequent fiscal and economic crisis put the program on hold until 2003.

In 2001, also under Puiggrós' management, the Framework Law 25467 on science, technology, and innovation was passed. Article 26 of this law made reference to Argentine researchers residing abroad, establishing that

> Scientists and technologists, residing in the country or outside of it, who fulfill the requirements established by the present law's regulations may belong to the National Registry of Scientists and Technologists, as well as aspire to obtain the distinction of 'Researcher from the Argentine Nation'.[5]

Modification of the legal migratory framework and relationships with Argentines abroad

One of the most important changes to the legal and institutional framework of migration to have occurred in the last decade was the enactment of a new migration law in December 2003. Law 25871 – unanimously approved – established a new general framework for the migrational predicament.[6] The law incorporated the topic of Argentines living outside the country under Title IX "From Argentines Abroad". Within this title, Article 102 included a forecast of signing agreements with destination countries to protect migrants' rights, including "the ability to make transfers of funds to support their family in the Argentine Republic".

Article 103 established a number of benefits for all Argentines who had lived abroad for more than two years and wanted to return to their homeland, saying that they could

> … bring goods for their work free of import duties, taxes, contributions, and other charges, as well as their automobiles, and personal and household items up to the value determined by the competent authority, to the extent and within the scope established by the Executive Branch.

Article 104 entrusted embassies and consulates with the task of keeping residents abroad informed about allowances and exemptions provided for by the law.

3 *Noticiencia* (2001). Dissemination organization of the press and communication office of the Ministry of Science, Productive Technology and Innovation, Year 1, No. 3, July 26th, page 6.

4 For further information on Raíces activities, see Noticiencia bulletins numbers 9, 11, and 12.

5 See <http:/ www.investigadordelanacion.mincyt.gob.ar/documentos/Ley_25467.htm>.

6 See <http://www.gema.com.ar/ley25871.html>. For further information about this law, see Giustiniani, 2004.

The most interesting aspect of this piece of legislature from the perspective of policies relating to migrants was their inclusion within the framework of migration policy and administration. This policy orientation was also manifested in the initiation of the Province 25 program, which replicated previous experiences in neighbouring countries – the Chilean Region 14 or Department 20 in Uruguay. It was formalized in Resolution 452/2007. The program was located within the sphere of the Ministry of the Interior – in the Secretariat of Provinces – and not in the chancellery.[7]

The aims established for the program were to:

a. Promote strengthening of links between the Nation State and Argentines resident abroad.
b. Promote the exercise of the political rights of Argentines residing abroad, with a view to ensuring adequate political representation of the population, as well as their electoral participation.
c. Optimize and speed up processes initiated by Argentines residing abroad and within the jurisdiction of the Ministry [of the Interior].

The establishment of the program in the Ministry of the Interior probably arose from the aim of promoting the suffrage of residents abroad. Law No. 24,007 of 1991 and its statutory Degree No. 1138/93 regulated the right of Argentines residing abroad to vote. Beyond this law – and beyond the Province 25 program – turnouts to vote from the 1993 election until the present day have been very small.

Province 25 emphasizes the provisions of administrative and operative benefits for returnees: social security, investment promotion, access to credit, sending of money from abroad for the development of productive projects, economic help for family members, purchase of real estate, validation of degrees, etcetera. Additionally, the program's web page offered simple software for residents living abroad to complete their details – it was expected that with this a reliable database of residents abroad could be constructed.

The program had very broad aims and fields of participation: to ensure the electoral rights of Argentines living abroad, to create institutes to represent communities of Argentines living abroad; to propose parliamentary representation of Province 25's population, to facilitate the management of documents within the competence of the Ministry of the Interior, to protect and assist Argentines abroad with their social rights, and to improve linkage, information accumulation, and Argentine state intervention concerning its migrants.

The annexure to Resolution 452/2007 pays particular attention to associations of Argentines residing outside the country (AARE). AARE's activities are mentioned

7 For the Province 25 program, see Pedrosa, 2011.

several times and the need to propel their participation in an institutionalized manner is noted. In this regard, Province 25 proposes the task of:[8]

> Designing and coordinating with the Ministry of Foreign Affairs, International Trade and Religious Affairs, creating an institutional level of representation of communities of Argentines living abroad. The participation of the NGOs of Argentines residing abroad in the design, formulation of regulations and effectiveness, will form part of the work methodology.[9]

Nonetheless, as Pedrosa observes, in one of the documents that served as the basis for the project, it is noted that:

> Notwithstanding the existence of NGOs that gather Argentines living abroad, it is necessary to generate other forms of representation, in order to channel as efficiently as possible the demands of the said population with regard to our country and their countries of residence.[10]

This affirmation tended to justify the creation of new spaces and organizations before the consolidation of those that already existed. The resolution contemplated the creation of other organizations of request – called "representative institutions" – of a formal nature, that were regulated by the national State (Pedrosa, 2011: 278). So, the resolution established the program's task as:

> To create representative institutions for Argentines residing abroad, and promoting integration of the same. In coordination with the State agencies with expertise on the subject and NGOs of Argentine residents outside the country, an institutional setting representing communities of Argentines abroad is created.[11]

Consolidation of the Raíces Program

From 2003, under the direction of Tulio Del Bono as the Secretary of Science, Technology and Productive Innovation, the Raíces Program resumed, and from

8 "Argentines abroad have developed a significant number of organizations, covering different areas with their activities and thereby demonstrating considerable interest in social participation. With the aim of propelling and receiving these initiatives, especially those aimed at defending their rights, promoting integration and unifying their representation, it is necessary to develop mechanisms that ensure fuller forms of interaction, between the Argentine State and residents abroad. For this reason the Ministry of the Interior has implemented the Province 25 Programme, through which it seeks to promote democratic participation of all Argentines residents abroad, and provides greater representation and institutional quality." Resolution 452/2007, Official Bulletin (Argentine Republic), 16/3/2007. No. 31.117. Year CXV, p.15.

9 Idem.

10 Pre-project initiated by the then Secretary of Provinces of the Ministry of the Interior, Rafael Follonier, 2006. Extracted from <http://www.argentinaelections.com/Provincia_25___con_RREE.doc>.

11 Resolution 452/2007, *Official Bulletin* (Argentine Republic) 16/3/2007. No. 31.117. Year CXV, p. 15.

then on it was consolidated in institutional terms. This process took place in the context of a sustained increase of resources assigned to science and technology, which manifested in an important opening of research positions, especially in Conicet.

Unlike what happens with unskilled economic migration – for which the actions of the Argentine government have consisted mainly of diplomatic negotiations with the governments of destination countries – during the last decade Argentine governments have adopted policies focused on researchers living abroad. The theme of researcher emigration formed part of Del Bono's management agenda. In *The Bases for Sectip's mid-Term Strategic Science, Technology, and Innovation Plan*, some strategic definitions regarding skilled mobility and migration were formulated (Sectip, 2005). The axis of the strategy proposed by the Secretary of Science, Technology, and Productive Innovation was the management of the mobility and migration of scientists and technologists, which supposed, at the same time, the promotion of mobility and the discouragement of emigration. This goal was part of a policy of increasing the country's scientific base with the explicit goal of reaching a proportion of three scientists and technicians per thousand members of the economically active population in 2015. This document stated that

> … the close ties of national scientific and technological communities with those of other countries are a necessary condition to conduct quality research. Therefore, it is necessary to encourage contacts between researchers under training and qualified researchers in Argentina with first-rate international research groups and institutions. Furthermore, it is essential to avoid that recent levels of emigration of qualified individuals are maintained or intensified. Complementarily, it is convenient to take advantage of the skills of Argentine researchers who live abroad, through systematic linkage activities.[12]

The *Bases* contained a specific section on the management of international mobility. In this section, the Argentine situation is summarized in the context of international trends, and four lines of policies are proposed: retention, promotion of international mobility, return, and linkage. In each one of these, directions and actions to be taken are suggested. The *Bases* contain a horizontal international cooperation program, in which objectives, strategies, and actions are detailed, including some on links with foreign residents – the responsibility of the Raíces Program – and some about the promotion of return. Also, in the Horizontal program, human resources in science and technology include a component – component V – about Return and linkage with Argentine researchers living abroad, along with specific recommendations.

12 Sectip, *Bases para un Plan Estratégico de Mediano Plazo en Ciencia, Tecnología e Innovación 2005-2015*. Partially extracted from <http://repositorio.educacion.gov.ar/dspace/handle/123456789/95217>.

The presence of this theme in Sectip's strategic planning is a good sign of the importance it was given. In this context, it is not surprising that the Raíces Program acquired major importance. Raíces is a program dependent on the National Directorate of International Relations of the Ministry of Science, Technology and Productive Innovation.[13] Towards the end of 2008, the Law 26421 was passed, which awarded a prominent ranking to the program.[14] Article 1 of the law characterized the program as a "State policy", and the following articles established the program's aims, functions, and operational conditions. The program aims defined by Article 2 of the Law are to:

a. develop linkage networks with Argentine researchers who live outside the country, thus increasing linkage with researchers living in Argentina;
b. disseminate Argentine scientific and technological activities outside the country;
c. improve the quality and availability of information about highly trained Argentine professionals residing outside the country;
d. integrate Argentine researchers resident abroad into scientific research, technological development, and innovation promoted by the national Government through the Ministry of Science, Technology, and Productive Innovation, the National Agency for Scientific and Technological Promotion, Conicet and remaining public organizations of scientific and technological promotion;
e. facilitate the return of those highly trained researchers, technologists, and professionals seeking to return and continue their careers in Argentine institutions;
f. involve the country's productive sector, foundations, and NGOs in the Program's activities.

Raíces has an Advisory Committee comprising representatives from Conicet, the Ministry of Foreign Affairs, the Industrial Union of Argentina, the National Commission on Space Activities, the National Atomic Energy Commission, the National Institute of Agricultural Technology, the National Institute of Industrial Technology, the National Inter-University Council, and three researchers, one of them a returnee.

The most visible component and also the most highlighted by the program itself is the repatriation of researchers. This program rests, more than anything else, on Conicet. According to a Raíces Program report, over two-thirds of researcher reintegration was financed by Conicet.[15] One of the instruments utilized is Conicet's Internal Postdoctoral Scholarships Program. The aim of these scholarships is to

13 For further information on Raíces, see the *Programa Raíces. Una política de Estado* ("Raíces Program. A Government Policy") brochure at <http://www.raices.mincyt.gov.ar/documentos/Programa %20Raices %202011.pdf>.

14 See <http://www.raices.mincyt.gov.ar/pdfs/Ley_26_421_Raices.pdf>.

15 See <http://www.raices.mincyt.gob.ar/documentos/Programa %20Raices %202011.pdf>.

facilitate the reintegration of Argentine researchers who are living abroad in different public and private research spheres in the country. This Council call is permanent and with the application, request for financial aid to meet the costs of settling in the country can be made. For the applications to be successful and have this type of scholarship granted, it is required that the applicants be up to 40 years of age and at the time that they submit their applications, they be residing outside the country. Applicants must prove that they have lived abroad for not less than two years and at the time of application they must have been developing research activities in foreign science and technology institutions in a continuous manner. Another eligibility criterion is that they must have previously tried to enter the Council's Scientific and Technological Researcher Degree, or in any case, to be on the verge of joining a public or private research institution.

In addition, some initiatives that are not specifically targeted at migrants have a greater reach and impact than some that have this explicit purpose. Such is the case of entries to the Conicet researcher degree. The flexibility that Conicet offers is evident in the provision that Argentine researchers living abroad can send their application forms from the country they are in. The sustained growth in entries to the researcher degree has facilitated a substantial number of residents living abroad to join this degree program. Nonetheless, a significant portion of those individuals who have returned have been post-doctoral scholarship recipients abroad who spent a short period of time outside the country and often had a commitment to return. In other words, these are cases which strictly speaking are difficult to fit into the general categories of repatriation or return.

Another tool related to the return of Argentine researchers living abroad – in this case from Anpcyt– is the *Proyectos de Investigación y Desarrollo para la Radicación de investigadores en Áreas Tecnológicas Prioritarias* (Research and Development Projects for the Location of Researchers in Technological Priority Areas or PRH-PIDRI). PIDRI's aim is

> … the incorporation of trained scientific and/or technological researchers into Implementation Units (UE), existing or future, that belong to universities and/or non-profit public or private institutions dedicated to scientific and/or technological research [...] in high-priority technology and economic impact and/or social areas, and/or priority geographical regions.

The establishment involves the reintegration of a researcher living abroad with a minimum continuous foreign residence period of four years.[16]

Similar to the Conicet and Anpcyt's instruments that have been summarized, the Raíces Program has a return subsidies provision. These subsidies are directed towards facilitating the reinstatement of Argentine researchers residing abroad who have received offers to work in local public or private institutions, and

16 See <http://www.agencia.mincyt.gob.ar/upload/GUIA_PRH_PIDRI_2011-VENTANILLA_ABIERTA.pdf>.

financing their return trip.[17] These subsidies have an "open window" call – they can be applied for at any time of the year –, and the applications are evaluated by the Raíces Program Advisory Committee. Grants may cover the cost of: tickets for the family group, repayment of excess baggage, sending of books, moving costs and customs taxes, transportation of scientific equipment related to the research topic, and the purchase of equipment for research.

Furthermore, Article 3 of the Law 26421 provides that The Raíces Program will

> … put in place a database of scientific researchers, technologists, and highly qualified professional Argentines living abroad who aspire to rejoin the Argentine professional environment, in order to facilitate the search for employment.

The interesting point of this definition is that the database of researchers living abroad – which according to the program information has 4500 records – is designed as part of a return before linkage policy.

The preeminence of the share of return – and the political visibility that they have acquired – has put the linkage activities in the background. This does not mean that there are no important linkage activities going on, but in general, the public presentation of the policy tends to highlight that if earlier brain drain was a dominant standard, this phenomenon has disappeared and return to the homeland is what prevails. The use of the term "repatriation" in place of the more neutral term "return", exemplifies the key nationalist orientation that colours the whole program's initiatives.

Probably the most interesting linkage initiative is that of encouraging the participation of Argentine researchers who live outside the country in projects financed by the Anpcyt. In accordance with the regulations in force, the Scientific and Technological Research Projects (PICT) corresponding to Category III International Cooperation and Raíces,

> … will be oriented towards promoting the link between a research group in the country and one or more Argentine researchers who live outside of the country, in order to jointly develop a research project with an Argentine institution and a foreign institution.[18]

In the last two PICT calls (2010 and 2011), a total of 37 projects were approved in this category – 18 in 2010 and 19 in 2011 –, for a total of 10,322,807 pesos – close to 2 million Euros.

In addition to this initiative, there are two others: "Projects for the development of virtual research networks" and "micro projects and medium sized technology-based companies". The first tries to link Argentine researchers in the country with those who are abroad through the creation of networks of specialists in different fields of knowledge to serve as a platform for the development of a research program, and the participation of the same, in thematic virtual forums.

17 See <http://www.raices.mincyt.gov.ar/aplicar_retorno.htm>.

18 See <http://www.agencia.gob.ar/IMG/pdf/Bases_de_la_Convocatoria_PICT_2011.pdf>.

The second program attempts to encourage innovation and job creation in micro and small enterprises (MSEs) through linking professionals in the areas of biotechnology and software with their Argentine counterparts living abroad.

With regard to virtual networks of researchers, the sub-program consists of a

> … local call for projects for the development of virtual networks of researchers in the four areas of knowledge: Social Sciences, Exact, Natural, and Biological Sciences, Health Science, and Engineering. The incorporation of these virtual networks that involve Argentine scientists abroad in the respective subject areas, will facilitate identification of leaders in each area who are responsible for coordinating forums, promotion of cooperative projects and integration activities among participating scientists.

This program receives small amount of funding – around 7000 dollars – for one-year long projects. Its timing has been irregular – calls for tender were opened in 2003 and between 2006 and 2008 and further for 2012 –. Up until that time 31 networks had been financed.[19]

Outline 2. Scientist networks financed by the Raíces Program (2203-2008)

As part of the Cidesal Project, an investigation that sought to reconstruct the dynamics and impact resulting from the networks driven by Raíces Program between 2003 and 2008 was conducted. First, a survey was carried out on the Internet in order to gather data that might provide a preliminary overview of the funded networks and systematize the records present in the virtual scene. Second, open-ended questions in order to obtain information to be provided by the members themselves were distributed as part of a digital survey. . Responses were received from half of the members of the networks studied; coming mainly from Social Sciences, followed by Exact and Biological Sciences.[20]

19 Details can be found at <http://www.raices.mincyt.gov.ar/documentos/redes_financiadas.pdf>.

20 In the evolution of support for the networks, from their beginnings in 2003 until 2008, the absence of a defined boss was noted. There are cases that cover a call period of two years (2003-2004; 2008), others that cover just one (2006; 2007; 2008). While in the 2007 electoral tear that included a presidential election – a peak of nine networks in 2007 is observed, in 2005 there are none. In addition, the section of the networks within the official Raíces site provides no information about what happened from 2008 onwards. It is clear that within the Raíces payroll and, in the case of Exact Science networks, certain forums are mentioned as networks, signaled as such in call applications to the program that made up part of the same network. As it was decided to group these networks together under the framework of the main network, a universe of 21 networks is seen. Of these networks the ones that acquire prominence are Social Science networks, followed by those from Exact Sciences while Engineering, Biological Sciences, and Health networks represent notable minorities. More information: <http://www.raices.mincyt.gob.ar/documentos/Anexo_II_Redes.pdf>.

With respect to the collection of Internet data, it is observed that records for first calls are practically non-existent. In fact, it is only mentioned on the Raíces page. However, from 2006 a remarkable change is seen in that, according to the network observed, different types of activity indicators and different forms of executed tasks appear: websites from the Ministry of Science, Technology, and Productive Innovation (Mincyt) or websites provided by the Ministry, fallen or not, specific calls from the networks in question, communities with press dissemination in distinct spaces (educational portals, blogs, etcetera) and network operation acts. While these networks took on progressively professionalized indexes, their records of activity levels vary and depend strongly on the performance obtained. Despite the fact that majority of participants did not continue to be actively visible – at least, to the general public – some of them did leave traces of productivity, a factor that also changed considerably depending on the case analysed. Amongst the most common indicators were scientific meetings, both nationally and abroad, and/or lectures given in the framework of the network, or academic appointments that referred to the former.

Moreover, one of the highlights in this output field was the endogenous character of the networks, due in great part to the fact that they were formed through pre-existing links; that is to say, in the end the program was financed by the connection of people who were already linked among themselves. In this content, public support not only represented a mark of greater formality and recognition in comparison to previous links, but it also enabled the budget to be managed. Although this was limited, it served to encourage interaction. Such ties were diverse and had varying degrees of depth, from links within the framework of specific meetings on the topic at hand to participation in other research projects in common, among others. A network was even established before it achieved financing from Raíces and it worked for many years without a specific budget based on the efforts of its members by optimizing their goodwill and by taking advantage of each visit from Argentines living abroad, among other initiatives. This situation brought to light some questions that did not have simple solutions: How can people who do not have the same connections – but who work in the same area – be aware of the existence of a network? And if they did: How can they join and participate in a scheme that already has public funding?

With respect to the impacts - understood as results - from these networks, there came a clear positive evaluation from the individuals consulted. In correspondence to the above and except for isolated cases, respondents stated that the networks promoted: (i) the exchange of valuable information; (ii) the transference of specific knowledge about the topic covered; (iii) strategic relationships with referees (individual or organizational) in front of a problematic situation; (iv) the organization of some scientific meetings (seminars, conferences, congresses, etcetera); and (v) new opportunities in scientific cooperation that are expressed as: doctoral and postdoctoral stays, joint thesis supervision, internships, bilateral projects, bilateral projects, presentation of subsidies, strengthening linkages with other scientists dispersed. It is also important to note that all respondents stated that the work of the network led to specific publications, mostly subject to refereeing.

Also, digital platforms - in their various forms - were considered useful tools, but not sufficient to ensure interaction among members. In practice, exchange took on different forms: themed forums; the writing of articles derived from common work; visits from researchers from the country of origin; interaction among members of the e-mail list; organization of specific meetings and workshops. Nonetheless, beyond the form taken, the majority of the individuals consulted agreed that the debates reached great levels of depth. Hence there is no basis in this study to argue that a specific form has taken precedence over another or others, but it can be assumed that these ties provided valuable feedback; especially when the goal was clearly defined from the start. Similarly, despite the fact that connectivity was appreciated on the basis of its usefulness, the respondents did not consider the virtual infrastructure as a sufficient condition to foster a sustained exchange since, by itself, it does not generate anything and it can be easily replaced. It is understood that, apart from this platform, good administration and communication is required on the part of the coordinator.

In terms of the role of public management, Mincyt's commitment and the Raíces program's purpose are redeemed in respect to the networks, principally due to their capacity to strengthen exchange between scientists and due to "the filling of an existing gap". Nonetheless, new opportunities to improve the initiatives' execution and support are identified: from the amount of funds awarded and the possibility to support solid, developed research projects in these spaces to monitoring of what has been completed, achieving balanced accounts, and technical assistance for those involved.

In short, after analysing the Argentine case, it is possible to argue that the network alternative is a tool that – although it may generate some kind of positive impact – it does not solve or contribute substantially, at least as it has been used up until now, to solving the crux of the problem: to create a systematic link with expatriate scientists. In particular, the lack of continuity and evaluation of the line of actions reflects an institutional problem which affects its possibilities of gaining more scale and obtaining relevant input that contribute to the scientific field and/or to national development.

Source: by María Verónica Moreno

The information available about this instrument is very limited, almost exclusively the institutional presentation that the Raíces program itself makes.[21] However, while looking for traces of different networks supported by the program it appears that its main activity has been the execution of a meeting of researchers living in the country and abroad to discuss the subject of the network (see the analysis of Maria Veronica Moreno in the section below). The monitoring of these activities, in particular the forums which were hosted on the Raíces program web page, showed very little activity: very few contributions from the supposed network participants – to obtain financing potential participants both in Argentina and abroad – had to be presented – and the lack of discussions – contributions

21 See "Experiencia argentina: redes del programa R@íces" ("Argentine Experience: R@íces Program Networks", in Cidesal (2013), *Informe final*, vol. 2.

tended to be limited to operative aspects. An aspect that could be of interest and requires a specific study is whether a relationship is observed between virtual networks and PICT International Cooperation networks and Raíces.

There are also some interesting support initiatives from associations of Argentine researchers abroad – in Germany, Great Britain, France, Belgium, and Luxembourg – closely tied to the program.[22]

The program has an additional important instrument oriented towards facilitating short visits from researchers living outside the country. The "Dr. César Milstein Subsidy" finances tickets and provides travel funds for Argentine scientists and technologists living abroad so that they can undertake stays of not less that one month and not more than four months in Argentine scientific and technological institutions. The main activities for which support is requested are: participation in research teams, thesis supervision, participation in thesis juries or competition juries, consultation for science and technology organizations in distinct subjects, teaching of postgraduate courses and degree courses. An Argentine research institution must request these subsidies.

Regarding dissemination activities, they are related on one hand to the supply of researchers abroad who are interested in making their professional backgrounds accessible for companies, institutes and universities, and on the other, to the execution of seminars and workshops to promote knowledge transfer.

Recently, the program has implemented the Raíces International Cooperation in Science, Technology, and Innovation Prize, aimed at prominent Argentine scientists who live abroad but maintain strong links with the national scientific community and the "Dr. Luis Federico Leloir" prize, targeted at foreign scientists who have promoted cooperation with Argentina. The Raíces prize has been awarded to 14 distinguished Argentine scientists who live outside the country.

The program also provides for the development of new lines of action, namely:

- *Raíces Productivo* ("Productive Raíces") Link with Argentine business people, professionals, and technologists abroad, for the development of scientific, technological, and business cooperation opportunities with a high added technology value.
- Incorporation of foreign scientists. The same is aimed at incorporating of foreign spouses whose Argentine partners have received the repatriation subsidy, into the Argentine scientific system.

In conclusion: ruptures and continuities in policies and programs for skilled emigration

Throughout the present work, important continuities and shifts in the development of promoting the return of researchers living abroad or the linkage of these researchers with Argentine groups and institutions, have been noted. Shifts

22 For more on Argentine scientists in Germany, see Dewey, 2011.

have been linked, more than anything else, to large political and economic crises that have recurred in the country's recent history. This pattern has contributed to the forging and reinforcement of an interpretation of skilled Argentine migration that is principally based on the impact of external factors on the national scientific and technological system.

The implementation of programs to promote return or links with professionals living outside the country has been a recurrent theme in Argentina's recent history. Beyond the fact that this recurrence obeys distinct factors, a common feature – more than anything, before 1966 – is the persistence of a vision of Argentina as a country affected by brain drain, the origin of which should not be looked for in the individual preferences of researchers or the attraction of scientific centres and universities in the United States, Europe, and other Latin American countries, but rather in the impact of strong expulsion factors. One of these factors was the repression exercised by the military dictatorships. Another was the recurrence of profound economic crises, which affected the possibilities to develop a professional career in stable conditions in terms of pay, project financing, and institutional climate.

This interpretation matrix concerning the Argentine situation involved placing emigrant researchers in the foreground. Within the wide spectrum of professional Argentines living abroad, the researchers were – and continue to be – considered the most significant group and the group towards which government initiatives should be directed. It is difficult to establish the reasons for this almost exclusive focus on researchers. Probably, a part of the reasons can be attributed to the particular visibility of the emigration of researchers at certain key moments in recent history. The mass resignation and departure of almost three hundred university professors – among whom there were some important leaders of the local scientific community – after the Night of the Long Canes was a highly symbolic development, a sort of watershed in the country's scientific and academic history.

Without denying the impact of these crises, their occurrence requires a more nuanced assessment. Among other things, skilled migration has been fairly constant, even in favourable national situations and contexts. As is well known in specialized literature, conditions and opportunities in destination countries have an influence on migration decisions and it is necessary to recognize these. Apart from its rigour, the prevailing interpretation has provided a conceptual framework for policy design. A salient aspect of this conceptual framework has been a prevailing focus on researchers as the principal addressees of public efforts in this area.

Therefore, for subsequent governments post the restoration of democracy in 1983, reference to this conventional view and adoption of initiatives to promote the return were necessary components of these governments' science policy programs. It is no wonder then that most of the initiatives adopted by various governments were directed at encouraging the return of researchers living abroad.

A consequence of the shifts pattern has been the recurrence of policies and programs to repair the effects of these ruptures. In other words, while there has not been any continuity in policies, various governments have carried out actions based in good measure on a shared conceptual framework and also based on fairly similar instruments. This last point provokes particular interest. A tour of the various programs implemented since the 1960s shows a striking persistence in the instruments that were applied. This does not mean that the programs have been identical in their design and execution or that they have had equivalent impacts. It is simply interesting to highlight that at the moment of choosing forms of intervention, the similarities are notable.

As was previously noted, the priority defined by the various initiatives was academic researchers. The state agencies that dealt with these initiatives were the highest national science authorities – Conicet in the 1960s, the Secretariats of Science and Technology in the 1980s, 1990s and early 2000s, and Ministry of Science, Technology and Productive Innovation in the last five years. The main policy option was to promote the return of researchers living abroad. Two basic strategies were used to achieve this. On the one hand, they sought to facilitate the processing of return through customs exemptions, reintegration subsidies, and, in some cases, easier access to mortgage loans. On the other hand, they sought to open up permanent employment opportunities. These opportunities depended on organizations – national universities, and, above all, on Conicet – on whose personnel policies return programs had no direct control.

From the first Conicet program in the 1960s, these programs shared some important features. The first of these is the articulation of program actions with Conicet's periodic calls and also with universities. The reintegration of researchers in local academia depended on the possibility that universities – almost exclusively national – could provide some positions and that in calls for entry to the Conicet researcher degree, the researchers who wanted to return would be able to compete for a place.

Therefore, the actions under direct responsibility of the various programs were, in general, to support establishment in the country, and to facilitate the transfer of researchers and their families. Probably the largest initiative on this level was granting of housing loans at preferential rates.

Initiatives to promote links with researchers living abroad had two facets. One of these was linkage with associations of Argentine researchers living abroad or with famous researchers living outside the country who had maintained connections with Argentine. In 1984, the Anacitec was created. For several years, this was the principal reference organization for Argentine researchers in the United States. The Association, as was previously pointed out, attempted to activate relationships with the researcher diaspora and even began to put together a database of Argentine professionals living outside the country. In recent times, associations

linked to the Raíces program have also been created or activated in the United Kingdom, Germany, France, Belgium and Luxembourg.

The relationship with associations of Argentine researchers living abroad was conditioned by the characteristics of the communities of Argentine researchers and professionals residing in foreign countries or cities and, above all, by the possibilities of interaction with the Argentine government. In a way, an important factor in meeting the associations of researchers was finding communication channels and links with the Argentine government. In fact, as was pointed out, the Raíces program was particularly influential in the creation of some of the associations that currently exist.

On the other hand, programs sought to facilitate linkages between researchers living abroad – without associations brokering in the middle – with Argentine academia through various instruments. An initiative common to several of these programs was the attempt to create a database of Argentine researchers living outside the country. In accordance with the relevant information, these initiatives have not been too successful, with the partial exception of the Raíces program. This task presented difficulties that are often overlooked, due to the lack of previous studies on the extent and characteristics of the target population, the insufficient development of search strategies and systematization of information, and difficulties in updating information.

As was previously noted, some Raíces program instruments present interesting innovations. Such are the cases of the PICT Raíces, PIDRI, and other linkage instruments, analysed previously. The two interventions with the greatest impact in the Raíces program share the common feature of allowing the splicing together of the program with national science and technology organization instruments -more specifically, with Conicet and Anpcyt. In other words, the efficiency of the Raíces initiatives is much greater when they are accompanied by generic or specific instruments to promote research. Among other things, these instruments put a much larger volume of economic resources rather than those specifically directed to Raíces into play.

The responses of researchers living outside the country to the calls for return – at those times when concrete opportunities to access permanent positions were offered – were positive. As previously mentioned, the various programs implemented since the 1960s have fulfilled, to various extent, the aim of facilitating the return of researchers. An open question – and one that is very difficult to approach – which remains unanswered is to what degree decisions to return were influenced by the programs, and to what degree they were due to personal or family reasons or a lack of opportunities abroad. In general, the instruments' characteristics, with the exception of the first program in the 1960s – appears not to have allowed the realization of significant investments in infrastructure and scientific equipments – that would have facilitated the return of well-established researchers internationally.

References

Albornoz, M.; Alfraz, C. & Fernández Polcuch, E. (2002). *Hacia una nueva estimación de la fuga de cerebros*. Documento de trabajo n.º 1. Buenos Aires: Centro Redes.

———— & Gordon, A. (2001). "La política de ciencia y tecnología en la Argentina desde la recuperación de la democracia (1983-2009)". In Albornoz, M. & Sebastián, J. (eds.). *Trayectorias de las políticas científicas y universitarias en Argentina y España*. Madrid: Consejo Superior de Investigaciones científicas.

Calvelo, L. (2008). "La emigración argentina y su tratamiento público (1960-2003)". In: *III Congreso de la Asociación Latinoamericana de Población (ALAP)*. Córdoba, September 24th to 26th.

Dewey, M. (2011). "Los científicos argentinos en Alemania". In: *Más allá de la fuga de cerebros. Movilidad migración y diásporas de argentinos calificados*. Buenos Aires: Eudeba.

Giustiniani, R. (2004). *Migración: un derecho humano. La ley de migraciones 25 871*. Buenos Aires: Prometeo Libros.

Houssay, B. (1989a [1939]) "El problema de las becas de perfeccionamiento". In: Barrios Medina, A. & Paladini, A. *Escritos y discursos del Dr. Bernardo A. Houssay*. Buenos Aires: Eudeba. Aparecido originalmente en *La Nación*, February 20th and 27th, 1939.

———— (1989b [1943]). "Carta a un joven investigador que emigra". In: Barrios Medina, A. & Paladini, A. *Escritos y discursos del Dr. Bernardo A. Houssay*. Buenos Aires: Eudeba.

Hurtado de Mendoza, D. (2009). "Periferia y fronteras tecnológicas. Energía nuclear y dictadura militar en la Argentina (1976-1983)". *CTS*, 13 (5): 27-64, November.

Lema, F. (2003). *La diáspora del conocimiento*, available at <http://www.fernandolema.com.ar/index.php?option=com_content&task=blogcategory&id=0&Itemid=28> (last accessed: 3/5/2014).

Leiva, M.ª L. (1999). *Políticas de recuperación y vinculación de argentinos en el exterior. Valorización del Patrimonio Nacional e Integración Regional*. Thesis for Master in International Migration Politics, directed by Lelio Mármora. Buenos Aires: Universidad de Buenos Aires.

———— (2011). "Planes de retorno-vinculación de científicos argentinos y dinámica de las diásporas". In: Hernández, V.; Mera, C.; Meyer, J.-B. & Oteiza, E. (coords.). *Circulación de saberes y movilidades internacionales: perspectivas latinoamericanas*. Buenos Aires: Biblos.

Luchilo, L. (2007). "Migraciones de científicos e ingenieros latinoamericanos: fuga de cerebros, exilio y globalización". In: Sebastián, J. (ed.). *Claves del desarrollo científico y tecnológico de América Latina*. Madrid: Siglo xxi Editores-Fundación Carolina.

Pedrosa, F. (2011). "Entre la organización y el desencuentro: las asociaciones de migrantes argentinos". In: Luchilo, L. (coord.). *Más allá de la fuga de cerebros. Movilidad migración y diásporas de argentinos calificados*. Buenos Aires: Eudeba.

Slemenson, M. (1970). *Emigración de científicos argentinos. Organización de un éxodo a América Latina. Historia y consecuencias de una crisis político-universitaria*. Buenos Aires: Instituto Torcuato Di Tella [mimeo].

Chapter 7

Diasporic Knowledge Networks Incubators

Alejandro Blanco

With the collaboration of
Alejandra del Real and Tania Ferreira

Introduction

Since the beginning of the 1990s, different initiatives seeking to redress the negative effects of "brain drain" have been observed. Accordingly, various actors around the world have initiated projects as they have sought to create long-distance links to "recuperate" expatriate professionals' abilities and knowledge. Nonetheless, in many cases, these types of initiatives have faced great difficulties associated with inadequate management of projects that seek to create links between geographically dispersed, qualified fellow country people. It is against this setting that the present chapter suggests the use of incubators as a strategy for the systematic creation and strengthening of diasporic knowledge networks. The following text is divided into two parts; a conceptual section that presents the proposal's theoretical framework; the other with a more empirical focus that presents results obtained from the application of this approach in the cases of Colombia and Uruguay in the development framework of the Cidesal project.

A Conceptual Approach

International Migration of Qualified Personnel: between loss and gain

As is widely known, brain drain is a concept that was coined in the 1960s and has been used to refer to highly educated expatriates leaving their countries of origin to live abroad. In very general terms, this approach has been characterized by a negative balance on the part of the sending countries. Hence, from this perspective, such countries are affected by the damaging consequences caused by the loss of their human capital, which represents a major obstacle for the endogenous development model (Lucas, 1998; Haque & Kim, 1995). This said, brain drain sets out a singular vision of international migration in understanding it as a social fact that generates ruptures between expatriates and their countries of origin. What

is argued is that people, as part of a social group, have only one possible form of political-cultural affiliation that is connected to only one particular nation state that is formed of spatially delimited territory and differentiated from other nation states. This perspective raises parallels between post-war nationalist thought and migration studies, since they both assume that migrants are nationals of one nation and citizens of one country (Wimmer & Glick-Schiller, 2002).

In the 1990s an alternative vision of the brain drain paradigm began to emerge, offering a different perspective on the international migration of qualified people. This has been labeled in different ways: the brain gain, the diaspora option, talent circulation, foreign knowledge networks, and scientific diasporas, among others. According to this approach, the migration of qualified personnel does not necessarily represent a loss for countries of origin, but rather it is considered a potentially beneficial phenomenon for the different actors involved (destination countries, migrants, and countries of origin). This is thanks to the creation of links with expatriates that are formed by those individuals who make remote contributions (where return is not necessarily an indispensable requirement) in the form of technological and knowledge transfer, brokering with actors abroad, collaborations of various types with actors in countries of origin, the circulation of goods and services, and the strengthening of technological science and innovation systems, among others (Brown, 2002. Barré *et al.*, 2003; Kuznetsov, 2006, Meyer *et al.*, 1997; Charum, 2001).

The contrast between the brain drain and the diaspora option (the latter term being used as a general form to refer to other conceptions of long-distance links) coincides with an important change in the migration theory field, which appeared with the development of the concept of transnationalism towards the end of the 1980s and the beginning of the 1990s. In this way, transnationalism recognizes that migrants maintain various forms of connection with people and institutions from their homelands abroad. This permits them to simultaneously live both "here and there", giving form to a cross-border social organization. Transnational theory brings to light the worldwide growth of both the intensity and span of these flows; not only of people but also of goods, information, and symbols, in which increasingly more efficient means of communication (in particular, the internet) and transport play a hugely important role. Hence, it could be said that the construction of transnational networks between qualified people corresponds to occurrences similar to those that enable the creation of networks between other types of migrants. As with the transnational approach, the latter follows a dynamic process of construction and reconstruction of social networks that are not only determined by individual autonomous or structural decisions, but are also conditioned by what is known as "social embeddedness", that is to say, multiple social, economic, and political aspects that span across the micro, mezzo, and macro-structural levels (Guarnizo, 2006).

The conceptual structure of the diaspora option was based on empirical evidence drawn from multiple initiatives around the world that were oriented towards constructing and strengthening connections between qualified migrants and their home countries. The origins of these experiences are diverse including, principally, government programs, projects financed with resources from international organizations or private institutions, and collective initiatives propelled by the diaspora itself and actors in the place of origin. And so, instruments to create transnational networks and lines of action for each experience vary depending on the interests of their creators.

Outline 1. Comparison of the Brain Drain and the Diaspora Option

	Brain Drain	Diaspora Option
Appearance of the concept	1960	1990
Migration Balance	Negative	Potentially beneficial
The effect of Migration	Rupture between the place of origin and the destination	Transnational links between the place of origin and destination(s)
"Recuperation" Mode	Physical return	Long-distance connection
Instruments of attraction	The politics of returning to the place of origin	The politics of long-distance links, the creation of networks, temporary visit programs, etc.

Source: own production

The idea of diasporic knowledge network incubators

It could be said that the roots of virtual communities go back to before the appearance of the Internet and computer-mediated networks. Their origins lie in the invention of writing, which allowed the speaker to be separated from the spoken and enable the creation of a form of new mediated, non synchronous form of communication. This enabled potential links that connected readers and mobilized them to be connected. Additionally, a virtual community may organize itself on a foundation of affinities that create links between the members of a social group with internal links, thanks to the existence of means of communication. Having said that, in a virtual community the convergence of various actors in the same physical location is not necessarily a starting point for social connection and in this sense, geographical borders cease to be a barrier to the construction of trans-local networks. In this way, the virtual facilitates the creation of social groups without their members being in the same geographical location, that is to say, the creation of social groups with mobile members, which permits the deterritorialisation of community (Lévy, 1999: 21). More recently, in the 1990s, a new technological revolution permitted the integration of various modes of communication (text, images, and sound) and setting up of a global, electronic

network that facilitated interpersonal interaction from multiple locations around the world among many people and at a chosen time (synchronous and non-synchronous); with this the virtual community was given a new push into the era of interactive networks (Castells, 2005: 359). This contemporary version of the virtual internet community is an effective means of creating, in pre-determined conditions, incubators for diasporic knowledge networks between qualified migrants who, despite being geographically dispersed, feel united by a sense of national identity, common intellectual interests, and belongingness to the same interactive cyberspace context.

Although knowledge networks have existed since the 1960s when scientists began to connect long distance via computers (see the history of Arpanet, Advanced Research Projects Agency Network[1]), it wasn't until the 1990s when, with the appearance of the internet, people began to make premeditated use of this new technology with the purpose of mobilizing members of qualified diasporas in favor of their home countries. Nonetheless, factors such as: weak mass internet access, particularly in countries in the South, and a lack of familiarity with the use of complex technical protocols that facilitate the use of e-mails and message lists, among other cultural factors, reduced the potential of virtual communities of qualified migrants in that era. In spite of this, initiatives such as the Colombian project, the Caldas Network, that opened its own digital interaction space (the R-Caldas) in 1993, or the South African Network of Skills Abroad (SANSA) project established in 1998, were pioneer experiences that enabled both understanding and a glimpse of the great possibilities for the creation of diasporic knowledge network incubators through internet usage (Charum & Meyer, 1998; Brown, 2003).

The concept of incubators for diasporic knowledge networks has a lot to do with the idea of business incubators – a term which is used to refer to an organization that offers a favourable environment for entrepreneurs, with the objective of accelerating the business plan development process and reducing the possibility of failure of these types of initiatives. Business incubators offer advantages to their members in terms of reinforcing their abilities, providing access to services, and providing networking opportunities, thus increasing their prospective survival and growth in comparison with the situation they would find themselves in outside of an incubator. In general terms, business incubators work through the relationships between stakeholders: employees, owners, suppliers, customers, the government, and creditors, amongst others (Barrow, 2001: 5). Similarly, the virtual community represents a privileged meeting space that offers members of the diaspora the opportunity to make new professional and academic links through meetings with others of shared interests. In this scenario, one of the main functions of network incubators (arising from virtual communities) is to broaden the connection spectrum of skilled migrants to allow the linking of actors (both

1 For a summary of the history of the Internet, see Castells (2005: 359-408; 2001).

inside and outside their places of origin), closing structural holes and establishing new flows of knowledge.

This approach does not deny the pre-existence of transnational links (generally strong, rooted relationships) between qualified members of the diaspora and their counterparts in their countries of origin, as well as other types of egocentric networks that migrants can construct in cyberspace that derive their existence from blogs, article comments, personal pages, and forums, to name a few. Nonetheless, the concept of diasporic knowledge network incubators differs from other transnational experiences in, at least, four fundamental aspects: (i) they constitute a "site of massive convergence" between geographically dispersed actors that includes qualified migrants who share the same nationality and interlocutors in the place of origin or expatriate knowledge stakeholders; (ii) they have the potential to disseminate expert knowledge via multiple specialized networks of an informal nature, limited obviously by the changing interests of their members, their motivation, and the size of the community registered on the technological platform that supports socialization; (iii) they are aimed at creating a system to offset the emergence of collective self-organized processes according to a bottom-up logic; and (iv) the critical mass connected in an incubator through cyberspace does not correspond to a natural or spontaneous circumstance, but the result of a deliberate strategic plan, which allows its purpose to be directed.

As may be appreciated, virtual Internet communities represent a fundamental part in the strategy for creation of a diasporic knowledge network incubator. Thus, strategy and management are key to successful configuration of diasporic knowledge network incubators. If any one of these factors were missing, it is very likely that projects would encounter great difficulties and would not have a good outcome.

Strategy

It is important to emphasize that although these projects may rely on virtual communities (composed of a suitable technological platform and a critical mass of registered qualified people), this alone is not sufficient to ensure that a diasporic knowledge network incubator will flourish. In effect, incubators need to be able to depend on strategic direction that informs participants as to the purpose which brings them together as group members, what mechanisms are available to achieve the projected aims in questions, what they can hope to achieve in the future, and how the project may be monitored as it advances. All of these elements are part of a strategy, without which virtual communities would not evolve beyond a space of interaction for qualified migrants with spontaneous connections to a strong multitude of Internet-connected intelligences with a clear vision. Therefore, the configuration of a strategy should be the first task to tackle before proceeding with any other activities directed towards configuring a collective intelligence of expatriates in cyberspace. In the following section, a review

of some important elements that form part of what here is called strategy will be examined.

To begin with, the concept of strategy discussed in this section is one commonly used in management literature, which was inspired by military principles in the field of war, and from which the idea of planning was taken and subsequently applied to the business world. In the beginning, administration theory experts understood strategy as a result of a rational planning process that permitted an organization to set its goals, identify courses of actions, and to adequately distribute resources. Later on it was recognized that strategies are not always drawn from rational planning but rather, in some cases, they may correspond to answers that emerge in response to unforeseen circumstances (Hill & Jones, 1996: 5). Seen in this way, a strategy is not necessarily static throughout the development of a project but rather, on the contrary, it may be formulated or reformulated in accordance with events that arise in the action flow of an initiative. However, while it is true that there are different models of strategy structure, there are some elements that are commonly employed in the majority of cases. These are: (i) definition of the project's orientation; (ii) analysis of the setting; (iii) definition of the required organization; (iv) selection of tactics for implementation of the strategy in question; and (v) design of an operational and sustainability plan. Although none of these topics will be examined in detail here, some general aspects will be mentioned which each reader is free to examine in detail on their own, in accordance with their own project's needs.

The first component in the formulation of a strategy is the definition of the main challenges that will be faced by the virtual community, which include, among others, the project's mission statement and goals. This provides an adequate context for constructing action plans and assessing emerging operations during the development of an initiative. This way, while a mission statement enunciates a community's reasons for being and what it should do, its goals specify what can be expected to be achieved in the future. In this sense, a virtual community that aims to build an incubator for diasporic knowledge networks should not be understood simply as an aggregate of people registered on a platform, but as a social group that, additionally, identifies with its own proposed objectives. Thus, the establishment and communication of stated strategies (mission statement, vision, scope, goals, values, and guidelines), and acceptance (implicit or explicit) of these on the part of group members, permits the understanding of a virtual community as an organization; that is to say, a social organization intentionally created for the achievement of a particular end through human action and the use of resources. While diverse types of organizations exist, in this point in particular horizontal organizations are referred to-configured by members of a virtual community who possess great autonomy given that they are not subordinate to project administrators, but are likely to be guided by a strategy that attempts to bring coherence to the various planned activities of the social group.

The second component refers to an analysis of the environment in which the diasporic knowledge network incubator will be developed, and which has the identification of project goals and threats as its object. At this point, at least four fundamental aspects should be analysed: (i) *immigration*, in order to account for the characteristics of the international migration of professionals belonging to a particular country of origin, including: main areas of concentration, degree of dispersion, the demographic profile of migrants and their level of education, specialized areas in which they work, institutional links abroad, and their research interests, (ii) *the national science and technology system* in the country of origin, detailing its structure, major programs, capacity indicators (researchers, research groups , projects and products) and identification of key actors (universities, development centres, etcetera), (iii) *policies* (national and international), translated into government programs and projects that aim to address the skilled diaspora, promoting scientific technology and innovation, and encouraging international cooperation in this field; (iv) *other related transnational projects and networks*, whether public, private or of third sector origin (including non-profit organizations, NGOs, etc.), identifying their approaches, features, coverage, and other relevant aspects that provide clarity regarding possible partnerships and synergies.

The third point is related to understanding the abilities required by the project administration team (in terms of human resources) and the development of a *formal organizational structure.* For this, it is necessary: (i) to identify and classify the activities required to launch the incubator; for example, the establishment of expatriate databases, identification of users to be connected, configuration of technological platforms, organizational support of thematic networks, responses to questions, commentaries and requests made by community members, writing of newsletters and press releases about group events, and the creation of strategic alliances, etc.; (ii) to form groups of activities necessary for the achievement of incubators' objectives in areas, for example, of marketing, content creation, community administration, and technical support, among others.; (iii) to assign a responsible individual with the necessary skills to each group for undertaking the tasks assigned to them. This may include the creation of certain roles within the organization, for example, community manager, web master, network manager, content writer, etc.; (iv) to stipulate the horizontal (at the same level within an organization) and vertical (with the project manager, members, etcetera) coordination, via the definition of processes. Hence, the size of the organization necessary for the development of a diasporic knowledge network incubator can vary depending on the magnitude of the project, which means that it is very difficult to conjecture, in a generic manner, as to a general figure for any project.

The fourth point is related to the selection of tactics or alternatives directly in relation to the form of knowledge network management needed to achieve the goals being pursued. Although some strategies may appear to contradict each other, it is always possible to combine diverse possibilities; their convenience should

be evaluated according to each project's possibilities and mission goals. Some network construction tactics are presented as follow:

i. bottom up or top down: this is the first approach in which the planned structure of a network is defined by a central intelligence (in other words, an administrator or decision making group) that establishes and demarcates the characteristics of privileged nodes, from which a community that generates interaction and produces results will be sought. As a result of this, nodes derived from this approach will receive the major part of the resources available to the project. On the other hand, with the second approach, intelligence is distributed among community members who establish and demarcate the nodes' characteristics, and who self-organize to give rise to emerging associations, not controlled by community administrators, although supported by them. This does not mean that two mechanisms cannot coexist in the same incubator, in some cases they may even complement each other or generate competition.
ii. Disciplinary or cross-disciplinary: knowledge circulation and creation can be organized within the limits of traditional demarcations of disciplinary knowledge (this is not free of great controversies and debates), whose boundaries may vary depending on the nomenclature used (UNESCO and OECD classifications may be used to illustrate this point); or, contrarily, from a cross-disciplinary viewpoint, in the convergence of knowledges that escape from established classifications, for example, cultural studies, feminist cyber culture studies, etcetera.
iii. One variant of the disciplinary option would be the creation of thematically dispersed (multidisciplinary) or focused networks, where there may be a great variety of specialized groups but in different areas of knowledge or, alternatively, many specialized groups within the same area of knowledge.
iv. The crowd sourcing approach, in which the construction of networks does not take place within a larger or smaller demarcated body of knowledge but rather where networks are constructed through concrete problems that demand that knowledge be mobilized in order for the former to be resolved. According to this approach, a person or organization proposes to the community, through an open call, a concrete task whose resolution involves some type of incentive (economic, symbolic, or some other type).
v. Nodes self-managed by members of the virtual community or administered by a project's core team, allowing the definition of who will be responsible for the execution of certain administrative tasks (such as the creation and publication of content, network invigoration, conflict resolution, and communication moderation, etc.) that require the

dedication of both time and effort towards the consolidation of each group. In the same way, direct intervention in the nodes on the part of a project's administrative teams could bring positive results for the advancement and consolidation of networks; nonetheless, it also involves greater budgetary allowance in order to be able to rely on the human resources necessary for the task.

vi. Exclusive virtual links or a virtual-face-to-face mode: although it is possible that diasporic knowledge networks be created with either of these two options, each alternative has unique characteristics in terms of budget management and project time implications. Therefore, it is worth keeping in mind that creating networks solely on the internet offers benefits aspects such as immediacy, cost reduction, long-distance action, etcetera, while face-to-face contact enriches communication and enables a more intimate understanding between the parties involved, which itself favours the building of confidence.

vii. The structuring of networks via geographic or thematic nodes incarnates a well-marked difference, given that the former option tends to group expatriates with different professional backgrounds and academic interests who live in the same city together while the latter option is focused on the construction of trans local networks amongst members of diasporas who, while they live in different parts of the world, share a common attraction to a research or knowledge issue in particular, this being their principal motive for cohesion. It is useful to mention that the first type of association is inclined to acquire a formal character (with legal status, statutes, a hierarchical structure, membership, and so on) that enables the association to count on a more enduring commitment from its members; while the second option is characterized by a fluctuating population with weak links but with a strong focus on specialized knowledge, though not so much on the development of socio-cultural aspects, which is common in geographic nodes.

viii. Finally, on one hand, there are knowledge transfer or circulation tactics that focus on channelling diaspora members' knowledge and experiences to their places of origin to contribute principally to science, technology, and innovation; or, on the other hand, they focus on the circulation of knowledge amongst different actors connected to an incubator, which enables the creation of multidirectional flows between people situated in different geographical locations. From the point of view of scientific dissemination from the country of origin, the first tactic represents an opportunity to redress the effects of the so-called "brain drain", while the second, as well as recuperating skills, also constitutes a window of opportunity for the internationalization of national knowledge.

Lastly, it is important to include an operational plan within a strategic formulation, a plan that clearly states the services to be offered, the scope of each line of action, and the type and locations of the knowledge that will be worked with. To achieve this, it is extremely useful to utilize process maps with the intention of organizing the work in question, to define responsibilities, and to predict expected results better. In addition, it is fundamental to pay attention to the sustainability plan design, and to make clear the manner in which the project in question will be financed, at the very least in the short and medium terms. Although financing virtual communities is not simple, some possible sources of finance for these types of initiatives include: (i) public resources, above all those that come from foreign affairs ministries or bodies in charge of administration of science, technology and innovation sectors in countries of origin; (ii) international cooperation or multilateral organizational resources; (iii) private sector resources including universities and innovation centres, among others; (iv) advertisement earnings; this option ends up being extremely complex, as a large number of registered users and concentrated web traffic are necessary for this option to be viable; (v) resources from community members themselves obtained through membership fees. This option is not highly recommend as it tends to discourage potential community members; and (vi) specialized services for community members, for example, labour mediation services for members of the diaspora who wish to return to their country of origin and regain lost professional contacts there, or providing services for external organizations that require highly specialized staff, attempting to emulate headhunting company models.

Management

Management is directly related to strategy implementation and it refers to the execution of previously planned tasks to achieve a concrete objective. Thus, the management of diasporic knowledge network incubators should be considered with regard to four key aspects: (i) the users in a particular virtual community; (ii) information and knowledge; (iii) technology; and (iv) communication. The last categorization is provided for purely descriptive purposes. Nonetheless, in practice, each of these components is intimately interrelated and interwoven, for which reason it is normal to identify some areas of juxtaposition in the approach that is addressed here.

Management of virtual community members

Managing users in a virtual community begins with generating platform traffic, which aims to have a significant number of visitors register and become active members[2]. Having successfully attracted an objective public and had them register on the platform, a virtual community begins to develop through member

2 For interested readers, to learn more about the conceptualisation of these three stages in generating a critical mass for a virtual community, consult Hagel & Armstrong (1999: 161).

participation. From this moment onwards, we will talk about a dynamic and complex social body that emerges, transforms, adapts, divides, that in some moments is strengthened and in others weakened, and finally, one day, disappears. In the same way, a virtual community can learn, organize and mobilize itself, and develop its own culture, composed of values, beliefs, norms, identities, and other social subjectivities, that arise from collective construction through socialization processes[3]. In this setting, the management of users after they have registered in the virtual community, seeks to achieve the following objectives: (i) member service and maintenance of a favourable communication environment; (ii) development of emotional links between users and the brand that represents their virtual community; (iii) motivation of and influence for the development of an incubator's strategic objectives; (iv) creation of social links, both within and outside of cyberspace; and (v) control of strategy development.

Knowledge and Information Management

In a diasporic knowledge network incubator, information and knowledge connected to qualified migrant members of a virtual community constitute one of the most valuable features that a project can depend on, and for this reason it is advisable to pay attention to the way in which these elements are managed. Therefore, knowledge management in incubators is intrinsically related to the development of activities oriented towards the diffusion and absorption of knowledge rooted in community members. However, such management is justified to the extent that communication and interaction enable the existence of a virtual community that does not necessarily lead to effective action in sharing knowledge or cooperation among members. Thus, the transition from a virtual community of highly skilled expatriates to a diasporic knowledge network incubator takes place when the knowledge possessed by members of the digital space benefits other actors, through direct connection between the involved parties, in this way making connections (weak or strong) through knowledge. Thus, knowledge management plays an important role in this process, contributing to overcoming of barriers that can make these types of interaction difficult. Amongst these difficulties are deficiencies in diffusion and absorption capabilities on the part of both the issuers and receivers of knowledge (Tang, 2011). This refers to aspects such as reluctance or lack of motivation in information sharing, lack of available knowledge, lack of technical skills in using communication tools that facilitate the giving or receiving of information, use of different languages causing distortion of messages, etcetera. In the same way, this management also includes actions such as support for the effective codification of knowledge, creation of meeting spaces, and coordination of the interested parties. Some examples of practical actions for the socialization, creation, and renewal of knowledge are:

3 For a more detailed description about the nature of organisation and different organisational theories,see Dávila (2001).

i. the establishment of spaces (physical or digital) in which experts and specialized audiences can come together to present and debate specific points. These spaces may include: forums, chats, and online videoconferences, as well as the design of face-to-face events in countries of origin in the form of workshops, conferences, summer courses, science fairs, and annual meetings, among other modes of meeting;
ii. support in collaborative research project execution between actors in the diaspora and actors in the place of origin, which involves tasks such as the creation of structured project directories, calls for financing, and identification of third-party sources of income on the part of national and international actors;
iii. forming relationships through distance tutorial or mentoring programs, through which support for final theses, pair evaluation, consultancy, or advice can be offered; and
iv. links with internship programs that stimulate the international mobility of students, scientists, and researchers to acquire knowledge in practical contexts.

Moreover, information management complements the work described in previous paragraphs and differs from knowledge management in that it focuses not on creating contexts for the diffusion and absorption of knowledge on the part of community members, but rather on the management of data derived from an incubator. This involves several tasks, such as: compilation, analysis, filtering, combining, storage, recuperation, and communication of this information to the interested public in question. Having said that, the three fields of opportunity (provisionally proposed) for information management can be associated with: (i) the individual skills existing in an incubator; (ii) community events; and (iii) the creation of strategy execution indicators. With respect to the first point, its purpose is to facilitate the identification and visibility of specific member profiles in the digital space, with which it is hoped that successful pairing between knowledge supply and demand will be achieved. This includes actions such as the creation of highly divided databases, journalistic articles (biographies, interviews, features, etcetera) that recognize the achievements of the people involved, and contain repositories of information organized according to specialized areas, with a detailed trajectory of community members; advanced search engines that enable simple finding of scientists and researchers, differentiating between variables such as place of residence, institutional links, specialty areas, key words, etcetera. The second point is more on the information generated by the virtual community on a day-to-day basis, such as the creation of new networks, events, forums, and conferences, registering these activities through directories, journalistic articles, videos, photos, and so on. Finally, the third point refers to data drawn from different sources (web traffic analysis software, platform activity, user interaction, on or outside of the Internet, etcetera) that provides raw material for the development

of indicators enabling measurement of strategy advances and the area used in the control task.

Technology Management

Platforms constitute digital support for a virtual community and as such they have a great impact on the construction of social relationships and on user participation in cyberspace. Just as the architectural design of a house or building affects the way in which people within them interact, the design, configuration, and quality of software used also has a significant influence on virtual community dynamics. Having said that, a common error made by some project managers when they reach the point of thinking about which technological platform they will use to connect qualified migrants is their instinctive reaction to think that they need to develop their own website, whether through an engineering department, at home, or with an outsourcing service. Usually, when this happens, a project is negatively impacted by software design delays, high development and infrastructure costs, and exhaustion on the part of the team members, which, in general, is not part of the mission statement. In contrast, it is beneficial to think pragmatically when it comes to technology, which means any opportunity to use an already existing platform (as long as it meets quality and functionality requirements) is more convenient than an option that requires development, given that the latter increases uncertainty and delays the project launch. In this sense, it is a good idea to consider contracting pre devised platforms that only take a couple of hours to configure, have already been tested, and that are constantly undergoing a technological innovation process. Hence, technology management is focused on the identification, configuration, and administration of different technological tools (one central and others secondary) that enable the achievement of the objectives posed in the strategy.

Communication Management

Communication management in virtual communities refers to handling the sending and receipt of messages sent between actors both within and outside the digital space. In this way, three types of communication flow are identified: (i) between a virtual community's administrator (community manager) and an incubator group's members; (ii) between the members themselves; and (iii) between a community manager and actors external to a virtual community. In the first case, the community manager is able to intervene among all the members of a community, sending messages to one or all of them, and is able to obtain feedback from incubator members. In addition, it is worth mentioning the about the existence of different communication channels between the community manager and members of the virtual community, the main two being e-mail and the web page itself. The second type of communication that takes place within the virtual community is that which occurs between the registered platform users themselves. This tangle of messages that come and go both publicly and privately enables

social group cohesion, which takes place parallel to the development of a personal contact network that densifies and forms specialized clusters as the virtual community matures and is correctly managed. At this point, one of the main tasks of the communication manager has to do with the organization of the information torrents circulating within the platform in order to avoid saturation. Thirdly, communication with actors outside the digital space is managed depending on the audience type, within which there are: potential users, strategic allies, and key opinion formers, which include mass media and other social networks. Having said that, it should be noted that one of the purposes of external communication is to increase the flow of visitors to the platform, with the aim of achieving greater registration of potential users and increased critical mass.

A Practical Approach

The Creation of Diasporic Knowledge Network Incubators for Colombia and Uruguay

The creation of diasporic knowledge network incubators that is described in the present section is in response to the main objective of the Cidesal project, which is to "redress the exodus of skills from Latin America, through the systematic and organized association of the highly qualified diaspora".[4] To achieve this, it was decided to develop a pilot project to make use of the internet and the creation of virtual communities, for creating links between skilled migrants and their homes, segmenting audiences by nationality. Thus, two independent incubators were created (one in Uruguay and another for Colombia), that involved the definition of a shared strategy for the two countries, which, although it needed to coincide in terms of general aspects, also needed to be sufficiently flexible to adapt to each case's particular interests. The most relevant aspects of this process will be detailed in the following section.

Vision

The Cidesal project developed two diasporic knowledge incubators, equipping each with thematically specialized networks, registered key actors, and knowledge-circulating activities.

Goals

- To create two virtual communities (one for Uruguay and one for Colombia), each with their own thematically specialized networks.
- The registration of at least 10 % of people identified in the "census" database, which both countries already had.

4 See: <http://www.msh-m.fr/presentation/organisation-scientifique/centres-heberges/cidesal/Le-Projet-CIDESAL/>.

- The creation of ten forums (five virtual and five face-to-face) to circulate knowledge among the diaspora members.
- The construction of a resumé bank with a number of registered users equivalent to at least 10 % of the virtual communities' total registered users.

Target public of the incubators

- Outside of the countries of origin: masters students, professionals with tertiary level and postgraduate qualifications, and national scientists and researchers.
- In the countries of origin: actors in the national science and technology system (universities, companies, research and development centers, research groups, etc.)

Having defined the principal points of the strategy (due to limited space only some aspects of the strategy are detailed here), the project moved on to the configuration of technological platforms for the creation of diasporic knowledge network incubators in Colombia and Uruguay. No software development was undertaken, but rather a pre-designed social platform that permitted personalization of some functions and graphical elements, as well as inclusion of the brand being used by the project, was acquired. Later, two domains were purchased (<www.laredc.com> and <www.reduruguayencuentro.com>), and connected with their corresponding platforms. E-mail accounts were created for each domain. Additionally, other technological platforms were configured and linked to each incubator's main web page, within which the creation of Facebook, Twitter, Issuu, and YouTube profiles was included. These alternative websites facilitated content management and connection with external social networks, along with performing other functions.

At a subsequent stage, a massive public invitation mail out was undertaken with the aim of achieving the registration of at least 10 % of those people registered in the Colombian and Uruguayan databases mentioned earlier. The aforementioned databases were put together during the first stage of the Cidesal projects, when a "census" of expatriates from each of the two countries was conducted. The Colombian team therefore had a minimum of 1300 registrations as its goal while the Uruguayan team was aiming for 50 registrations. After seven months of work, on January 31st 2013, the Colombian platform (C Network) had 1,786 registered overseas users, as well as 3,348 in Colombia; the Uruguayan platform (Encuentro Network) obtained 256 registrations from users outside the country and 90 registrations from users living in Uruguay.

One of the first activities undertaken as part of the invigoration of the incubators was the identification, within the databases, of user profiles of people who could be leaders in the creation of groups or thematic networks within the platform. Thus, a list of people with doctorate or post doctorate degrees was extracted from the databases. These were, preferably, from among individuals working in

research centres or as professors in foreign universities. The individuals chosen were sent an e-mail each in which the Cidesal project objectives were presented and in which they were invited to lead or participate in the creation of a thematic group to link fellow citizens around the world through shared academic interests. When an affirmative answer was not received, the community manager invited the chosen individuals to participate in other activities such as opening forum discussions or giving a conference on an area of interest. The Colombian team sent messages to 1022 people who corresponded to the previously defined parameters, and the Uruguayan team sent messages to 82 such people.

Every one of the diaspora members who accepted the invitation to actively participate in the project launched a group based on their own interests. Additionally, other members (both within and outside the countries in question) gradually joined the list of network creators, for which reason it was useful to develop tutorials and to assign a community manager to each incubator. In this way, a "bottom-up" construction strategy was established, in which each creator defined their group's theme and objectives. In addition, the community managers, with the intention of invigorating the community in question, directly created other group areas where there were no volunteers. In the Uruguayan case, ten thematic groups were created by community members themselves and 14 were created by the network administrator. In the Colombian case, the administrator formed five groups whereas the virtual community members created 118. Of the ten groups created by the Uruguayan group members, seven members resided outside Uruguay, one of them having a Bachelor degree, one a master, four doctorates, and one was a post doctorate. On the Colombian side, of the 118 networks created by the Colombian network members, 58 creators lived outside Colombia. Of these members, two had Bachelor degrees, 23 had Masters degrees, 23 had doctorate degrees, and 9 had post doctorates.

Once the groups had been created, the objective of loading relevant and specific information for each of the existing groups was pursued. Thus, five types of content creation were promoted: (i) links of interest to external pages; (ii) videos; (iii) documents of interest (research articles, final theses, etcetera); (iv) group members' resumés; and (v) event information. Of course, content was not limited to the aforementioned categories. In this way, content creation strategy was applied through direct requests sent to each of the group creators, as well as requests sent to other participants to ask them to publish information that would help to reinforce the thematic space. The community manager was also able to contribute content to groups where necessary. Thus, 77 pages with information of interest, 41 videos, 21 resumés, and 83 documents were created on the Uruguayan site. Likewise, in the Colombian network, 36 pages were created with user participation, and 56 videos, 42 resumés, and 110 documents were published.

In the next stage, the Cidesal team concentrated on the numerical growth of thematic networks with the purpose of creating a critical mass that would

invigorate the digital space. Two mechanisms were devised to encourage new users to register in each group:

i. requesting that the creator of each thematic group send invitations to their contacts (for this to happen it was necessary for the community manager to make contact with the group leader); and
ii. through selective invitations; the incubator administrator undertook an advanced search of registered users to find out which of them had keywords in their profile that related to the title or description of thematic groups. In this way, the Uruguayan network was able to achieve an average of 10 people per group, giving a total of 212; and the Colombian network achieved an average of 7.7 people per group, giving a total of 1155 members amongst all the groups.

The follow up activity was related to the creation of specialized forum discussions within each of the thematic networks, which sought to socialize knowledge amongst diverse actors, geographically dispersed but linked by common interests. To achieve this, each group creator and the participants with the highest level of education were invited to open forums. Invitations were sent by e-mail to targeted individuals to educate them as to the importance of their participation in these knowledge circulation settings. When favourable responses for forum creation were not obtained, the community manager went ahead and created spaces for discussions that they considered relevant in accordance with each network's specific topic. In this way, the Uruguayan network was able to create an average of three forums per group (a total of 79 forums, including the Community Manager's proposals) while the C Network created a 0.5 forum per group, giving a total of 54 forums. Later, the opening of each new forum was announced to each group's participants and they were invited to participate by leaving a comment on the forum. 61 commentaries were obtained in the Uruguayan network while 91 were left in the Colombian network.

Finally, another hugely important activity for knowledge diffusion was the organization of specialized conferences (virtual or face-to-face), made by diaspora members, taking advantage of one of their visits to their country of origin to undertake these activities *ad honorem*. In order to attract speakers, mass calls were put out by e-mail, information was published on the virtual communities' websites, and a search of databases of highly educated migrants was undertaken to find out which ones of them would be visiting their countries of origin in the short term. As a result of this strategy, the Uruguayan network was able to record two videoconferences: the first was about skills management in businesses and was given by Gerardo Capano, a resident of France who holds a doctorate in social psychology, and currently works for the Paul Valéry University, Epsylon Laboratory, the International Labour Organization (ILO), and the French Agency for the Employment and Skills Development (AFDEC). The second conference was about the comparison of socio-demographic characteristics of the Uruguayan

and Colombian populations, and the idiosyncrasies and limitations of productive and academic development in Uruguay. It was given by Mirna Rugnon, post doctorate in Law and Social Sciences, and resident in Colombia. The Colombian network was able to record a videoconference titled "The Constitution and the Implicit Legal System", given by Melba Luz Calle Meza, who is a post-doctorate in Public Law from the Panthéon-Assas University (Paris II) and resides in Spain.

In this way, eleven face-to-face conferences were conducted in Colombia via the C Network with the participation of Colombian institutions interested in specific areas of knowledge. The reference details of each of these conferences is given here:

i. "Environmental Refugees", held at the Our Lady of the Rosary University by Nathaly Pineda, doctoral candidate, which had 15 attendees;
ii. "Industrial Digital Cameras", held at the National University of Colombia by Federico Ariza (Magister living in Canada), which had 11 attendees;
iii. "Day Conference on Industrial Digital Cameras and Vision Systems for Quality Control", which was held at La Salle University, also conducted by Federico Ariza, which 34 people involved in the topic attended;
iv. "The Relationship Between In Vitro Research and Clinical Research in Dental Biomaterial", held in the Pontifical Xavierian University by John Alexis Domínguez (who holds a doctoral degree and lives in Brazil), which 18 people interested in the topic attended;
v. "Computation Fluid Dynamics (CFD) Modeling of Membrane Bioreactors (MBR) for Wastewater Treatment", which took place at the Pontifical Xavierian University, conducted by Nicholas Rios (post doctorate, resident in Denmark), which had an attendance of 52 people;
vi. "Generating Pluripotent Stem Cells: the Link Between Pluripotency and Cell Cycle", presented at the National University by Diana Coronado (who holds a doctoral degree and resides in France), which had 15 attendees;
vii. "Keys to Launching a Start-up", presented at the SENA Techno park by Marcela Morales (Magister living in Spain), which had 48 participants;
viii. "The Birth and Death of Giant Stars: Spectacular Regional Views with Modern Telescopes", presented at the University Sergio Arboleda by Juan Rafael Martínez (holds a postdoctoral degree and is a resident in the United States), which brought together 35 people;
ix. "The Use of Economic Evaluations for Decision-making in Health", held at the School of Business Administration University, hosted by Rafael Alonso Cristancho (post doctorate degree holder, resides in the United states) which had an attendance of 30 people;
x. "The Formulation of Vaccines Against Paracoccidioidomycosis Based on Synthetic Peptide P10", presented at the Pontifical Xavierian

University by Julián Esteban Muñoz (PhD living in Brazil), which was attended by 20 people; and

xi. "Perspectives and Tips to Successfully Pursue Graduate Studies in Venezuela", held at the Iberoamerican University Corporation, thanks to Ricardo Ceballos (Master living in Venezuela), which brought together an audience of 20 stakeholders.

Characterization of incubator users

From the information that the incubator users provided as part of their own profiles, a characterization of the expatriate population registered in each network was undertaken. A user registration form for each of the virtual communities was created with the same parameters, with the aim of standardizing the information entry fields to make them comparable between the two networks in the analysis stage. Each form had seven items, arranged in the following way: (i) name; (ii) gender; (iii) location; (iv) educational level; (v) knowledge area; (vi) research interests; and (vii) institutional links.

Users associated with the C Network and the Encuentro Network who registered as living outside their countries of origin showed important differences in terms of their demographic characteristics, among other aspects. It is interesting to note that while the majority of Colombian migrants linked to the C Network are young – 68 % of registered users are between 25 and 39 years of age – the majority of the population associated with the Uruguayan network appears to be more mature and dispersed (in terms of their age) than the Colombian network, with 70 % users between the age of 40 and 69 years. Additionally, another detail of interest that contrasts the two networks is that while the registered Colombian users living outside the country appear to be predominantly male in all age segments, the information collected from the registered users of the Uruguayan incubator present somewhat feminized indicators in the younger strata.

Incubator user survey

In January 2013 an electronic survey questionnaire was sent out to the Uruguayan and Colombian incubator users, with the aim of investigating various features related to the use and perceptions of, and benefits obtained by C Network and Encuentro Network users. In the Colombian case, 669 people responded to the survey, out of which 61 % were living in Colombia and 39 % outside the country. With regard to the Uruguayan case, 62 people responded to the survey, of whom 27 % resided in Uruguay and 73 % outside the country.

The first survey question was targeted at finding out what the main value perceived by incubator members was. C Network and Encuentro Network users agreed in answering that making professional, academic, or work contacts was the most valuable aspect that they saw in these types of interactive spaces. This answer had a significant advantage over other options, such as obtaining or

disseminating information and knowledge on specialized topics in terms of proportion of respondents favoring it. In that sense, there is a harmony between what incubators seek to create (networks and social connections between geographically dispersed actors) and what the audience connected to these incubators most value. Nonetheless, when survey respondents were asked about the main benefit that they had effectively received from being incubator members, the answer was that contact making was not the main benefit but rather securing information and knowledge about specialized topics was. Having said that, the percentage of network members who answered that they had benefited from this varied, depending on whether they lived in their country of origin or outside it and also based on the incubator they belonged to. In the case of Colombians living outside the country, 42 % of those surveyed responded that they had benefited in some way. These benefits included: securing information (19 %), making contacts (18 %), and the ability to publish information (5 %). In contrast, Colombians living within the country appear to have perceived a much greater benefit from the network than their counterparts outside the country. Amongst these benefits were, in order of importance: securing of information and knowledge (41 %), establishing contacts (19 %), and the ability to publish information (6 %). As can be observed, Colombians residing both within and outside the country received benefits in similar proportions with regard to the establishment of contacts and the ability to publish information.

Nonetheless, there is an important difference between the two groups in terms of the benefits associated with the information and knowledge attainment. Perhaps this may be explained by the fact that members residing in Colombia place a greater value on attaining knowledge and information from the incubator than their counterparts in other countries (32 % vs. 19 %, respectively), and that this, at the same time, is what those members living within the country have most found in the network. In this content, a type of imbalance between the benefits perceived by the two groups can be observed; incubator users residing in Colombia make more of the opportunity than do those who live outside the country. With respect to the Uruguayan case, the relationship is inverted in comparison to what is seen in the Colombian case. A 40 % of Uruguayan users residing in the country responded that they had received some kind of benefit from the incubator while 51 % residing in other countries made the same affirmation. For Uruguayans living outside the country, the benefits obtained were as follows: attainment of information (33 %), making contacts (9 %), and the ability to publish information (9 %). Uruguayans living in their place of origin classified the benefits they had received as follows: obtaining information (20 %), making contacts (13 %), and the ability to publish information (7 %). So, the principal difference, as perceived, between the benefits obtained by each of the Uruguayan groups is also focused on the attainment of information, in this case, the audience outside the country receiving the greater benefit. However, at this point, when

presented with the question of the main perceived value of the incubator, 34 % of the Uruguayan users residing outside the country selected the obtaining information as their first choice, while 23 % of those who live in other countries said the same. This suggests the hypothesis that there is a direct proportional relationship between the valuation of access to information and knowledge by incubator users, with the greatest perceived benefit being the same in both the Uruguayan and Colombian cases.

Graphic 1. Principal benefit received (Colombians outside of Colombia)

Source: own production based on electronic survey made to incubator's users, January, 2013

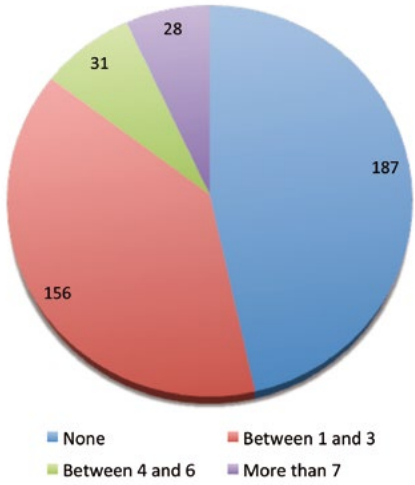
Graphic 2. Principal benefit received (Uruguay outside of Uruguay)

Source: own production based on electronic survey made to incubator's users, January, 2013

With respect to the characteristics of connections established between incubator users, links seem to be made more frequently between users who did not previously know rather than between those who already knew each other. While 47 % of Colombian incubator users responded that they had made contact with at least one previously unknown person, 32 % responded that they had made contact with at least one other user who they already knew. In the Uruguayan case, 43 % had established contact with at least one stranger, while 36 % had made contact with someone they already knew. It should be noted however that, the aforementioned figures are confirmed when the variable of geographic location is introduced. Details regarding connections established between members who did not previously know each other show that, in the case of Colombian users residing in Colombia, 54 % responded that they had established contact with at least one previously unknown person through the incubator, while the figure for Colombians residing in other countries dropped to 38 %. With respect to Uruguayans living in Uruguay, the percentage of users who affirmed that they had initiated these types of connections was 47,while it was 41 % for Uruguayans residing abroad.

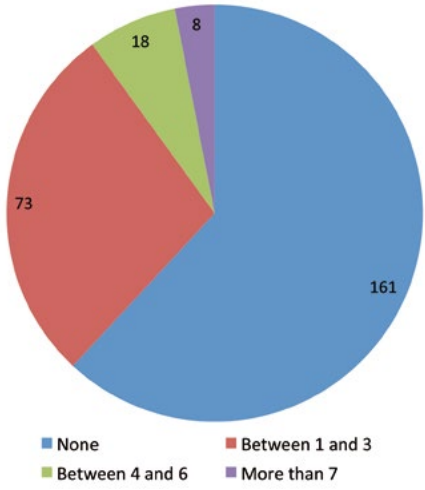
In this context, it is observed that people residing in their countries of origin tend to establish more connections with previously unknown incubator members than their fellow country people living in other countries. It is worth mentioning here that, in general, the number of connections that each individual made with other previously unknown incubator members is relatively low, in the range of between one to three contacts. With respect to connections made in the incubator between members who previously knew each other however, in the case of Colombian residents living in Colombia, 37 % responded as having established these types of contacts, while the figure for Colombians living outside of the country dropped to 24 %. As regards Uruguayans living in Uruguay, the percentage is 22 while for Uruguayans living abroad the figure rises to 38 %. Hence, it is of importance to note that not only do, within the Uruguayan diaspora people establish more links with contacts that they previously knew than the Uruguayan members living in Uruguay but also that Uruguayan expatriates establish links as much with previously unknown members as with previously known members, a phenomenon not seen in any other population group previously analyzed. In effect, 41 % of Uruguayans residing in other countries affirmed that they had made connections with members they didn't know before while 38 % had made contact with members they knew previously. This is a difference of only three percent, in contrast to the Colombian case where there is a difference of 14 %.. In general, for the Colombian and Uruguayan network populations, the number of connections made by each person with other previously known incubator members is relatively low (the same as the figure presented for contact made between previously unknown members), in a range of between one to three contacts.

Graphic 3. Contacts made with previously unknown members (Colombians in Colombia)



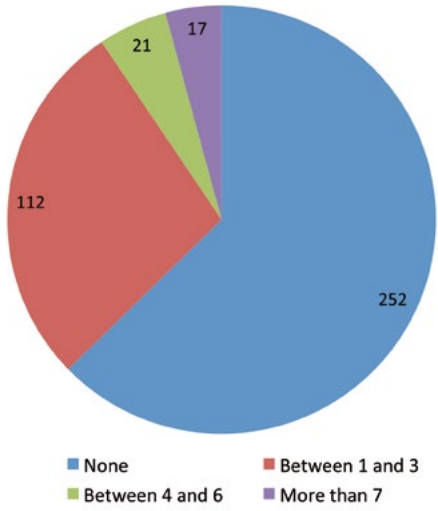
Source: own production based on electronic survey made to incubator's users, January, 2013

Graphic 4. Contacts made with previously unknown members (Colombians outside of Colombia)



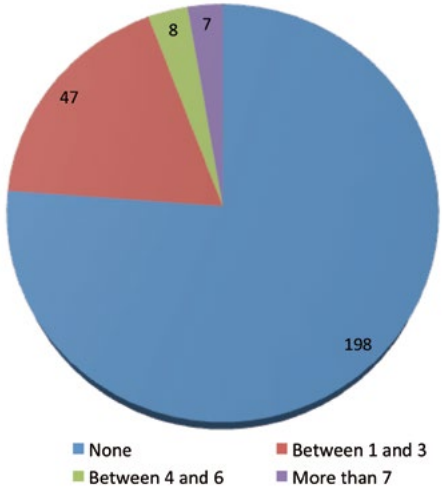
Source: own production based on electronic survey made to incubator's users, January, 2013

Graphic 5. Contacts made with previously unknown members (Colombians in Colombia)



Source: own production based on electronic survey made to incubator's users, January, 2013

Graphic 6. Contacts made with previously unknown members (Colombians outside of Colombia)



Source: own production based on electronic survey made to incubator's users, January, 2013

Regarding the type of participation demonstrated by incubator users it may be said that, as in the case of other virtual communities, it is largely passive. In the Colombian case, the percentage of users who responded that they participated passively was 89 % while only 11 % responded that they were active participants. Nonetheless, while in the Uruguayan case 69 % users said that they were passive

participants (which continues to be the majority), active participants accounted for 31 % of users, almost three times more than in the Colombian case. When the figures are analyzed by place of residence (under the categories of within or outside the country of residence), it is interesting to note a certain connection between the size of the community and the type of participation. It may be said that there is an inversely proportional relationship between group size and the degree of active participation in the group, that is to say, the bigger the group size, the lower the degree of activity, in terms of percentage. Thus, of the surveyed populations in the Colombian and Uruguayan populations, the most numerous population group is that of Colombians living in Colombia (407 survey respondents), with an active participation rate of 8 %; followed by Colombians living abroad (262 survey respondents), with an active participation rate of 13 %; then comes the Uruguayan expatriate group (45 survey respondents), with an active participation rate of 21 %; and finally, Uruguayans living in Uruguay (17 survey respondents), with an active participation rate of 31 %. As may be appreciated, when the group surveyed is smaller, active participation tends to be greater. When the causes of passive participation are investigated, the answers given by Uruguayan and Colombian survey respondents match on two main points: firstly, lack of time, and secondly, not knowing how to participate in the project. In contrast, the two least significant reasons for passive participation are: difficulties with the technological platform and lack of interest.

Conclusions

The existence of connections between highly qualified expatriates and partners in the country of origin, via which knowledge flow, is not something new. In this sense, diasporic knowledge networks have existed for some time, either as a result of the effort of the same actors who earn some kind of profit in creating such links or through the involvement of third parties (usually government programs) to "recover" expatriate skills to mobilize them in favour of the home country.

What makes the incubator of diasporic knowledge networks model new, which is presented in the present work, is the idea of creating, in a premeditated manner, digital spaces (with extensions in the physical works) of massive convergence, where supply and demand of knowledge have a space to meet up, making the appearance of "collective intelligence" possible through socio-technical networks at everyone's disposal.

This approach rests on a belief in the potential of connected multitudes, inclined to collective collaboration and mobilization when they feel that they are part of a community. From this perspective, network incubators are informal, self-organized, flexible, adaptable, and susceptible to being modelled in accordance with a previously defined strategy, which is oriented towards the action of various actors.

To this extent, one of the main attractions in this model is the capacity to expand the spectrum of connection possibilities, in comparison with the options that incubator members had at their disposal before joining the system. Thus, network incubation opens connections between people who, as well as sharing the same national identity, share the same intellectual interests, and who have, in the incubator, different services and resources at their disposal to strengthen human connections and knowledge circulation. Nonetheless, for this model to be viable various aspects, such as strategic direction, human network management, use of technology, and information and knowledge management need to be supplied and combined.

References[5]

Alder, P. S. (1989). "When knowledge is the critical resource, knowledge management is the critical task". *ieee Transactions on Engineering Management*, 36 (2): 87-94.

Bacon, J. (2009). *The Art of Community*. California: O'Reilly Media.

Barre, R.; Hernandez, V.; Meyer, J.-B. & Vinck, D. (2003). *Diasporas scientifiques/Scientific Diasporas*. Paris: ird Éditions.

Barrow, C. (2001). *Incubators: A Realist's Guide to the World's New Business Accelerators*. New York: Willey.

Brown, M. (2003). "The Shouth African Network of skills abroad (sansa): the South African experience of scientific diaspora networks", available at <http://horizon.documentation.ird.fr/exl-doc/pleins_textes/divers10-04/010047991.pdf> (last accessed: 3/11/2012).

———— (2002). "Intellectual diaspora networks: their viability as a response to highly skilled migration". *Autrepart*, 22: 167-178.

Buss, A. & Strauss, N. (2009). *Online Communities Handbook*. Berkeley: New Riders.

Castells, M. (2005). "La era de la información". *La sociedad red*, vol. 1. Mexico City: Siglo xxi Editores.

_____ (2001). *La Galaxia Internet. Reflexiones sobre internet, empresa y sociedad*. Madrid: Areté.

Charum, J. (2001). "La opción diáspora científica. Una nueva posibilidad de recuperación de las capacidades emigradas". *Colombia Ciencia y Tecnología*, 19 (2): 12-18.

———— & Mejer, J.-B. (1998). *Hacer ciencia en un mundo globalizado*. Bogotá: tm Editores.

Cross, R. *et al.* (2010). *The Organizational Network Fieldbook*. San Francisco: Jossey-Bass.

———— & Thomas, R. (2009). *Driving Results Through Social Networks*. San Francisco: Jossey-Bass.

Dávila L. de Guevara, C. (2001). *Teorías organizacionales y administración*. Bogotá: Mc Graw Hill.

Edwards, H. & Day, D. (2010). *Marcas Pasión. Establezca vínculos emocionales con los consumidores*. Bogotá: 3R Editores.

García, A. (2002). *Organización y gestión del conocimiento en la comunicación*. Asturias: Trea.

Granovetter, M. (1973). "The strenght of weak ties". *American Journal of Socioogy*, 78 (6): 1360-80.

Guarnizo, E. (2006). "Migración, globalización y sociedad: teorías y tendencias en el siglo xx". In: Ardila, G. (ed.). *Colombia: migraciones, transnacionalismo y desplazamiento*. Bogotá: Facultad de Ciencias Humanas, Universidad Nacional de Colombia.

5 For further information about web 2.0 apps with which complete the job on virtual community, we recommend accessing to the book *Planeta Web 2.0 Inteligencia colectiva o medios fast food*, which is downloadable from <http://www.planetaweb2.net>.

Hansen, M. (1999). "The Search-Transfer Problem: The Role of Weak Ties in Sharing Knowledge across Organization Subunits". *Administrative Science Quarterly*, 44 (1): 82-111.

Hagel, J. & Armstrong, A. (1999). *Negocios rentables a través de internet. Net Gain*. Barcelona: Paidós.

Haque, N. & Kim, S.-J. (1995). "Human Capital Flight: Impact of Migration on Income and Growth". *FMI staff papers*, 42 (3): 577-607.

Hill, Ch. & Jones, G. (1996). *Administración estratégica*. Bogotá: Mc Graw Hill.

Howe, J. (2008). *Crowdsourcing*. New York: Three Rivers Press.

Karz, D. & Kahn, R. (1978). *Social Psychology of Organizations*. New York: Jhon Wiley & Song.

Kaushik, A.(2011). *Analítica Web 2.0 El arte de analizar resultados y la ciencia de centrarse en el cliente*. Barcelona: Gestión 2000.

Kuznetsov, Y. (ed.) (2006). *Diaspora Networks and the International Migration of Skills*. Washington dc: wbi Development Studies.

Lévy, Pi. (1999). *¿Qué es lo virtual?* Barcelona: Paidós Ibérica.

Lucas, R. (1988). "On the mechanism of economic development". *Journal of Monetary Economics*, 22: 3-42.

Meyer, J.-B. (2006). *Toward sustainable knowledge diásporas: the rationale for an appropriate technopolicy.* Report for the unesco Diaspora Knowledge Networks Project [mimeo, ird].

——————— *et al.* (1997). "Turning Brain Drain into Brain Gain: The Colombian Experience of the Diaspora". *Option in Science, Technology and Society*, 2 (2).

Nonoka, I. & Takeuchi, H. (1995). *The knowledge-Creating Company. How Japanese Companies Create the Dynamics of Innovation*. New York: Oxford University Press.

Penenberg, A. (2009). *Viral Loop*. New York: Hyperion.

Sadler, P. (1988). *Managerial Leadership in the Post-Industrial Society*. Aldershot: Gower.

Tapscott, D. & Williams, A. (2010). *Wikinomics*. London: Penguin.

Tang, F. (2011). "Knowledge Transfer in Intra-Organization Networks". *System Research and Behavioural Science*. 28: 270-282.

Varela, F. J.; Thompson, E. T. & Rosch, E. (1992 [1991]). *The Embodied Mind: Cognitive Science and Human Experience*. Massachussets: The mit Press.

Vertovec, S. (2001). "Transnationlism and identity". *Journal of Ethnic and Migration Studies*. 27 (4): 573-582.

Wimmer, A. & Glick-Schiller, N. (2002). "Methodological nationalism and beyond: nation-state building, migration and social sciences". *Global Networks*, 2 (4): 301-334.

Chapter 8

Computer supporting Diaspora Knowledge Networks: a case study in managing distributed collective practices

William Turner, Jorge J. Garcia Flores & Mathilde de Saint Leger

Introduction

Diaspora Knowledge Networks (DKN) take root in an open space that is progressively hemmed in – closed – because people learn how to cooperate with one another. Through their efforts to cooperate, they fix the cognitive, institutional and territorial scope of their activity and they test the relationships for which people are willing to be held responsible. And out of this action emerge stable social structures called Diaspora Knowledge Networks. These are the vectors through which knowledge and skills circulate over national borders. Talent mobility is a factor of home country economic and social development to the extent that the closure dynamics at work in creating DKN are managed correctly.

Cooperating together is an achievement and not a given. The reason lies in the conceptual difference which exists between simply interacting with others – exchanging information – and actually doing things together. The difference lies in such things as mutual confidence, a common language, collective procedures for sense-making and conflict resolution. When these conditions hold, an accountability principle is actively endorsed (Goguen, 1997): people order the elements and relationships which structure their stories – understand by story both the actions that people undertake and the narratives they use for giving them meaning – in ways which are clearly understandable to their audience. When people interact (especially at a distance), they tend to tell the story they want; the pressure of having to position themselves in an on-going flow of cooperative activity is much less.

We saw in Chapter 2 of this book that members of the diaspora interact much more than they engage in collective strategies for home country development. The questionnaire study reported in that chapter shows that the level of interaction is high: only 13 % of the talented expatriates living outside Argentina, Uruguay and Colombia admit to having lost contact with their home country; most (79.5 %)

say that they maintain regular ties with it; only 7.5 % of the respondents said that they were actively engaged in projects with professional organizations for home country development. We take this last category as being representative of working DKN.

The high 79.5 % figure confirms the legitimacy of speaking about "connected migrants". In the digital age, migrants are no longer the icon of the exiled cut off from their loved ones, alone abroad without emotional support (Diminescu, 2008). However, they appear as being much more tied to their countries of origin through cultural, family or friendship-based interactions than through active involvement in collective strategies for development. That is why the theoretical question that we will be addressing in this paper is that of moving from interacting with others to concretely doing things with them, a question which, in the migration world becomes: how do you create the conditions for making members of a country's talented diaspora accountable for cooperating in efforts aimed at building Diaspora Knowledge Networks?

Doing things with others in the digital space of Internet

When people are at a distance, they are no longer in a situated learning context (Lave, 1991). To the contrary, they take part in a distributed collective practice (Turner et al., 2006); their self-identity no longer depends to the same extent upon fitting into a local community of practice. What is important in one context – that is, the tangible elements with which people fill their stories, and the manner they use for weaving these elements into a plot – is not necessarily recognized as being equally important in a different context. Uncertainty exists with respect to what others will consider as being important or not (Hinds & Kiesler, 2002). In the mobility world, migrants are "there" in a different political, social, economic and cultural context to those with whom they are communicating "here", at home, or "elsewhere" in the other countries of a diaspora network. This means two things: first, storytelling is now for the most part document-mediated; huge bases of digital traces are now available through Internet for computer scientists to data-mine. Second, storytelling as a process for integrating people into the dynamics of collective action is under strain as we just said.

In this paper, three conditions are considered necessary for successfully managing the distributed collective practices of the mobility world (Turner *et al.*, 2010). The first concerns the *meta-narrative* which is used to articulate one's personal experiences in a local context with what people are doing elsewhere in other contexts. The second is that of building *cognitively active boundary objects* in order to organize moments of social bonding during which time people can transform the weak relationships of shared origins into strong, confidence-based social ties needed for engaging in on-going collective action at a distance. Finally, we will show that if data-mining techniques are useful in finding information on the Web

and in packaging that information for boundary object construction, these techniques undergo constant *reconfiguration* and, consequently, have to be fine-tuned on a regular basis. These three conditions have to be met in order for people to move from interacting with others to actually engaging with them in the digital spaces of Internet.

Two meta-narratives explaining Talent Mobility

In the world of talent mobility, two meta-narratives lie at two opposing ends of a continuum leading from interaction to a solidly installed collective practices. One side of the continuum is organized around a fundamental premise of political economy, namely, that people born in a country should contribute their human capital to the development of that country. Talent mobility is often seen as being an exception to this normative meta-discourse on citizenship rights and obligations, and this is why talent mobility is often described negatively in terms of a brain drain. The Diaspora option (also called diaspora strategy or diaspora policy[1]) takes the radical view that people can help their homeland by staying away (Meyer *et al.*, 1997). As Alan Gamlen notes, this "represents a fundamental shift in perspective on migration and human capital. It was previously assumed that those inside fixed geographical boundaries contributed their human capital to the nation, while those living overseas did not. The diaspora option undermines this basic premise" (Gamlen, 2005). Gamlen goes on to identify three types of policies:

> … diaspora networking, remittance capture and diaspora integration. Diaspora networking can take various forms, including the promotion of commercial networks, 'branded' partnerships and scientific networks […] Remittance capture consists of maximizing expatriate remittances and investments and channelling them towards national development goals. The term diaspora integration refers to the promotion of social cohesion between the homeland and the diaspora (2005: 32).

On the other side of the continuum lies a second meta-narrative which is anchored in a liberal economic philosophy and privileges individualism at the expense of a mobile elite's attachment to its country of origin, its values, its culture and its development. Evidence suggests that diaspora members increasingly see themselves as transnational knowledge workers who sell their talent by building niches for themselves on the international job market. Building a niche implies interacting with people in order to build and maintain over time a wide social capital base that can be used, when needed, to create a demand for their multicultural skills (Colic-Peisker, 2010). From this perspective, socio-cultural identity is no longer thought to be determined by birthplace and territorial attachment; it is constructed through on-going experiences as much as it is determined by memory and traditions. The

1 See chapter 3 in this volume.

discourse with respect to the rights and obligations of citizenship is very largely occulted. For example, Val Colic-Peisker cites a Vietnamese woman holding a European Union and an Australian passport who states: "When people ask me where I come from, I hate this question because I do not know where I come from. It depends what you want to know […] where I was born, or what is my nationality or where I work […] it's all different, you know…" (2010: 478).

In the talent mobility world, a social capital base is often grown through maintaining contacts which are made as a student. The mobile elite is often composed of people who have graduated from the best universities and from laboratories with a long tradition of international cooperation. Consequently, they benefit from their institution's renown when attending international conferences and workshops and meeting people from foreign countries. Moreover, these institutions often have a policy of sending their students abroad for training, or post-doctorate programs. Established institutional practices of international cooperation create what has been described as corridors of mobility for their members (Melin, 2004). Young students arrive abroad and are recognized as the protégé of a Professor who, herself, has generally stayed in the same institution and who can consequently provide her students with access to friends and colleagues in that institution. Finally, because they come from a dynamic milieu, the former classmates and friends of these students often have similar trajectories to their own, and this explains to a very large extent the intensive use of social network systems by the mobile elite abroad. People stay in contact through Facebook, Whatsapp or Kik. It eases the emotional stress of being away from home but, more positively, these constant, on-going interactions with friends enables them to confidently share their personal experiences with an in-group and, in return, receive advice and guidance when having to deal with the cultural and social differences that often complicate their day-to-day existence in a foreign country.

In short, when pride comes from having one's personal knowledge and skills recognized as valuable assets on the international job market, and when mobility is not seen as a rupture with traditions, family and friends but as a way of life, interacting with others, telling them the stories of battles fought and won which highlight one's capacity as a transnational knowledge worker, enhances one's social capital base and prepares the next step in a career. The framework provided by the liberal meta-narrative is that of entrepreneurship, of selling one's talent on the job market to the highest bidder; it is not one of engaging in a collective project for home country development.

This doesn't mean, of course, that the two can't be made to coincide, that personal entrepreneurship is necessarily in contradiction with engaging in collective action. There is a continuum going from interacting with others to concretely doing things together. There are moments along that continuum when the weak ties of social interaction become the strong bonds of collective action. Generally, these moments are materialized when people take jobs and thereby accept the

constraints of fitting into an organizational chart through which management defines tasks, duties and interpersonal relationships. An organizational chart is a convenient way of representing the moment when the accountability principle takes hold and people are held responsible not only for their acts but for communicating in an intelligible fashion about the meaning of what they are doing with others. That said, ethnomethodologists have long pointed to the difference between "projects on paper" and "projects in reality"; the contingencies of doing things together in the real world implies pragmatism, that is, the capacity to adjust, negotiate, persuade and articulate what is often a wide range of different viewpoints (Sharrock; Button, 1997). From the ethnomethodological perspective, work organizations undergo constant redefinition. In order to describe this reconfiguration work in action, one of the techniques used is that of identifying and/or building boundary objects (Star & Greismemer, 1989).

Cognitively active boundary objects

Having moments of social bonding is a second condition for managing distributed collective practices. These moments are imposed from the exterior; they don't naturally arise from on-going social interactions. Cooperation is an achievement and, as we've just seen, one of the ways of installing the accountability principle which organizes this cooperation is to use an organizational chart. Management sees people as moving in and out of slots requiring specific know-how and skills in a division of labour serving to coordinate their collective activity. When people don't do what is expected of them, or if they tell stories which are judged incomprehensible, the judgement is justified not on the basis of a manager's subjective evaluation of the person but, in theory at least, against the measuring rod of the tasks, duties and interpersonal obligations outlined in the chart. An organizational chart is a boundary object in the sense of setting the accountability principle against a backdrop of accepted socio-cognitive practice. However, this particular type of boundary object – the organization chart – codes hierarchical relationships; the socio-cognitive relationships configuring a Diaspora Knowledge Network are self-organizing.

The point here is a general one: confidence comes from knowing that differences of opinion won't be resolved arbitrarily by invoking the "*bon vouloir du prince*"; people work pragmatically and when they innovate and do things which are unexpected of them, they want to think that they have the right to do so. A boundary object offers them this right: it avoids direct face-to-face confrontation between individuals; people who disagree can refer to an external source of authority to resolve their differences. In the case of an organizational chart, although it is a blueprint for action, everybody (including management) agrees on the need to regularly update it in order for it to remain relevant over time. So a marge of interpretation comes into play. There is no one best way of doing things: if you do

too much, and step outside the bounds of the prerogatives defined in the chart, you enter into competition with others; but, if you do too little, and attempt to justify inaction by arguing the limits of your mandate, you can also be accused of not fully cooperating socially.

Boundary objects are used in organizations to take the heat out of interpersonal relationships. They serve to externalize subjective evaluations, to collectively fix the limits of what can be done together and, as a consequence, to gain confidence in a collective capacity for doing things with one another. Boundary objects constitute an incentive for people to act; they enable them to legitimately exercise their personal powers of interpretation without fearing the backlash of "*le prince*"; and the fact that boundary objects are never completely adequate representations of real-world complexities provides protagonists with a plot for telling the story of how, through their personal skills and know-how, they were able to improve the collective understanding of what is at stake in cooperating together. Entrepreneurship is valorised: people don't fit into a collective action; through their investments of time and effort they configure an activity in ways which ensure that the value of their personal skills and know-how is recognized. They make a niche for themselves.

What, then, are *cognitively active boundary objects*? If organizational charts serve to codify managerial relationships which are hierarchical and top-down, cognitively active boundary objects are designed to code the self-organizing dynamics at work in distributed collective practices. As said before, our interest lies in capturing the closure dynamics configuring the socio-cognitive arrangements which explain the structure of DKN. These closure dynamics take root in the fact that people, in order to make their actions intelligible to others, adopt a common vocabulary and use recognized categories of interpretation for ensuring that they will be understood. But instead of increasing their freedom, they can find themselves locked into an "iron cage" which not only limits their perception of the world, but also their capacity to act in it (Bowker & Star, 1999; Callon, 1991; Callon, 1998). Our hypothesis is that by using data-mining and mapping techniques, engineers can alert to the dangers of the iron cage. Cognitively active boundary objects are considered as a means of encouraging a critical appraisal of the categories and the social relationships which configure actions in practice.

The idea that computer constructed boundary objects can be used to enforce application of the accountability principle when managing distributed collective practices is a strong hypothesis. It implies that computer based techniques are able to objectify socio-cognitive relationships in the same way that was described above when talking about an organizational chart. But obviously this is not the case. First, there is always a lingering suspicion with computation that the algorithms are wrong, that what is being visualized isn't anchored in the reality of socio-cognitive relationships but, rather, in the formalisms being used to capture them. Second, this suspicion is aggravated by uncertainty with respect to who has

the authority for imposing the use of computer maps as a device for coordinating collective actions. An organizational chart projects the image of a recognized and generally accepted *rapport de forces* between management on the one side, workers on the other. It materializes authority, the right of some to say if others are doing what they should. But who has that right in a distributed collective practice? We will suggest that managers of DKN[2] should be responsible for enforcing the accountability principle in the distributed arena of talent mobility practices and that they should use the maps for that purpose.

The reason for making that proposal lies in work by Sperber & Wilson (1986), which we have used to think through the challenges of communicating in the digital environment of Internet. Following Grice (1957), these two authors consider that if communications are to be effective, messages have not only to inform people of something; they also have to alert those people to the fact that the information sent merits their attention. The codes used for successfully communicating with one another operate at two levels: the information level and the level of intentions. When only information is exchanged but receivers to not perceive its importance for the sender, receivers will not feel obliged to react to it. Accountability sets in when the second condition holds. As Jean-Pierre Dupuy says, doing things together depends upon recognizing that the goal isn't simply to interact – exchange information – but that, to the contrary, the goal is to exchange information with the purpose of collectively making sense out of it (Dupuy, 1992). And this is precisely were the difficulty lies when communicating over Internet: information is exchanged but it is hard to capture the attention of readers and alert them to the fact that it merits response. Christian Licoppe attributes this to what he calls the "always-on" culture of Internet: peoples' cell-phones are generally always on and if not, they can be contacted rapidly by using their personal digital assistants or by leaving a message in their Email box. It is easy to contact people, but assailed by information from many channels in the digital world, it is much harder to attract and keep their attention (Licoppe, 2006).

Added to this is what we discussed above – the ambiguity of words – the fact that when working in contexts which are economically, socially and culturally different, it is hard to know how to find the words for communicating one's intention to engage in collective sense-making; for notifying, in other words, the need to launch a moment of social bonding. Language is effective in creating social ties to the extent that words signpost debates, differences of opinion and interpretations which have to be resolved in order to advance collectively. People working together in a community of practice know immediately how to recognize these words; they know the history of social battles which have been won and lost and can immediately detect the words announcing those to come. But this isn't the case when on-going collective activity is distributed geographically over a wide range of independent contexts. The semantics of battle stories vary from one

2 See chapter 7 of this volume.

place of situated action to the next. People working over the frontiers of cultural differences don't share a common vocabulary. Without help, they are not able to see what merits attention and what doesn't. And we expect that help will be provided by managers of Diaspora Knowledge Networks by using computer maps as cognitively active boundary objects for framing socio-cognitive relationships. But in what context?

Dynamically framing socio-cognitive relationships

This then is the third and last condition for managing distributed collective practices: DKN managers need to engage with talented expatriates, but what will serve as common ground for making contact? One solution is to play on the goodwill register. Members of the diaspora are often considered as gatekeepers showing goodwill when it comes to building bridges over the borders of cultural, economic and social differences. Empirical studies have confirmed the role that migrants play as go-betweens. They provide home country mobility candidates with labour market information, professional contacts and a safety net for their arrival in a foreign country. They also sponsor cross-generational investment, mentoring and acting as "angel" investors which are more accessible to migrants than the mainstream venture capital community of a receiving country. Symmetrically, they transmit information in the opposite direction: for example, they are able to explain investment opportunities to investors in their host counties, thereby enhancing the credibility of that information and reducing the cultural, social and political entry barriers for these investors to their home country markets (Lowell & Gerova, 2004; Lucas, 2004).

However, goodwill is not enough; empirical evidence shows that networks created "bottom-up" are fragile. They crucially depend upon relationships with public and private institutions that are neither robust nor stable (Turner et al., 2003). This has focused attention on reach-out mechanisms used by diaspora members to gain institutional support for their initiatives (Berthomière & Chivallon, 2006) and, inversely, upon the actions taken by national governments to engage members of their talented diaspora in home country development projects (de Haas, 2006). As chapter 7 in this book shows, one form of action is to install public arenas in digital space for engaging migrants, members of diaspora organizations and other actors from government and the civil society in an on-going dialogue about how to capture the skills and knowledge of people living abroad for use in home country development projects.

This then is our answer to the common ground question: social network systems can be used by DKN managers to actively communicate with people on the move. However, analysis of this hypothesis using Google Analytics shows its limitations.[3] When the social network sites of our project were opened in 2012,

3 See <https://www.google.fr/intl/fr/analytics/>.

between 800 and 1000 people visited the Uruguayan site monthly and of this number, roughly 45 % were located in Uruguay, 12 % in Spain, 7 % in Chile, 6 % in Argentina, 4,5 % in France, and between 2 % and 3 % in Mexico, Brazil, Columbia, United States and Germany. A strong point with digital public arenas is that they provide a meeting place for a cosmopolitan audience geographically dispersed in a great many countries. In addition, visits to the site signify a certain interest which can become an active engagement when people sign-up for membership. Signing–up implies filling out a profile indicating where they are located geographically and institutionally, their subjects of interest, their educational background and their current job position. The sites offer tools for searching these profiles in order to contact people with similar interests. A further step up the ladder of active engagement is to join a group in order to work together on a specific subject in a restricted digital space dedicated to that purpose. 122 groups were created in a very short time after the Colombian site was opened: around 5 groups were proposed in Agriculture and the Humanities; around 10 in the medical, health and natural sciences; over 30 in engineering and technology; and close to 45 in the social sciences. However, despite these obvious signs of interest and goodwill, only a very small number of group members remained active over time. Once again, goodwill isn't enough to ensure that Diaspora Knowledge Networks are effective and efficient vectors for capturing know-how and skills located world-wide. In addition to opening social network systems, DKN managers have to have the technical means of enforcing the accountability principle in those public arenas.

Data-mining and mapping

Much has been written about integrating users into the design process of socio-cognitive systems. This literature focuses on how, over time, trust is built up in the relevance and robustness of these systems (Buisine *et al.*, 2010). In this section, we will present the procedures we adopted for gaining the confidence of DKN managers when using 'Unoporuno'. These procedures concern the specific problems of scaffolding natural language processing tools for data-mining and mapping the Web; data curation and data stewardship (Karasti et al., 2006). These three concepts serve for articulating a response to what we call Wittgenstein's dilemma. For us, this dilemma lies at the heart of building up trust in data-mining the Web for semantic information.

Wittgenstein holds a unique position in language theory because he is often considered as the founding father of two opposing theories of meaning (Bouveresse, 1973). In *Tractatus Logico-Philosophicus* which he published in 1917 (Wittgenstein, 1961a), he defended a correspondence theory of language which holds that words project a picture of reality so that, logically, if a person understands what is said or written, the relationships between the words used in the locution or the text

corresponds to the relationships which exist in the world between those objects. Engineers work in this framework. For example, the semantic Web is emerging as a result of a huge investment in time and effort aimed at building sharable ontologies predicated on ongoing classification work. And as we will see when we talk about data curation, successfully data-mining the Web implies building a standardized vocabulary that normalizes the meaning of words so that they signify the same thing in different contexts. In *Investigations Philosophiques* (Wittgenstein, 1961b) which was published in 1953 after Wittgenstein's death, he defended a different theory of meaning, arguing that meaning is socially constructed through the language games people play. For J. F. Lyotard (1979), this idea is essential for understanding social bonding in a collective practice. It implies that when we are in a group, the moves that others make are immediately understood. On the one hand, we know how to interpret their intentions because the words they use are markers of conflicts; they designate the battle lines of a "*rapport de force*". On the other hand, we also know that cooperation is not the only outcome of taking part in a language game; the efforts of others to configure socio-cognitive relationships in order to build a niche for themselves at my expense can lead to a conflict. With respect to incubating Diaspora Knowledge Networks, Wittgenstein's second theory of meaning implies that managers have to take a position, they have to make their point of view known on why the talented are accountable for acting in favor of home country development. If they don't, they exclude themselves from the language games underlying the dynamics of social bonding and lose all hope of influencing the way in which socio-cognitive relationships can be configured. Data stewardship is undertaken as a means of organizing language games.

What, then, is the Wittgenstein dilemma which is captured and materialized by computer supporting Diaspora Knowledge Networks through efforts aimed at mapping out socio-cognitive relationships? In passing from a logical theory of meaning to a social theory of meaning Wittgenstein was obliged to change his conceptual, methodological and technical frameworks. When maps are used as boundary objects, they simultaneously combine these two opposing frames of reference. On the one hand, they have to be seen as robust pictures of reality, correctly showing the socio-cognitive relationships structuring a collective practice. This is a necessary condition for gaining social acceptance of the fact that they can be used as an external reference for articulating different interpretations of what is at stake in a given distributed collective practice. On the other hand, however, corresponding to reality isn't enough. They have to be perceived as useful devices for engaging language games. If maps are not debated, criticized and negotiated, their usefulness as tools for making collective sense out of individual mobility experiences won't be recognized. Other tools exist for installing cooperation (Schmid, 2011), why use maps to move people along the continuum from simply interacting with one another to effectively doing things together for their home country?

After presenting the technical scaffolding of 'Unoporuno' in the next part of this section, the concept of data curation will be presented in Part 2 and data stewardship in Part 3. As we will see, data curation is carried out using a correspondence theory of meaning whereas data stewardship demands using a social theory of meaning. Both steps make use of the results obtained through the application of 'Unoporuno' and, symmetrically, data curation and data stewardship serve in return for constantly improving the relevancy and the robustness of these results. Combined through retroaction, these three concepts consequently offer a solution to Wittgenstein's dilemma of having to work with two different theories of meaning when using natural language processing techniques for extracting semantic data from the Web.

Scaffolding 'Unoporuno' for finding evidence of talent mobility on the Web

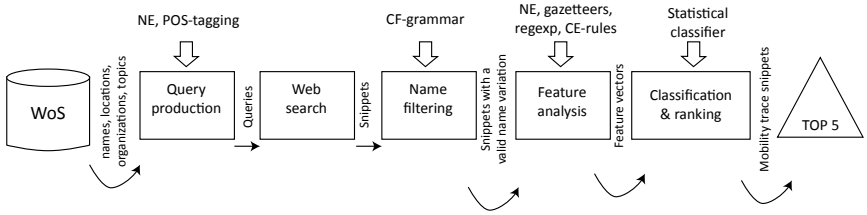
International stocks and flows of highly skilled migrants are generally identified and evaluated by using population censuses, population registers, labour market surveys, administrative data, specific surveys and case studies (OECD, 2002). Our approach is different, but complementary. It is based upon the idea that the Web can be mined using computer science techniques in order to find documentary proof of a person's mobility status. It assumes that users of 'Unoporuno' have a list of names, want to ensure that the people appearing on those lists have effectively left their country of origin and are, consequently, potential candidates for membership in Diaspora Knowledge Networks.

A list of names can be constructed for various reasons. For example, DKN managers will want to fan the flame of goodwill. When people join the social network sites described in chapter 7, managers will want to engage them in articulation work; to get them to mobilize the skills and knowledge they are gaining abroad in projects for home country development. Another reason arises when the national job market doesn't have people with the skills and know-how for meeting specific needs. Implementing the Diaspora Option implies reaching out to people and telling them "we want you" to get involved in home country projects. Registers can be used for identifying experts abroad, such as lists of scholarship holders, exchange student laureates, members of multinational firms, etc. However, this approach is intrusive and can often meet with negative reactions on the part of those people who are solicited. Michel Callon has addressed this question by talking of the need to develop a "translation strategy" (Callon, 1986) in order to build partnerships: data-mining a corpus of past publications can help DKN managers find the words to convince the talented that by helping their home country they will accumulate social capital which will serve them in the future. Finally, a third situation can arise. A DKN manager might want to systematically monitor what is going on in a particular area – for example, describe the mobility trends

in Uruguay's biotechnology sector. For that purpose, she can use patent and/or academic databases such as the Web of Science (WoS), extract automatically the names and addresses of authors appearing in those databases and then decide, on the basis of a probability calculation, if such and such a person should be contacted or not. This then is a third way of building a targeted corpus: instead of starting off with a list of names as was the case in the first two options, computer assistance is provided here for producing the list.

'Unoporuno' was designed as a pipeline which can accommodate the three different strategies described above. WoS[4] is shown in Figure 2 as the entry point to the pipeline, but if DKN managers have already constructed lists, they simply input those names into the pipeline using a special 'Unoporuno' interface developed for that purpose.

Figure 1. Natural Language Processing pipeline for the Mobility Classification Task



Source: own production

When 'Unoporuno' is given a list of names, it doesn't simply carry out a name search. It combines a name with other criteria in order to reduce ambiguity. Homonyms exist especially for common names such as William Turner who is not only one of the co-authors of this paper, but also a 19th Century English Painter, and a movie character in the *Pirates of the Caribbean*. A solution for dealing with homonymy lies in combining the name of a person with the names of other entities such as subject areas, institutions and countries. 'Unoporuno' automatically does this in different ways and produces about 20 queries per person. These queries are submitted to a browser – Google for example – which returns about 20 snippets for each query. In theory, then, about 400 snippets should be manually processed in order to find appropriate documentary evidence confirming the mobility status of a person. Such a task is clearly too effort-intensive and time-consuming to imagine people engaging in it in order to find a "*needle in the haystack*". 'Unoporuno' offers a solution: only 5 snippets – the Top 5 – are presented to the system's user; according to 'Unoporuno's calculations, these Top 5 snippets are likely to contain a link to irrefutable documentary evidence on the Web proving a person's mobility status. This represents about 1.25 % of the theoretical 400 figure and, potentially, a huge saving in time and effort for the user.

4 See <http://thomsonreuters.com/web-of-science-core-collection/>.

Snippets are the short document summaries produced by a browser in response to a question. Here is an example of a snippet produced by Google:

Figure 2. An example of a snippet produced by Google in response to a person search

> *Mister X, Centro de Matemática*
> Mister X es un profesor de sistemas dinámicos y geometría en el Departamento de Matemática de la Univesidad de Cambridge y está asociado ...
> <*http://www.cmat.edu.uy/cmat/docentes/misterX*>

A human reading this snippet would be able to infer that Mister X is affiliated with the *Centro de Matemática* in Uruguay, but is currently a Professor of system dynamics and geometry in the Department of Mathematics at the University of Cambridge. The document referenced by the snippet is obviously a useful resource for determining Mister X's mobility status as being either:

- mobile: has gone abroad for professional or academic reasons and has lived away from the country of origin for at least one year.
- local: has only spent short periods of time abroad (less than one year).

In order for the machine to draw the same conclusion and automatically carry out the "*mobility classification task*", it has to know that "*Mister X*" is the name of a person; that "*Centro de Matemática*" and "*Departamento de Matemática de la Universidad de Cambridge"* are the names of two different institutions; that "*uy*" in the *http* address is an abbreviation which designates Uruguay. Coherent sets of metadata depend upon the decisions taken to classify named entities in snippets – *"Mister X", "system dynamics", "Centro de Matemática", "Uruguay"* – in appropriate analytical categories which give them their meaning – *a person, a subject area, an institution and a country*. Making these decisions lies at the heart of the data curation problem which we will come back to in the next part of this article. 'Unoporuno' prepares the ground for addressing this problem through application of the techniques shown in figure 1 for name filtering, semantic snippet analysis, supervised classification and ranking.[5]

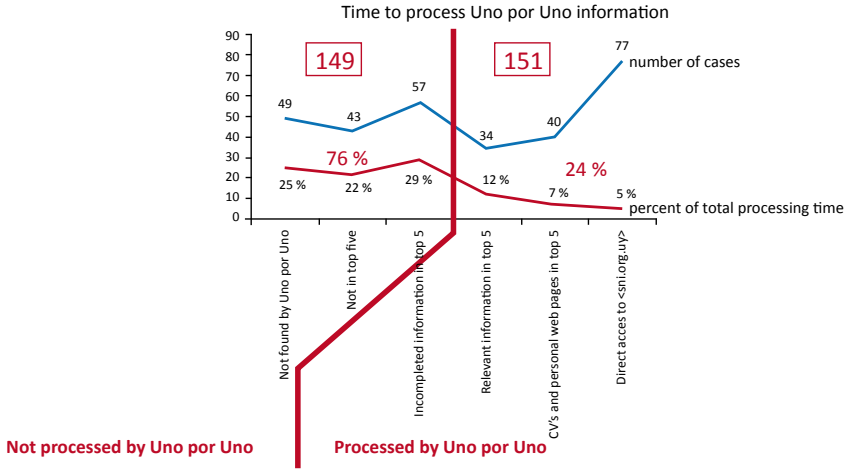
A machine is expected to do as well as a human in determining the mobility status of a person; in order to test this hypothesis, a "gold standard" was created by manually annotating a set of documents. 'Unoporuno's automatic classification of the mobility status corresponded to the gold standard in 78 % of the cases. The proposition was then inversed and instead of using a gold standard, we asked human evaluators to judge the usefulness of the machine's Top 5 snippet selection for solving their specific "*needle in the haystack problem*". Results were computed using the true mobility status of each person and Inter-evaluator agreement was measured. In 80 % of the cases, evaluators correctly determined the mobility status of a person using the Top 5 selection; however, only a moderate level of inter-evaluator agreement was observed (0.60) with respect to the value of specific

5 For a detailed description of the pipeline presented in figure 2 with a discussion of the technical options adopted in order to carry out the mobility classification task and evaluate the results obtained see Garcia Flores *et al.*, 2012.

snippets for making those decisions. Finally, user satisfaction measures were built as a means of improving system performance. Our hypothesis is that satisfaction will increase to the extent that 'Unoporuno' alleviates the time and effort that goes into finding documentary proof of a person's mobility status given the mass of irrelevant information on the Web.

The user satisfaction measures were developed using a corpus containing the names of 300 talent mobility candidates. We included in this corpus the names of 149 people for which 'Unoporuno's treatment of the mobility classification task was irrelevant, and 151 people for which it was relevant. We then randomized the corpus and gave it to an evaluator. The evaluator was asked to use 'Unoporuno's Top 5 snippet selection for deciding upon the mobility status of each of the 300 people but, of course, she was not told what set of snippets was relevant and what set wasn't relevant. The only rule was to move on to an evaluation of the next name on the list if she was unable to decide upon mobility status after 15 minutes. The total processing time for the 300 people was a little less than 50 hours. We found that 76 % of the evaluator's time was spent trying to determine the mobility status of the 149 people not correctly classed by 'Unoporuno' while only 24 % of her time was spent on the 151 people classed by 'Unoporuno'.

Figure 3. User satisfaction with 'Unoporuno'



Source: own production

Figure 3 shows that the data was distributed in a way designed for studying user behaviour in 6 different types of situation. The number of cases defining each situation is given along the blue line; and the time taken to work through each situation is given as a percentage of the total processing time along the red line. The category "not processed by 'Unoporuno'" on the left-hand side of figure 3 includes three situations for which the technical scaffolding of 'Unoporuno's pipeline needs to be constantly monitored and improved.

The first situation "*Not found by 'Unoporuno'*" (49 cases; 25 % of total processing time) calls into question the quality of the name filtering algorithm used for detecting documentary proof of mobility on the Web; the second situation "*Not in the Top 5*" (43 cases; 22 % of total processing time) focuses attention on the list of semantic features which 'Unoporuno' uses for classing snippets among the Top 5; the third situation, "*Incomplete information in the Top 5*" (57 cases; 29 % of total processing time) concerns the performance of the ranking algorithm. We observed the evaluator's behaviour in order to see how they named the entities which they considered important – names of people, of subject areas, of institutions and geographical locations; how they defined categories and relationships for classing semantic features; and how they ordered their lists of metadata in order to carry out the mobility classification task assigned to them.

On the right-hand side of figure 3, under the heading "processed by 'Unoporuno'", we distinguished three different types of documentary evidence mined from the Web in order to determine their relevancy for the mobility classification task. The category "relevant information in the Top 5" refers to a situation where the name of one country appears in a document referenced in the Top 5 snippet set, and the name of another country appears in a document referenced by a different snippet in that set. A typical example of this situation occurs when, for example, an author publishes a scientific paper for which her institutional affiliation is in Spain and a second paper for which it is in Uruguay. Both these papers are referenced in the Top 5 snippet set but the meaning of this co-presence is hard to interpret: for example, if the person has only spent a short period abroad, less than a year, then she should be classed as "local"; but if the time spent in Spain is more than a year, then she should be considered as a member of Uruguay's talented diaspora. Given this uncertainty, the evaluator took the most time to work through these types of situation (34 cases; 12 % of total processing time). When a click on one of the top 5 snippets gave direct access to a cv or a personal web page, the evaluator obtained irrefutable proof of mobility status almost immediately (40 cases; 7 % of total processing time). And, of particular promise for the future, was the rapidity with which the Top 5 snippets containing a <sni.org.uy> address were processed (77 cases; 5 % of total processing time). The Sistema Nacional de Investigadores (SNI) is a database which was created in 2007 as part of a growing worldwide movement to install electronic cv information systems for managing highly talented human resources in national and regional science systems.[6] It contains a very detailed summary of the careers of all the researchers recognized as belonging to the Uruguayan academic community, even if they have elected to take up residence in another country.

6 See as well the Euro-CV project at <http://www.eurocv.eu/>.

Curating the data produced by 'Unoporuno'

Curating the data produced by 'Unoporuno' is necessary for improving the performance of the system over time. As we just said, 'Unoporuno' currently achieves 80 % correspondence with semi-automatic classifications which means that 2 out of 10 people get through the filters set up for data-mining the Web. If we were able to reduce this figure to 1 out of 10 or, even better, if we got close to a 100 % correspondence rate with the gold standard, this obviously would increase confidence in the system. We feel that improving confidence can be achieved by undertaking three different types of actions.

First, with respect to system design, it is obviously necessary to improve the technical scaffolding of 'Unoporuno' for carrying out the mobility classification task and, as we saw, this is the goal of using the user satisfaction measures discussed above. Second, a critical look has to be taken at the gold standard idea. In the tests described above, inter-evaluator agreement on snippet value was only moderately robust. We think that the reason lies in the fact that evaluators use a social theory of meaning for judging the value of evidence and not the correspondence theory of meaning which underlies the gold standard philosophy. Proof of mobility derives from conclusions drawn when reading a document; only with CVs and personal web pages does the evidence speak for itself. People adhere to different meta-narratives, are in different social, economic and cultural contexts and therefore consider the semantics of mobility from different perspectives. It is no wonder then, that inter-evaluator agreement is only moderately satisfactory.

Finally, from a conceptual point of view, both technical and social reasons explain the lack of correspondence between human and machine classification in 20 % of the cases tested above. Instead of trying to attain a predefined gold standard – that is, get a 100 % overlap on human and machine classifications – we consider data curation as being a way of inversing this proposition in order to represent the gold standard as a boundary object. Envisaged from this perspective, it serves to capture the intentionality of human actions and thereby helps in stabilizing how words are used to tell the story of cooperating through Diaspora Knowledge Networks. The reasoning is as follows: we can expect agreement on the quality of the documentary evidence for 80 % of a corpus; but for 20 % of that corpus humans and machines will not agree. This doesn't mean that the machine is wrong, that humans are right and that the only goal should be to improve the technical scaffolding of 'Unoporuno' in order to ensure overlapping results. It means to the contrary that 'Unoporuno' should be given the capacity to question the lack of inter-evaluator agreement by focusing attention on the need to collectively build a common language for improving that agreement. It's with this goal in mind that we engaged the mapping program mentioned earlier and which will be described in more detail below when we talk about data stewardship.

Data curation is the name given in Library Science to the practice of integrating documents into a coherent framework through the use of metadata. Four categories of metadata are exploited by 'Unoporuno': the name of talented mobility candidates validated by a DKN manager; that person's institutional and geographical location; and a description of her area of activity. The computer science community has built a very rich set of resources for extracting named entities from digital documents. For example, for 'Unoporuno' extraction, we used the following resources to determine geographical mobility:

- multilingual database of world cities: 1744328 records;
- multilingual list of world cities with more than 100,000 people: 3545 records;
- multilingual list of countries: 516 records.

And to determine institutional mobility, we adapted to our needs the:

- World universities list: 6532 records;
- World research centres list: 3802 records;
- JRC World Organizations database: 525862 records.

Finally, we specifically developed:

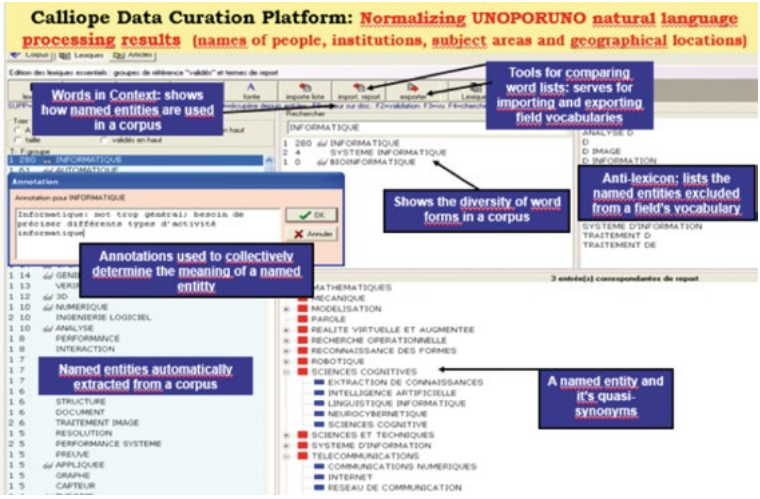
- a context-free grammar for Spanish and English name parsing;
- a semantic analyser for identifying subjects of interest and job occupation categories in digital documents; and
- a statistical classifier (SVM) for ranking the relevancy of those items for determining the mobility status of talent mobility candidates.

Algorithms did the matching: they recognized an entity named in a snippet as belonging to one of the above lists and assigned that entity to an appropriate category in the metadata coding scheme. They did this through brute force, on the assumption that the lists contained the names of all the relevant entities needed for describing the reality of the migration world. Curating 'Unoporuno' data implies verifying this assumption. For this purpose, a data curation platform has been developed called Calliope (de Saint Leger & Turner, 2005) and is shown in figure 4.

Calliope automatically extracts from the 20 % subset in a test corpus the names of people, institutions, subject areas and geographical locations. In order to illustrate the functions available through the Calliope platform, the example of subject area terminology is considered in figure 4. The list of words shown in the left hand column under the heading "named entities automatically extracted from a corpus" characterizes the granularity problem: some terms are more general than others but the decision as to what is general and what isn't is not as straightforward as it might seem. In the column "a named entity and its quasi-synonyms", "cognitive science" is taken as the general term whereas "knowledge extraction", "artificial intelligence", "computer linguistics", etc. are considered as being quasi-synonyms, that is, as being specific terms illustrating subject areas in cognitive

science. Had the goal been to build a conceptualization[7] of what is involved in data-mining the web, "knowledge extraction" would have been considered as a general term in that particular field of activity. Words have prefixes and suffixes and a wide range of spellings or declinations as shown in the column "diversity of word forms in a corpus" and they can be used as well with different meanings in different contexts, a phenomenon which can be controlled by using the "words in context" field on the Calliope platform. As we said above, a great deal of work is currently going into building conceptualizations for use in data-mining the Web, consequently the "tools for comparing word lists" – which imply importing and exporting existing terminologies – are important tools to have on a data curation platform because they serve in aligning a conceptualization under construction with what other people have done but for different purposes. Finally, as the goal of data curation is to build a shared view of the world, using "annotations to collectively determine the meaning of a named entity" and explicitly building an anti-lexicon containing a list of the "named entities excluded from the field's vocabulary" are two moments in classification work which are of crucial importance to social bonding.

Figure 4. Curating data mined on the Web



Source:

7 For computer scientists, "A body of formally represented knowledge is based on a conceptualization: the objects, concepts, and other entities that are presumed to exist in some area of interest and the relationships that hold them. A conceptualization is an abstract, simplified view of the world that we wish to represent for some purpose. Every knowledge base, knowledge-based system, or knowledge-level agent is committed to some conceptualization, explicitly or implicitly. An ontology is an explicit specification of a conceptualization" (Gruber, 1993). Our work in this paper aims at producing conceptualizations; work to come will produce ontologies to computer exploit these conceptualizations.

Data curation uses a correspondence theory of meaning to improve the performance of 'Unoporuno'. A shared conceptualization of what is important and what isn't will evolve over time as a project goes through different phases. In order to manage the dynamics of changes in socio-cognitive relationships, DKN Managers will want to build new corpuses for each phase in order to test ideas on what should be done and on who should be held responsible for doing it. The Calliope Platform enables them to constantly update the data curation process and converge towards robust lists of named entity variations for representing the structure of Diaspora Knowledge Networks; this is a condition for reinforcing the semantics of cooperation over time.

However, as we said in speaking about Wittgenstein's dilemma, efforts to clarify cooperation semantics implies anticipating upon what is important and what isn't in a given situation. The sought-after result is a strategy determining how people should invest their time, effort, human and material resources in doing things together and, on this point, there is rarely agreement. To the contrary, conflicts of interpretation arise constantly and the capacity to overcome them explains a project's success or failure. With 'Unoporuno', we assume that DKN managers will data-mine the Web and use the information obtained in order to take part in the language games determining the success or failure of a project. But this assumption implies changing registers, switching from a correspondence theory of meaning to a social theory of meaning. Our hypothesis is that DKN managers do that naturally, without thinking about it. When curating the data mined on the Web they have in mind the language games they will play with the talented expatriates who spontaneously sign up on their social network sites, or who are enrolled in home country development projects because of their specific skills and know-how.

Data curation and data stewardship are two inseparable moments of social bonding. Having a robust picture of real-world, socio-cognitive relationships is a condition for being considered as a competent and skillful player in language games. But it is not enough. A picture of socio-cognitive relationships says nothing about how that picture is created and used. As we saw above, two meta-narratives exist which provide different perspectives on how to paint a picture of the migration world. Data stewardship implies recognizing the fact that building a conceptualization is theory-loaded. In technical terms, data stewardship means disposing of mathematical tools for modelling data from different points of view.

Data Stewardship

DKN managers are expected to take the lead in engaging language games which can serve in the emergence and consolidation of Diaspora Knowledge Networks. But in mathematical terms, there is no one best way for representing objects and the relationships between them. How the structure of a Diaspora Knowledge

Network is visualized will depend upon the meta-narrative which drives the modelling process.

Table 5 below was constructed with 'Unoporuno' in order to identify the country to which Uruguayans are the most attracted when they leave Uruguay. The frequency count in the right hand column of this table shows that 93 people were concerned by the study and of that number, 28 left Uruguay to go to the USA, 19 to Spain, 16 to France, etc.

Table 1. Destination countries for Uruguayan migrants

Country	Frequency
Uruguay	93
USA	28
Spain	19
France	16
Brazil	15
Great Britain	8
Germany	6
Canada	6
Mexico	5
Chile	3
Portugal	3
Argentina	3
Venezuela	2
Australia	1
Cuba	1
Ireland	1
Israel	1
Italy	1
Japan	1
Russia	1
Switzerland	1

Source:

Frequency counts appear as being both objective and legitimate measures of how people order their preferences with respect to country destinations but, in fact, they are highly interpretation-laden. Using frequency counts implies that migration flows can be summarized in terms of a dichotomy opposing sending and receiving countries. Preferences are described in terms of the attractiveness of a destination country, attractiveness which is defined in terms of social, cultural, institutional and/or intellectual affinities. Talent mobility is represented as being

a competition for human resources, "attractiveness" being a measure of why some countries win in this competition while others lose.

As we explained above, a second idea of migration is that the talented are entrepreneurs and that their concern is less with the attractiveness of a foreign country and more with positioning themselves in a way which will allow them to make a niche for themselves on the international job market. This perspective holds that people will go to places where they can hope to reinforce networks of cognitive, institutional and interpersonal cooperation. Here is that argument expressed mathematically:

For each document in a test corpus, a computer counts the number of times that the names of different countries occur together. The result is represented using the following measure:

$$E_{ij} = \frac{C_{ij}^{2}}{C_i \, x \, C_j}$$

Cij = the number of times 2 countries "i" and "j" occur together in the same document; *Ci* is the frequency of "i" and *Cj* the frequency of "j". If *Eij* is 1, when one country is visited the other is necessarily visited as well; when *Eij* is 0, that means the contrary, if "i" is visited then "j" won't be visited. The *Eij* measure can be interpreted as an opportunity measure: a country frequently cited in association with other countries is a place where people go for acquiring the human, social, financial and material capital needed to go elsewhere[8].

The graph in figure 5 shows how frequency and co-occurrence measures lead to different estimations of a country's importance in structuring a DKN. The blue line shows a classification of country preferences when frequency counts are used to do the ordering; the red line shows the same classification but when a co-occurence measure is used to do the ordering.

When frequency counts are used, Spain is ranked 2nd behind the United States and just a little before France and Brazil in terms of its attractiveness as a destination country. It attracts about 20 % of Uruguayan talent mobility candidates, whereas about 30 % are attracted to the United States. However, the red line on that figure shows a different classification when the co-occurence measure is used. The *Eij* measure is close to 0.80 for Spain and only 0.45 for the United States. Uruguayans consider Spain as being a much better place for building their cooperation networks than the United States.

Frequency counts serve to rank the attractiveness of destination countries; the theoretical problem is that of understanding why some countries win while others lose in the competition for talent. Co-occurrence serves to rank countries according to the opportunities they can potentially provide when constructing a

8 Turpin *et al.* (2008) consider, for example, "that it is not so much current location that is important for 'brain-drain' or 'brain-gain' but rather the places scientists have been and the networks and scientific conduits they have laid down in their travels".

personal career: the theoretical problem is a network management problem; where should people go in a network in order to capture the cognitive, institutional and interpersonal resources required for becoming a transnational knowledge worker? As we will see in the following section of this paper, it is this network management problem which motivated our construction of cognitively active boundary objects using the co-occurence measure.

Figure 5. Locating network resources for managing a career as a transnational knowledge worker

Source:

The structure of Diaspora Knowledge Networks can be visualized from different points of view and this raises the question of data stewardship. In what direction should managers take their data: towards supporting a meta-narrative of cooperation, or towards language games which are anchored in the idea of a growing competition for human resources on the international job market? Despite our decision to go the first route, other options exist as this example shows. And this is where the challenge lies for engineers. Computer supporting data stewardship implies providing users with appropriate mathematical tools for telling their story. Mathematical toolkits have to be created and tested for their power in configuring socio-cognitive relationships as a means of thickening a plot with different perspectives on strategies for doing things together.

Using cognitively active boundary objects to take part in the language games of the migration world

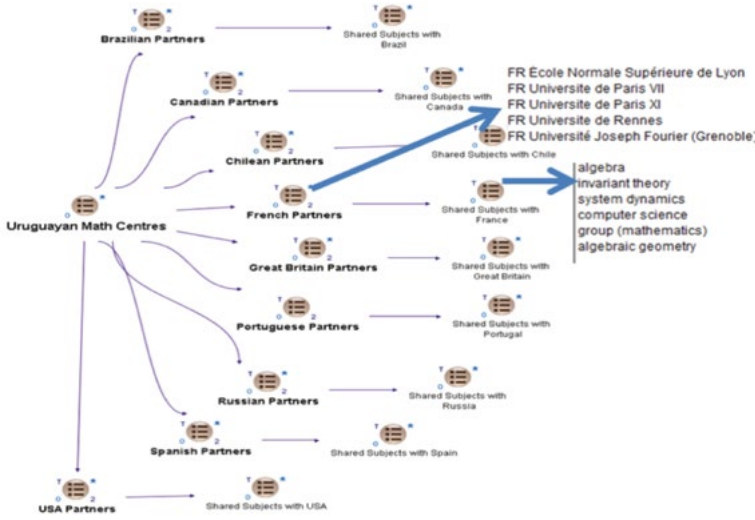
Boundary objects are cognitively active to the extent that their value in representing the socio-cognitive relationships structuring the language games of the migration world is recognized. But this confidence is hard to come by when boundary objects are constructed by mapping out data which have been data-mined on the Web. As we've seen in the preceding section, confidence in the results of computer applications depends upon carefully scaffolding the natural language and statistical techniques used to find data on the Web. It means curating that data in order to ensure the coherence of metadata classification schema. And finally it means scripting a dialogue using a meta-narrative which is empirically grounded through the use of appropriate mathematical tools.

"Scripting a dialogue" is the name given in the collaborative learning literature to efforts aimed at providing external guidance to people who are attempting to develop specific collaborative skills and cognitive strategies (Fischer *et al.*, 2013). Our script is the following: the talented are entrepreneurs faced with the challenge of building a niche for themselves on the international job market. Personal calculations aimed at determining what is important and what isn't for meeting that challenge are organized around the goal of becoming competent and skillful transnational knowledge workers. Data consequently needs to be processed in order to identify the socio-cognitive relationships for building the cooperation dynamics enabling protagonists to set-up, consolidate and grow networks of institutional and interpersonal support. An example of a map allowing DKN managers to actively script a dialogue in this way is provided in figure 6.

Figure 6 uses Compendium software developed at the Open University in Great Britain[9] in order to map out the cooperation relationships of Uruguayan Math Centres as revealed by a study of their members' mobility patterns. A typical career trajectory for a transnational knowledge worker is the following: he initially trained in Mathematics at Montevideo's *Universidad de la República*; left Uruguay to do his PhD at Stony Brook University in New York and then became a Professor of system dynamics at Trinity College in Cambridge. These data constitute a talent mobility graph in which *countries are connected*: Uruguay, the United States and Great Britain; *cities are connected*: Montevideo, New York and Cambridge; *institutions are connected*: Stony Brook, Cambridge and the *Universidad de la República*; and different *cognitive levels of classification are connected*: system dynamics is a subfield in mathematics which is, itself, an area of research in the Natural Sciences. Individual talent mobility graphs are aggregated in order to produce the cognitively active boundary objects visualized using Compendium software.

9 See <http://compendium.open.ac.uk/institute>.

Figure 6. A map showing the structure
of socio-cognitive relationships in a *Diaspora Knowledge Network*



Source:

Compendium software is designed for interacting at a distance on the Web. When DKN managers install Compendium maps on the social network sites described in Chapter 7, they create a moment of social bonding which is computer supported through the use of these devices. For example, the nodes shown on Figure 6 are Compendium symbols for a list. When users of the software hover over a node with their mouse, the content of the list (*) found at that node is displayed as are the tags (T) used to index that list. Tags are normalized names of entities used to index the datasets located at the different nodes. Figure 6 shows the datasets tagged under two headings "French Partners" and "Shared subjects with France". The assumption is that by visualizing the cognitive, institutional and social landscape created by talent mobility, latent and weak ties in that landscape can be transformed into binding social capital if appropriate language games are played (Turner *et al.*, 2009).

Figure 6 shows the outflow of Uruguayan mathematicians to partner institutes located in other countries and immediately raises data curation questions. If the relationships pictured on this map are not correct, people can correct the information using a Compendium editorial interface and then re-post the map on the Web for collective approval. The philosophy implemented here with

Compendium is that of the Internet bazaar[10]. Cognitively active boundary objects will become more and more robust over time because people who play in a given language game are concerned about truth; if they are to be held accountable for their acts, the information used to position them in a network of duties and obligations has to be reliable. Curating data, making it fit with what is being played out on stage, is an integral part of social bonding.

Social capital accumulation can often be explained by the fact that people move through the political, economic and social corridors that have been constructed for them by others. Figure 6 shows that Uruguayan mathematicians go to Brazil, Canada, Chile, France, Great Britain, Portugal, Russia, Spain and the United States. The accountability question is why those countries and not others? Is the Uruguayan mathematics community "locked into" a set of mobility corridors which might limit its capacity to capture the most useful skills and knowledge currently available? In short, are these destination countries chosen for scientific reasons or because of the rigidities of an "old boys" network?

Tagged entities can be used by Compendium for detecting the overlap between different datasets. In this way, we discovered that talented Uruguayan mathematicians go to Russia, Brazil, Chile and the United States to study statistics and applied mathematics. With this information, another set of narratives can be constructed around the need for sharing mobility experiences in order to overcome the stress of fitting into a new cultural situation, and for getting advice and guidance from trusted colleagues. Clearly, the cultural experiences of fitting into working situations in Brazil, Chile, Russia and the United States will not be the same, but this matters less than knowing that others are living through what I'm living through, and that they will no doubt be able to supply me with a certain number of suggestions for becoming a knowledgeable actor in my local context. Also, and symmetrically, "in-group" contacts create the conditions for future mobility by supplying access through trusted colleagues to labour market information and professional contacts in different countries. So the point is a general one: membership in Diaspora Knowledge Networks is rewarding because it allows the talented to capitalize on the goodwill that comes naturally from having the same birthplace; they can build a career for themselves as transnational knowledge workers without cutting themselves off from the emotional comfort and well-being which comes from their cultural heritage.

10 The Internet bazaar is the world of a thousand eyes. If enough people look at an object and that object isn't a true picture of reality, then people will react and correct the picture to improve its correspondence with the real world. Building open software is premised upon this principle: as Eric Raymond argues: "Given a large enough beta-tester and co-developer base, almost every problem will be characterized quickly and the fix obvious to someone" or, less formally, "Given enough eyeballs, all bugs are shallow; […] every problem will be transparent to somebody" (Raymond, 1999).

General conclusions

This paper is anchored in a computer science research field called social informatics (Turner, 2009). Three basic assumptions in this field are that:

- cooperation is an achievement, the result of successfully managing the socio-cognitive relationships which constantly reconfigure distributed collective practices;
- the steady increase in the availability and amount of computing power will affect the skills and know-how required for doing things together;
- people are learning how to use the cognitively active boundary objects produced by computers to move from simply interacting with one another – exchanging information – to concretely engaging in collective actions.

This paper can be read as an attempt to identify and describe different procedures for organizing this learning experience. The problem raised was that of computer supporting the emergence and consolidation of Diaspora Knowledge Networks. The boundary object produced for that purpose was a map used for scripting a story about what needs to be done for home country development and who should be held accountable for doing it. The map shows links in data mined from the Web between people, countries, Institutions and subject areas. The first thing that people have to learn in order to use computer generated boundary objects is how to make sense out of the relationships shown between the objects on the map. More concretely we showed that this question is one of gaining confidence in the value of the map as a device for building social capital.

Using talent mobility to explore network management practices can occult the question of building social capital, for it is a political economy dogma to consider that a person born in a country should contribute her human capital to that country. Most of the work that has gone into analysing the competition for talent on the international job market has been contextualized in terms of a brain drain/brain gain opposition premised upon the idea that the loss of human skills reduces a country's capacity to develop economically and socially. Various strategies have been implemented to reduce brain drain, such as restrictive policies designed to make migration more difficult; incentive policies offering better opportunities in the home country which are designed to make emigration less attractive; and compensatory policies, whereby either the receiving country or the individual migrant is taxed in order to compensate the sending country for the loss of human capital. But these measures have generally failed to produce effective solutions. The question then is to know if we can move from a focus on mobility as a loss of human capital to one where it appears as a social capital gain.

By adopting what is called the diaspora option – the idea that the talented can help their home countries by staying in foreign countries and working through DKN in order to personally contribute to country of origin development – we

respond positively to this last question. However, the diaspora option is a meta-narrative which considers mobility as an opportunity rather than as a loss and in order for it to be taken seriously, it has to be grounded in empirical evidence. Proof has traditionally been sought through two different approaches, one statistical aimed at evaluating the international stocks and flows of highly skilled migrants by using population censuses, population registers, labour market surveys, administrative data, specific surveys and case studies; the other qualitative, using such things as field research, questionnaire studies and interview guides to obtain empirical evidence on how talented migrants act as go-betweens promoting productive relationships between their host country and their country of origin. However, the evidence of brain gain is not clear and has been very much debated (Meyer & Wattiaux, 2006).

Our approach makes use of documentary evidence found on the Web and uses a sociological definition of proof derived from work by Bruno Latour. For him, when a scientific statement is taken for granted, that doesn't mean that it corresponds to what is true about the world, it only means that enough evidence has been collected for people to feel that they no longer have to continue investing time, effort and money in collecting more (Latour, 1989). Our argument was twofold: first, that if the diaspora option is to be taken seriously, DKN managers have to repeatedly up-date it given on-going changes in the socio-cognitive configuration of a Diaspora Knowledge Network – in other words, they have to actively engage over time in showing why people and institutions should be held responsible for transforming the latent and weak links detected on maps into strong social bonds for collective action; and second, their network management strategy has to be taken seriously in the language games leading either to cooperation or conflict. We insisted upon the fact that being taken seriously in a language game isn't easy when the evidence for taking a position is empirically grounded in data through the assistance of a machine. For that reason, we looked at the necessary integration of three different approaches for data-mining the web: technically scaffolding natural language and statistical techniques for extracting relevant data; curating these data in order to improve their robustness for reliably representing socio-cognitive relationships; and finally mathematically fitting the data into a meta-narrative for defending the diaspora option in the language games of the migration world.

This then is the second thing that people have to learn in order to make use of computer generated boundary objects in collectively sustaining cooperation dynamics. There is not the technical on one side and the social on the other: building a network management strategy for cooperating at a distance requires organizing moments of social bonding around technical questions affecting how collective action options are evaluated and implemented. Specific procedures can be experimented. This paper has attempted to identify and explore some of them.

Acknowledgements

We would like to express our gratitude to five people – the late and much regretted Leigh Star, Geoffrey Bowker, Michel Callon, Les Gasser and Jean-Baptiste Meyer – for the many hours spent in discussing the conceptual and methodological challenges faced when trying to analyse distributed collective practices and create ways of computer supporting their development over Internet. The research for this paper was carried out in the Cidesal project (*Création d'incubateurs des diasporas du savoir en Amérique Latine*), a project which was financed from 2009 to 2013 by the EuropeAid program of the European Union and coordinated by Jean-Baptiste Meyer at France's *Institut de Recherche pour le Développment*. Five teams from Colombia, Argentina, Uruguay and France took part in the project: we would like to thank their members for an extremely rich and rewarding scientific experience.

References

Berthomière, W. & Chivallon, Ch. (eds.) (2006). *Les Diasporas dans le Monde Contemporain*. Paris: Karthala-msha.

Bouveresse, J. (1973). *Wittgenstein: la Rime et la Raison*. Paris: Editions de Minuit.

Bowker, G. C.; Star, S. L.; Turner, W. A. & Gasser, L. (1997). *Social Science, Technical Systems and Cooperative Work: Beyond the Great Divide*. Mahwah New Jersey: Lawrence Erlbaum Associates.

Bowker, G. C. & Star, S. L. (1999). *Sorting things out: Classification and its consequences*. Cambridge, ma: mit Press.

Buisine, S.; Fouladi, K.; Nelson, J. & Turner W. A. (2010). "Optimiser le processus d'innovation grâce aux traces informatiques d'usages", in Desprès, S. & Crampes, M., *Actes du Colloque IC 2010, 21es Journées Francophones d'Ingénierie des Connaissances*, *École des Mines d'Alès*. Paris: Presses des Mines

Callon, M. (1986). "Elements pour une sociologie de la traduction. La domestication des coquilles Saint-Jacques et des marins pêcheurs dans la Baie de Saint-Brieuc". *L'Année Sociologique*, 36.

———— (1991). "Techno-economic network and irreversibility", in Law, J. (ed.), *A sociology of monsters. Essays on power, technology and domination*, London: Routledge.

———— (1998). "An Essay on Framing and Overflowing: Economic Externalities Revisited by Sociology", in Callon, M. (ed.) *The Laws of the Markets*. Oxford: Oxford and Keele-Blackwell-Sociological Review.

Colic-Peisker, V. (2010) "Free floating in the cosmopolis? Exploring the identity-belonging of transnational knowledge workers", *Global Networks*, 10, 4

de Haas, H. (2006). *Engaging Diasporas: How governments and development agencies can support diaspora involvement in the development of origin countries*, Oxford: Oxford University-International Migration Institute, available at <http://www.imi.ox.ac.uk/pdfs/engaging-diasporas-hein-de-haas.pdf> (last visited: 1/7/2014).

de Saint Leger, M. & Turner W. A. (2005). "Mesure de l'apport informationnel des corpus à l'organisation de l'activité collective", *Actes des Journées sur les Systèmes d'Information,* Elaborée, Toulon: isdm, 287, 22: 13, available at? <http://isdm.univ-tln.fr/PDF/isdm22/isdm22_saintleger.pdf> (last visited: 1.º/7/2014).

Diminescu, D. (2008). "The Connected Migrant: an Epistemological Manifesto". *Social Science Information*, 47: 565-579.

Dupuy, J. P. (1992). *Logique des phénomènes collectifs*, Paris: École Polytechnique-Ellipses.

Fischer, F.; Kollar, I.; Stegmann, K. & Wecker, Ch. (2013). "Toward a Script Theory of Guidance in Computer-Supported Collaborative Learning", *Educational Psychologist*, 48 (1): 56-66,

Gamlen, A. (2005). "The Brain Drain is Dead, Long Live the New Zealand Diaspora", *Working Paper*, 10, Oxford: University of Oxford-Centre on Migration, Policy and Society.

García Flores, J.; Zweigenbaum, P.; Yue, Z. & Turner, W. A. (2012). "Tracking Researcher Mobility on the Web Using Snippet Semantic Analysis", *Proceedings of the 8th International Conference on Natural Language Processing*, October, 22-24, Kanazawa: Springer Publishers, Lecture Notes in Computer Sciences.

Goguen, J. (1997). "Toward a Social, Ethical Theory of Information", in Bowker, G. *et al.*, *Social Science, Technical Systems and Cooperative Work*. Sussex: Psychology Press.

Grice, H. P. (1957). "Meaning", *Philosophical Review*, 66: 377-388.

Gruber, Th. R. (1993). "A Translation Approach to Portable Ontology Specifications". *Knowledge Acquisition*, 5 (2): 199-220

Hinds, P. J. & Kiesler, S. (2002). *Distributed Work*. Cambridge, ma: mit Press.

Karasti, H.; Baker, K. S. & Halkola, E. (2006). "Enriching the notion of data curation in e-Science: Data managing and information infrastructuring in the Long Term Ecological Research (lter) network", *cscw*, 15 (4): 321-358.

Latour, B. (1989). *La Science en Action*, Paris: La Découverte.

Lave, J. (1991) "Situating Learning in Communities of Practice", in Resnick, L. B.; Levine, J. M. & Teasley, S. (eds.), *Perspectives on Socially Shared Cognition*. Washington, dc: American Psychological Association.

Licoppe, Ch. (2006). "Pushing the Distribution Model to its Limits: Distributed "listening" in a helpline". *cscw*, 15, 2-3: 123-148, junio.

Lowell, L. & Gerova, S. (2004). *Diasporas and Economic Development: State of Knowledge*. Washington dc: World Bank, available at <http://siteresources.worldbank.org/intprospects/Resources/334934-1322593305595/8287139-1327608098427/LowellDiaspora.pdf> (last visited: 1/7/2014).

Lucas, R. (2004). *International Migration Regimes and Economic Development*. Stockholm: egdi.

Lyotard, J. F. (1979). *La Condition postmoderne: rapport sur le savoir*. Paris: Minuit.

Melin, G. (2004). "Postdoc abroad: inherited scientific contacts or establishment of new networks?". *Research Evaluation*, 13, 2: 95-102, agosto.

Meyer, J.-B. *et al.* (1997). "Turning Brain Drain into Brain Gain: the Colombian Experience of the Diaspora Option". *Science, Technology and Society*, 2.2: 285-317

Meyer, J.-B. & Wattiaux, J. P. (2006). "Diaspora knowledge networks: vanishing doubts and increasing evidence". *International journal on multicultural societies*, 8, 1; 4-24, Paris: unesco.

Organization for Economic Cooperation and Development (oecd) (2002). "International Mobility of the Highly Skilled", *oecd Observer: Policy Brief*, July.

Raymond, E. S. (1999). *The Cathedral & the Bazaar*. Sebastopol: O'Reilly Media.

Schmid, K. (2011). *Cooperative Work and Coordinative Practices: Contributions to the Conceptual Foundations of Computer-Supported Cooperative Work (cscw)*, London: Springer Verlag.

Sharrock, W. & Button, G. (1997). "Engineering Investigations: Practical Sociological Reasoning in the work of Engineers", in Bowker, G. C.; Star, S. L.; Turner, W. A. & Gasser, L. (1997). *Social Science, Technical Systems and Cooperative Work: Beyond the Great Divide*, Mahwah New Jersey: Lawrence Erlbaum Associates.

Sperber, D. & Wilson, D. (1986). *Relevance*. Oxford: Basil Blackwell.

Star, S. L. & Griesemer, J. (1989). "Institutional ecology, translations and coherence: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology". *Social Studies of Science*, 19: 387-420.

Turner, W. A. (2009). "The interdisciplinary dialogue of Social Informatics", in Reber, B. & Brossaud, C. (eds.), *Digital Cognitive Technologies: Epistemology and Knowledge Society*, London: iste-John Wiley.

———— Henry, C. & Gueye, M. (2003). "Diasporas, development and icts", in Barré, R.; Hernandez, V.; Meyer, J.-B. & Vinck, D. (eds.). *Les diasporas scientifiques et techniques. Expertise Collégiale,* Paris: ird Editions.

Turner, W. A.; Bowker, G.; Gasser, L. & Zacklad, M. (eds.) (2006). "Infrastructures for Distributed Collective Practices". *cscw*, 15, 2-3: 93-110, June.

Turner W. A.; Meyer J.-B.; de Guchteneire P. & Azizi, A. (2009). "Diaspora Wissensnetzwerke", in Kissau, K. & Hunger, U. (eds.). *Migration, Internet und Politik. Potentiale für Partizipation, Kommunikation und Integration*. Wiesbaden: vs Verlag.

Turner, W. A.; Buisine, S.; Ganascia, J. G.; Eveque, L.; Fouladi, K. & Marlier, J. (2010). "La conception innovante des objets à intelligence incorporée", in Noyer, J.-M. & Juanals, B. *Technologies de l'information et intelligences collectives*. Paris: Hermès-Lavoisier

Turpin, T.; Woolley, R.; Marceau, J. & Hill, S. (2008). "Conduits of knowledge in the Asia Pacific: research training, networks and country of work". *Asian Population Studies,* 4 (3): 247-265.

Wittgenstein, L. (1961a). *Tractatus Logico-Philosophicus*, Paris: nrf: Librairie Gallimard.

———— (1961b). *Investigations Philosophiques*, Paris: nrf: Librairie Gallimard.

Digital humanities and transnational governance

The creation of incubators of diasporas corresponds with the historic stage of current globalization. It responds to the emerging principles that inextricably combine the contributions of the Social Sciences and the Humanities with those of the new Information and Communication Technologies (ICT). It induces a transnational governance that is both novel and necessary.

Current conditions

Today, geopolitical and technological transformations have substantially modified the conditions for mobilisation of the diasporas. Recurring socio-economic challenges in the North and rapid growth of opportunities in certain regions of the South have generated new dynamics. These have in turn led to emerging countries eventually becoming poles of attraction.[1] In Latin America, for example, the economies now require an influx of skills and calling on the diaspora has thus become more pressing and more specific. In Uruguay, the diaspora is invited to fill in particular shortages in qualified employee profiles that are not exclusively intellectual, such as of skilled trades or technicians.[2] Neighboring Argentina presses for the return of its researchers through repatriation programmes that are heavily advertised.[3] Brazil offers mobility grants to attract senior and junior academic personnel from abroad to its universities and laboratories. For these countries and others, the diaspora is explicitly called upon to participate in training their human resources that are required for current developments more than ever before.

In contrast to the past when pro-active re-insertion programmes scarcely expressed a specific and constructed demand, those of today are based on needs that are more clearly identified and have better data-mining tools. The dynamics of the emergence of these countries on one hand and the *ad hoc* activation of the diaspora on the other are, therefore, complementary in the same way as the findings of the case studies on China and India, which are often cited.

The diaspora is also better known than before. Its dimensions and the diversity of its components are not without some surprises. The Latin American observatory of diasporas (Mical) has revealed that the previously visible parts of them – composed of the well-established so-called 'homeland associations' – represent

1 Chapters 1 and 2.
2 Chapter 4.
3 Chapter 6.

only a small fraction of the highly skilled expatriate populations who maintain an effective professional link with their countries of origin.[4]

In short, it appears that the new form of the diaspora link is more often at individual level and direct, without going through an association or a formal collective entity. Despite being dispersed and fragmented, this new form of diaspora linkage is particularly productive because it signifies its presence by its results in terms of scientific and technical cooperation.

The fragmented character of the diaspora adapts well to the current configurations of *internet*, with a *web* 2.0 more favourable to individual interactions through *blogs* and *microblogs* or small, focused, reactive groups, such as those enabled by the social networks with exchange of multi-media contents appropriate for facilitating the transnational co-existence of migrants with their diverse backgrounds.[5]

It would not be trivial to observe that computer scientists originating from India who shuttled between Bangalore and Silicon Valley – paragons of the innovative action of the diasporas – were among the first to tap massively into the blogosphere. This enabled them to exchange technical information, market signals, job opportunities and strategic guidance. Such remote interaction could eventually make it possible to overcome a limitation of the earliest diaspora networks: that of communication by mailing lists to begin with, and later on through the website of the association. While the first frequently choked, by excessive "noise", the real actions under way,[6] the second, too hierarchical (*top down* from the website to the members or occasional visitors), lacked spontaneous initiatives to spread adequately.[7]

Diaspora incubators

After several years of accumulated experience and many examples of networks, it was possible to identify the need for support systems for the creation, development and continuity of diaspora links. The idea of diaspora incubators condenses this function of support, which can reassure the home countries and also many other actors (host countries, international agencies, NGOs, decentralized cooperation and institutions).[8] This idea arises from the fact that if the associative structures of the diasporas of knowledge are entities that are often self-organized, their enhancement, as well as the emergence of other convergent actors and initiatives, would require consequential support. The communities concerned with the diaspora link must invest in it in order to capitalize on the cross-fertilizations that it generates.

4 Chapter 2.
5 Chapter 7.
6 Chapter 5.
7 Chapter 3.
8 Création d'incubateurs de diasporas du savoir pour l'Amérique Latine (Cidesal), <www.observatoriodiasporas.org>.

As with the incubation of innovative enterprises, the role of linking heterogeneous actors is essential. A review of several hundred diaspora networks carried out in the middle of the first decade of the 21st century made it possible to rationalize past experiences and to conceptualize the functions that were required for such incubators (Meyer & Wattiaux, 2006; Meyer, 2011). This conceptualization is derived from the socio-economic *actor-network theory* which postulates four operations for successful innovation processes (Latour, 2005): problematisation (convergence of meaning), mobilization (involvement of actors), enrolment (definition of the network) and interessment (consolidation of the link). These have been transposed into four operational functions, which were tested during the project entitled Incubators of Knowledge Diasporas for Latin America (Cidesal).

The first consisted of finding the actors, in the first place the active members of the diaspora. New techniques of semi-automatic research were developed to identify and locate them. Here it was a question of overtaking the traditional methods of location and storage in under-utilized databases, as previous experiences had revealed (Caldas, SANSA, MIDA, etc.). Very often they affected only a fraction of the expatriate populations, those who had already been incorporated within the ambit of associational and diplomatic communities. The data collected by these traditional methods rapidly became outdated because of the relative volatility of the diaspora. In contrast, the instruments being used currently aim at continuous and more detailed updating of information.[9]

The second function was concerned with the area of communications. It was necessary to get in touch with the expatriates and to convince them to join in reinsertion efforts. This exercise could not be undertaken in a massive and indiscriminate way but rather with the involvement of the actors at an early stage in the definition of the kinds of relationship that they intended to have with their partners. The tools used enabled this introduction which was both broad and specific. Platforms of digital exchange offered places where these first links could be established.[10]

The third function is not wholly distinguishable from the preceding one. It was that of constructed interaction through individual and targeted partnerships. The detailed description of the skills of the diasporas, which is possible today, makes it possible to match them to the specific requests or projects of the country and of its communities.[11] To do so, it is necessary to organize these projects and requests. The constitution of strategic alliances in the home country to bring about the conformity of actions with the diaspora could also be achieved through digital platforms.[12]

9 Chapter 2 and chapter 8.
10 Chapter 7.
11 Chapter 8.
12 Chapter 7.

Finally, the last function is that of sustainable involvement of the actors in a productive or simply creative relationship. The engagement of expatriates for their home countries is not easy because they have, by their position abroad, already been captured by many other networks, in particular those from highly knowledge intensive regions where they pursue their main activities.[13] The challenge is thus of stabilizing their interests for engagement with their home countries by the countries showing commitments towards their diasporas.. Symbolic or substantial incentives and compensations, national programmes ostensibly promoting their participation and facilitating their working remotely, offering comparable and even better conditions or benefits compared with person what are offered to individuals, are some of the options that constitute possibilities of sustainably engaging these much sought after human resource communities.[14] The host countries also have an important role to play in these efforts, in fueling these dynamics from which they too can benefit, by partially allowing and encouraging their highly qualified immigrants for engaging in collaborative projects, particularly by reinforcing their infrastructures of better communication and interaction.[15]

Principles and outlooks

People of the diasporas are not subjects who can be governed as an extra-territorial extension of the national population. They form a civil society with several allegiances which, as a result, requires a special kind of governance founded on several unique principles.

The first is that of pluralism. Diasporas are heterogeneous and have multiple identity-based affiliations which cannot be reduced to a monolithic representation. Their contacts in the home countries should also be pluralistic for projects which are naturally diverse and varied. Experience has showed that any attempt at bureaucratic monopolization of the diaspora fails rapidly.

The second principle is that of horizontality. The world of knowledge is essentially that of peers, of equals, among whom relationships are not hierarchical. This form of relationship is favorable for reactive exchanges on complex themes. The collegiality between the diaspora and the home community deserves to be maintained and cultivated.

A third principle resides in the idea of flexibility. The geographic as well as professional and social mobility of actors is important. Their roles should be able to evolve and the networks integrate these changes. We observed, for example, that the proponents of cooperation are very often circular migrants, that is, people who were part of the diaspora and then returned and could eventually leave again.

13 Chapter 6.
14 Chapter 4.
15 Chapter 3.

There are two ways to apply these three principles and make them work: organization on the one hand and technology on the other. The constitution of a multipartite structure where actors and representatives of diasporas and home communities can operate forms part of the first. Installing platforms for remote multilateral interactive exchanges belongs to the second. To set up tools that converge towards these two modes – that are often combined – the contribution of the host and home countries is a determinant. This articulation of organizational and technological options for the development of new entities, that is the contemporary diasporas, is a technopolicy approach. It is the combination of tools provided by programs in the digital humanities and a transnational governance founded on the participation and empowerment of non-state actors which can enable this development and shape these new world relationships.

References

Latour, B. (2005). *Reassembling the social: an introduction to actor-network theory*. Oxford-New York: Oxford University Press.

Meyer, J.-B. (2011). "A Sociology of Diaspora Knowledge Networks". In: Faist, T.; Fauser, M. & Kivisto, P. (eds.). *The Migration-Debelopment Nexus, a Transnational Perspective.* Basingtoke: Palgrave-Mac Millan.

Meyer, J.-B. & Wattiaux, J. P. (2006). "Diaspora Knowledge Networks: Vanishing Doubts and Increasing Evidence". *International Journal on Multicultural Societies*, 8 (1).

Today, the diaspora appears as a possible asset, for many countries' development. In this vision, reconnection with high skilled expatriate human resources has acquired a particular momentum. However, this focus outside of the national territory suffers from a lack of tools to translate itself into a tangible contact and actual mobilization. Devices for a fertile and expanding nexus with the diaspora do exist though. This book reveals the experimental works and reflections attempted in this direction. It provides active and concrete thinking about how this step of globalization can be sustained with decisive and appropriate measures.

UNIVERSIDAD
DE LA REPÚBLICA
URUGUAY