" Transnationalism and diaspora resources having an impact on development in the homelands[1]"

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Introduction

Within the current context of globalisation, transnationalism has taken on an importance that shows the value of diasporas' own decentralised mechanisms in promoting development in their countries of origin. In particular, scientific diasporas that bring skilled migrants[2] together have the potential to benefit science and technology as well as socioeconomic development in their countries of origin to a greater extent than the traditional institutional set-up. Brain drain and the growing knowledge gap in the world lend legitimacy to these innovative forms of knowledge transfer, brought about by the collective as well as the individual strategies of the new transnational identities of non-state actors.

Although migration and development are high on the international political agenda today, there is a shortage of data on diasporas in the host countries as well as a lack of information on their transnational practices and the impact on the development of their homelands. Of the different types of diasporas, scientific diasporas play a key role as agents of development, given the fact that knowledge is recognised as a core catalyst for progress and for reducing poverty (Tindemans, 2006) (UNESCO, 2006a).

This paper examines the transnational practices of scientific diasporas from developing countries who live in Switzerland and have been set up to reinforce science,

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[2] Since the paper is based on research done in the country of destination, the terms "migrants" and "immigrants" are used interchangeably here.

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technology and socio-economic development in the home countries. Based on field work carried out in 2006 and 2007 that traced skilled Colombians, Indians and South Africans in Switzerland, this paper explores the migration determinants, the migrants' living conditions and the characteristics of their daily lives, highlighting the transnational initiatives and the so-called "giving back" practices that they have adopted towards their homelands. While showing the great value of their practices and initiatives, the paper provides evidence of the favourable conditions and obstacles, both in host and home countries, which enable or hinder their transnational initiatives. The paper compares data from different case study countries to show that migrants' ability to mobilise and engage in collective action for the benefit of their country of origin depends on an array of factors, including motivation, migration determinants, the social situation and conditions in country of origin prior to migration, and their social resources and class position in the host country, as well as an enabling environment. The paper addresses how these factors interact to gain an understanding of migrants' identities, their feeling of integration in the host country and their transnational endeavours towards their homeland. Finally, the paper identifies good practices and provides policy recommendations to deepen and enhance the transnational initiatives of diasporas in a way that will allow them to have a positive and sustainable impact in developing countries.

The paper is structured as follows. After a first part introducing transnational communities and diasporas as examples of new forms of identity and of social actors outside the traditional institutional framework, I provide an overview of Switzerland as an increasingly important destination for skilled migration. Subsequently, I present the objectives and methodology of the research project on scientific diasporas and highlight the relevance of the three countries that were selected for this study. I then present the empirical analysis of the migration determinants and living conditions in the host country, before highlighting the links between migrants' integration, their transnational identity and their endeavours for the benefit of their homeland. A further section emphasises individual motivation and collective action as core factors that make scientific diasporas a possible factor in development. The last part provides evidence of how migration influences development, specifically in terms of poverty reduction, by presenting concrete brain gain and transnational practices from the three case study countries. The paper concludes with a discussion of the main findings and their policy implications.

Transnational communities and diasporas surplanting nation-states

The expansion of globalisation has encouraged increasing movements of people as well as to transnationalism being recognised as a new form of identity and of social action; this has placed international migration and development high on the political agenda. The emergence of new strategies of social mobility through the deployment of migrants' resources, organised collectively through migrants' associations or simply due to individual aspirations, has led to recognition of how important transnational communities are in the modern world. As Vertovec (2004) stated, migrants' transnational practices are stimulated and fostered by globalisation, and their cumulative effect is in turn to intensify transformative global processes. One of the most significant implications of this is that nation-states have been losing power as the principal organiser of collective life and as bearers and creators of national identities (Castells, 1996).

The concept of transnationalism (Vertovec, 1999, 2004) (Basch et al., 1994) (Portes et al., 2005) refers to an imagery of a permanent back-and-forth shuttle, in which migrants build their daily lives in two or more societies and cultures at the same time. Therefore, as

Vertovec (1999) highlights, it is a kind of social transformation that spans borders. From this perspective, transnationalism underscores the fact that migrants have a sense of belonging to various countries and thus straddle the boundaries of the nation-state (Glick Schiller et al., 1999). Repeated evocation of the "here" and "there" shows the multiple ways in which migrants are linked to their country of origin while also participating in the daily life of the host country, challenging traditional assumptions that migration involves a gradual process of assimilation and acculturation into the host society.

As examples of transnational communities, diasporas emerge as significant precursors of the surplanting of the nation-state (Basch et al., 1994) (Vertovec, 2004) (Meyer, 2001). Their activities and practices, as well as their mere identities, design an international deterritorialised space and demonstrate the value of their own decentralised mechanisms in promoting development in their countries of origin. The validity of the concept of diasporas is explained by Bordes-Benayoun and Schnapper (2006) as being the value of solidarity encompassed, as well as by the alternative it claims to offer through the affirmation of collective identities across national barriers. Caloz-Tschopp (forthcoming) reminds us that discussions on diasporas reveal a persistent tension between dispersion, new forms of political organisation, and the role of diasporas in international relations, and highlights those approaches that situate diasporas outside the state but inside the nation. While many issues regarding the concept of diasporas remain unresolved, there have been further attempts to clarify the term.

Vertovec (1999) describes diasporas as a social entity shaped by a triadic relationship made up of globally dispersed yet collectively self-identified ethnic groups, the territorial states and contexts where such groups reside, and the homeland states and environments where they or their families come from. Similarly, Bordes-Benayoun (2002) describes a triangular relationship involving the country of origin, the diaspora itself and the host country. The author highlights social dispersion, cultural spread and diverse forms of identities, and integration and relationships with others as some of the main characteristics of diasporas. Cohen (1997) highlights the capacity of diasporas to make valuable and creative contributions to the country of residence and to the country of origin, as well as pointing out their sense of community and solidarity with members of the same ethnic group who also live in the diaspora's physical location.

In particular, scientific diasporas that bring skilled migrants together have the potential to benefit science and technology as well as socioeconomic development in their regions of origin to a greater extent than the traditional institutional set-up. According to Barré et al. (2003), scientific diasporas represent a self-organised community of immigrant scientists and engineers living in developed countries and working to have an impact on development in their country of origin, particularly in the realms of science, technology and education. Brain drain and the growing knowledge gap in the world are behind these innovative forms of knowledge transfer that operate by the collective as well as individual strategies of the new transnational identities of autonomous subjects (Castells, 1997), and provide evidence of the need to explore transnational practices of skilled migrants as a policy option to support development.

Switzerland: an important destination for skilled migrants

Switzerland has long been a country with a high immigration rate. Some 22.4 per cent of the total Swiss population of 7.4 million inhabitants are foreign-born, while 20.5 per cent are people of foreign nationality (Kaya, 2005). Similarly, according to the International Organization for Migration (IOM, 2005), in 2000 Switzerland was ranked 20th in the world for

countries hosting the largest number of international migrants; its 1.8 million migrants represented 1.0% of the world's total. In 2005, the country was third in the list of OECD countries with the highest prevalence of foreign-born people (OECD, 2007)[3]. Today, Switzerland is also an increasingly important destination for skilled migrants (IOM, 2005); following a worldwide trend of student mobility that has increased spectacularly since the beginning of the 21st century[4] (UNESCO, 2006b), it is an important destination for international students (OECD, 2007), most of whom are enrolled on advanced research programmes[5].

Among OECD countries, Switzerland is, after Luxembourg, the country that is most dependent on immigrant labour, with immigrant share of the workforce close to 25% (Becker et al., 2008). Recent Swiss labour market data shows how the nature of migration flows has evolved in recent years, shifting from a low-skilled labour force towards a highly skilled one (Pecoraro, 2004, 2005)[6]. In a recent study, Becker et al. (2008) point out that the selective immigration policies of the "three circle model"[7] introduced in 1991 and the "two circle model"[8] which replaced it in 1998 led to a significant increase in the share of skilled immigrants over the last few years[9]. Similarly, Pecoraro and Fibbi (forthcoming) assert that the transition to a knowledge-based economy, along with the selective admission policies of Swiss immigration legislation based on selection by skill level and nationality, might have contributed to today's migrant flows being better qualified than before. It is obvious that Switzerland's geographical location within Europe plays a significant role in attracting skilled labour from European Union (EU) countries. Accordingly, Pecoraro and Fibbi (forthcoming) show how, in 2000, around 75% of the total of skilled migrants in Switzerland came from the EU prior to enlargement and the EFTA countries, while only 15% were non-European citizens of developed countries; migrants from developing countries accounted for less than 10% of all skilled migrants. All of these facts and data provide evidence that Switzerland is an important destination for skilled migrants.

Up to now, there has scarcely been any research in Switzerland on the topic of skilled migrants from developing countries, and the potential of scientific diasporas has not been fully addressed either. Although the share of skilled migrants from developing countries does not seem to be significant, the issue is still important since the exodus of skilled migrants from developing countries to industrialised countries is a major dilemma. Due to the limited availability of human capital, it has become imperative that developing countries try to recover the valuable resources of skilled nationals who have settled abroad. There is therefore a need for supporting evidence regarding the position of skilled migrants from

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[3] After Luxembourg and Australia and just above Canada and New Zealand, which are all "mature" immigrant countries (OECD, 2007).

[4] The Institute of Statistics of UNESCO shows how, in 2004, more than 2,5 million students studied outside their country of origin, representing an increase of 41% in five years (in 1999, there was a total of 1.75 million international students worldwide) (UNESCO, 2006b).

[5] According to OECD data, international students in OECD countries enrol even more frequently on advanced research programmes than on regular university programmes. In Switzerland, more than 40% of those on such programmes are international students, a high percentage that is rivalled only by the situation in the United Kingdom (38.6%). Indeed, international students represented 12.7% of all enrolments in tertiary education in Switzerland in 2004, while 42.5% of all persons in advanced research programmes were international students (OECD, 2007).

[6] Traditionally, workers' education attainment is what defines them as high or low skilled, the highly skilled being those who have reached tertiary education. A further, widely used definition of "highly skilled" is the one used by OECD in its Canberra Manual (1995), which defines a highly skilled labour force as having either completed tertiary education or being employed in an occupation related to science & technology.

[7] According to the "three circles model" the Swiss government introduced in 1991, immigrants from the European Economic Area had preferential status (first circle). If demand for labour could not be satisfied by immigrants from these countries, workers from the United States, Canada, Australia and New Zealand could be recruited (second circle). All other countries formed the third circle.

[8] The "two circles model" or *dual system* (Becker et al., 2008) introduced in 1998 replaced the "three circles model" by a classification that only differentiated between European Union / European Free Trade Association countries and all others.

[9] Their study on *the Swiss migration policy and industrial structure* provides evidence leading to the conclusion that the current admissions policy has made a positive contribution to structural change in Switzerland (Becker et al., 2008).

developing countries, and their living conditions and experiences in Switzerland, as well as information on their transnational endeavours for the benefit of their countries of origin. Such evidence is essential if public policies are to aim to engage with their diasporas to encourage development.

Project background and methodology

With an objective of filling some of these gaps and recognising the importance of today's migrants' transnationalism, the project "A Swiss Network of Scientific Diasporas to Enforce the Role of Highly Skilled Migrants as Partners in Development"[10] aimed at providing a better understanding of the potential of skilled migrants from developing countries living in Switzerland to favour development in their countries of origin through *brain gain* mechanisms, social remittances (Levitt, 1996, 1999) and other decentralised transnational practices by scientific diasporas.

Using qualitative methods, the research traced skilled Colombians, Indians and South Africans during 2006 and 2007 in different Swiss cities that had a high population of foreign citizens[11]. Using the term *skilled* as defined by the Canberra Manual (OECD, 1995), the sample included persons who had completed tertiary education or who were working in science and technology. Respondents represent a cross-section including professionals in diverse sectors as well as students and researchers in various fields, of different socio-economic backgrounds, ages and gender. Four categories were established among the respondents: 1) scientists, post-doctoral researchers and PhD students at academic and research institutes; 2) staff working in international organisations; 3) managers and consultants working in private industry; 4) professionals in governmental institutions. The research followed a gender perspective, highlighting specific conditions and circumstances faced by female skilled migrants.

In total, seventy-six (76) skilled migrants participated in our study: 27 Colombians (15 women and 12 men), 23 Indians (9 women and 14 men), and 26 South Africans (10 women and 16 men). During face-to-face interviews, participants were asked open-ended semi-structured questions, which allowed us to gain a better understanding of the conditions, practices and perceptions of skilled migrants with regard to three areas: 1) their migration trajectories and living conditions; 2) their links with their home countries and the *brain gain* mechanisms and strategies they adopted; and 3) good scientific and development policies and practices to support skilled migrants as development partners.

The research laid emphasis on the generation of primary data, which was then analysed on a country-specific basis to construct three case studies: Colombian, Indian and South African (Tejada and Bolay (eds), forthcoming).

Three case study countries: Colombia, India and South Africa

The three case study countries are good examples, due to the dynamism of their skilled migrants, and scientific and professional diasporas around the world, and their significant brain gain experiences, as well as for the presence of their skilled nationals in the

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[10] The project was directed by the Cooperation@epfl unit at the EPFL and was carried out in collaboration with the International Labour Office (ILO), the University of Geneva (UNIGE), and the Swiss Forum for Migration and Population Studies (SFM), with financial support from the Geneva International Academic Network (GIAN).
[11] The interviews were conducted mainly in Geneva and Lausanne and to a lesser extent in Zurich, Basle and Berne. These cities are in the cantons with the highest populations of foreign citizens.

Swiss labour market. Accordingly, the Swiss Population Census data for 2000 shows that 79.5% of Indian nationals, 73.1% of South Africans and 45.8% of Colombians in Switzerland are highly skilled (Table 1). This source proves that migration from India and South Africa to Switzerland is becoming increasingly qualified over time, given that recent migration data shows that 83.6% of Indians and 78.7% of South Africans who arrived in Switzerland after 1995 are highly qualified. Recent migration from Colombia to Switzerland is becoming less qualified over time, since 41.3% of Colombian who arrived after 1995 are highly skilled. However, in the Colombian case, the gender dimension is very significant as there is an upward trend in the proportion of women among highly skilled Colombians living in Switzerland: 56.5% of highly skilled Colombians in Switzerland are women, while 63.3% of highly skilled Colombians arriving in Switzerland after 1995 are women. These data are indicative of the possible trend at the end of the 20th century.

Table 1. Distribution of the migrant labour force in Switzerland by origin

	Migrant population		Recent migrants*	
	Proportion of highly skilled	Total	Proportion of highly skilled	Total
Sub-Saharan Africa				
Ethiopia	20.4	1036	13.8	487
Angola	15.2	1653	7.0	449
Ivory Coast	28.1	438	24.1	259
Cameroon	26.9	992	24.8	585
Kenya	22.8	576	20.9	270
Congo (Kinshasa)	35.5	1939	32.8	590
Nigeria	37.9	737	35.7	419
Senegal	37.6	514	32.9	281
Somalia	13.2	1375	8.7	490
South Africa	73.1	629	78.7	424
Latin America				
Argentina	61.2	759	64.3	311
Brazil	32.7	4546	31.9	2546
Chile	33.2	2428	46.0	280
Ecuador	38.5	550	38.5	337
Colombia	45.8	1508	41.3	894
Mexico	69.0	607	71.9	346
Peru	46.8	1604	40.9	637
Asia				
China	61.7	2527	65.4	1257
India	79.5	2923	83.6	1227

Source : data from Swiss Population Census 2000.
*Men aged 15-65; women aged 15-60; human resources defined according to the Canberra Manual (OECD, 1995); * Recent migrants correspond to migrants who arrived in Switzerland after 1995; this table considers only those countries whose recent migrants are > 250 persons; countries highlighted in grey are those whose migrants to Switzerland are growing more skilled over time; the others are countries whose migrants to Switzerland are growing less skilled over time.*
This table was prepared by M. Pecoraro from Swiss Forum for Migration and Population Studies.

Additionally, all three countries maintain ongoing scientific dialogue with Switzerland. Swiss bilateral scientific collaboration is especially advanced with India and South Africa. Both countries have an institutional framework supporting science and technology exchanges with Switzerland, given that both are priority countries under the current bilateral cooperation strategy of the Swiss State Secretariat for Education and Research (SER), which uses various instruments to guide and promote collaboration[12]. At the other extreme, there is no existing institutional framework for scientific exchanges between Switzerland and Colombia despite the fact that there are many collaboration initiatives that have been systematically established on a bottom-up basis over the past two decades. Most of these have been promoted by members of the Colombian scientific diaspora and have persisted thanks to the commitment of Colombian scientists without any systematic institutional or financial support.

Colombia, India and South Africa have put mechanisms in place to try to capitalise on the resources of their diasporas. For example, the Indian diaspora has played a significant role in backing up socioeconomic development in India. Some estimations show that skilled Indian expatriates living mainly in the USA and active in the information and communication technologies (IT) sector facilitated one third of all the foreign investment in India during the 1990s (Tarifica Ph. Ltd., 1998). In fact, the Indian experience has been recognised as a significant example for the world; beyond poverty reduction, the diaspora has created a development model which could potentially be replicated by other developing countries threatened by brain drain (Khadria, 1999, 2001) (Saxenian, 2000). Moreover, with the creation of the Ministry of Overseas Indian Affairs, and the Scientists and Technologists of Indian Origin Based Abroad (STIOs), the Indian government has incentivized its nationals abroad creating investment opportunities[13].

Colombia was the first country to put the idea of the *scientific diaspora option* into practice systematically through the creation of electronic networks of scientists abroad (Meyer, 2001) (Barré et al., 2003). Based on collective action, the *scientific diaspora option* seeks to recover the resources and skills of emigrated human capital. Indeed, for many years the Caldas Network (Charum and Meyer, 1998) (Charum et al., 1997) was regarded as the most advanced version of this brain gain strategy and was followed by initiatives from other countries such as Argentina, Chile or Venezuela in Latin America, India and Korea in Asia, and even South Africa in sub-Saharan Africa. The technical and human structure that made the Caldas Network possible, celebrating its rise and then lamenting its unfortunate fall, had its origins in Switzerland. Despite the lack of sustained support due to flaws in Colombia's science and technology policy, this structure continues to work in a dynamic way through associative action, working mainly under the aegis of the Association of Colombian Researchers in Switzerland (ACIS).

South Africa has also mobilised its efforts in trying to recover the skills of its human resources abroad, both for individual countries and also with regional initiatives. The country was appointed by the African Union to spearhead the process of developing a shared vision for sustainable development in Africa and incorporating the contributions of the diaspora as Africa's sixth economic region. South Africa is also involved in efforts by the New Partnership

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[12] In Switzerland, the SER is responsible for defining the objectives, principles and instruments of scientific cooperation. In the current phase 2008-2011, both South Africa and India belong to the group of priority countries for bilateral scientific cooperation, together with China and Russia, as well as Japan, South Korea, Chile and Brazil. The most important mechanisms of cooperation with India and South Africa are the scientific and technological cooperation agreements, as well as the establishment of leading houses which coordinate these collaborations.

[13] The STIOs is an internet-based network hosted by the Indian government, which seeks to mobilise overseas talent and expertise and help ensure that this knowledge contributes to Indian development. The members of this network come from a wide range of industries, research institutes, laboratories, universities and businesses, and interact with counterparts in the home country (http://stio.nic.in)

for Africa's Development (NEPAD)[14] to harness the diaspora for development. NEPAD endeavours to develop strategies to utilise the scientific and technological know-how and skills of Africans in the diaspora for the development of the continent. Moreover, the creation of the South African Network of Skills Abroad (SANSA Network)[15] has been a example to the world of a strategy to mobilise diaspora resources to benefit South Africa, linking them with business opportunities and cooperation projects in the academic, cultural and commercial fields[16]. In addition, South Africa has recently increased its efforts to promote the return of its skilled nationals from abroad (Bhorat et al., 2002).

In the implementation of these and other similar initiatives, it has been shown that the role of the migrants themselves, their dynamism, creativity, affective capital and motivation, together with their strategic value as transnational individuals, are key elements that encourage brain gain and "giving back" practices. The following sections present empirical evidence from the three case studies of Colombian, Indian and South African skilled migrants in Switzerland, highlighting their transnational initiatives and practices, and their impact in the home countries.

Migration determinants and living conditions in the host country

The Colombian, Indian and South African diaspora each provide a contrasting view of the motivations and incentives for migration. However, a number of comparisons can be drawn between the three countries studied. With regard to migration pull factors, the respondents from the three countries indicated a mixture of reasons for emigrating. These included professional opportunities and professional relocation, higher wages, and further studies and a scientific career at renowned research and academic institutes. The testimonies of skilled migrants give evidence of Switzerland's attractiveness as a place with internationally prestigious scientific and technological research institutes. An Indian postdoctoral fellow at the ETHZ commented, *"After finishing my PhD, I wanted to come to Zurich. Zurich is internationally renowned because of its Nobel prize winners".* An Indian PhD student in Communication Systems at the EPFL asserted*, "EPFL is the best in Europe in this field. I got a referral from the place where I was working in India".* Similarly, a Masters student at the University of Berne said that she left South Africa *"motivated by the opportunity to study in a state-of-the-art institution with laboratories and infrastructure that do not exist in South Africa".*

The strong aspirations and migrants' own willingness to advance are important reasons for migration among the highly skilled. As Khadria (2004) reveals in his study on the migration of skilled Indian IT and health professionals, these people have strong desires to get to *"greener pastures"* (p. 9). A Colombian postdoctoral student mentioned: *"I came because of my intense passion for science and professional and scientific achievement, and the fact that at a high research level there was no PhD in Colombia in my field".* The evidence shows how, unlike unskilled workers, skilled migrants can indeed move more easily and have more choices. Many respondents from the three countries mentioned that their migration routes included a stay in other countries before they settled in Switzerland. Indeed, skilled mobility is intrinsic to the scientific world (Meyer et al., 2001) and it can encourage the advancement of scientific standards in the home countries. A Colombian lecturer at EPFL

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[14] http://www.nepad.org/2005/files/documents/inbrief.pdf
[15] http://sansa.nrf.ac.za/
[16] SANSA currently works as a database and networking tool, and is one of the main virtual communities of the Information Services and Advice Unit at the South African National Research Foundation.

asserted, *"Exposure to the international arena is basic for scientific and personal advancement, as well as for the development of scientific capacities in Colombia".*

Some respondents from India and Colombia - and South Africa to a lesser extent - emigrated with the help of institutional exchange programs and bilateral scientific research opportunities. A postdoctoral fellow at the ETHZ, mentioned: "*I came through the Indo Swiss Collaboration in Biotechnology Programme (ISCB). One of the ISCB researchers, my supervisor and part of the ISCB team took my application. I get very good salary and have a good fellowship. That's why I left India".* In the Colombian case, scholarship programmes from both Swiss and Colombian institutions have played a key role in opening up possibilities for Colombians to pursue their studies abroad. One third of Colombian respondents came to pursue their studies and research with the support of scholarships[17].

Another significant factor was family reunification and marriage, which is mainly a migration determinant for women. A female Indian PhD and Lecturer in Psychology asserted, *"I followed my husband - there was no choice. He was first posted to the Indian mission and then was hired by the United Nations".* Moreover, the research gives evidence of the interplay of gender dimensions in the migration determinants as well as of the complex mêlée of motivations behind migration, including circular migration involving temporary return to the country of origin. The testimony of a female Colombian Senior Post doc illustrates this, *"After a first short stay in Switzerland due to my husband's scientific career, I went back to Colombia with my children to finish my studies there and then came back to Switzerland. (…) I started a PhD thanks to a special scholarship programme from the Swiss Confederation for women who, like me, were taking a professional break to be with their children. This scholarship financed my PhD."* The Colombian case validates what the studies of Riaño (2003) and Riaño and Baghdadi (2007) on female skilled migration prove since many Latin American women who arrive in Switzerland for marriage are indeed graduates.

The key push factors at play included the lack of a sense of security at home. In Colombia, conflict from civil wars, violence and insecurity provided the impetus for some to go abroad. Similarly, in South Africa, violence, a high crime rate and decreased security were significant push factors encouraging migrants to leave their homes. It was apparent that there were commonalities in the impetus to initiate migration. Marginalisation and social fragmentation were key incentives for some skilled South Africans. An engineer and entrepreneur said, "*I left South Africa due to the problems of apartheid. The resources and facilities for education were distributed unequally. I tried to escape from that situation".* Similarly, another South African engineer mentioned, "*I had the same preoccupations as many white South Africans had in the 1990s. How were things going to develop in South Africa? How would a white South African be able to position himself in an increasing environment of affirmative action? To what kind of scenario would be my children exposed if I decided to found a family?"* These testimonies confirm the studies of Bhorat et al. (2002) and Waller (2006), which show how affirmative action and marginalisation are a key determinant of skilled migration from South Africa[18]. Moreover, networks of professional and social contacts as well as scientific linkages can be determinant in the migration process. Respondents mentioned that some key informants (work colleagues, members of the diaspora, former lecturers or employers, as well as people encountered at international

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[17] The most common scholarships and funding institutions that have supported Colombians are: the International PhD Programme from the Swiss National Science Foundation (SNSF), the Marie Heim-Vögtlin Programme from the SNSF, the EPFL-SDC Fund, the ICETEX (Instituto Colombiano de Crédito Educativo y Estudios Técnicos en el Exterior), ESKAS (Eidgenössische Stipendienkommission für ausländische Studierende), Colfuturo, Colciencias, as well as scholarships from the French and the German governments and from the Max Planck Society.

[18] While in South Africa 72% of the skilled population is white and only 26% is black (Brown, 2003), the sample of respondents is an image of the skilled South African diaspora which is mainly white (Bhorat et al. 2002).

conferences) were their principal source of information on scholarship programmes, the possibilities of assistantships and scientist exchanges.

Migrants' living experiences in the host country are determined by diverse social, cultural, and economic, as well as human/personal circumstances and factors. In their first experiences in the host country, skilled migrants from the three countries encountered some obstacles as well as positive experiences. An analysis of their experiences and perceptions in this regard might provide some clues as to the interplay between integration and the development endeavours for the benefit of their countries of origin.

Encouraging elements that were mentioned by most of the respondents were the possibility to work in an excellent scientific and professional environment, and the Swiss quality of life. Skilled migrants' positive first experiences were facilitated by social and professional networks and support from friends and colleagues. There were visible differences about further encouraging elements in the first experiences of the skilled migrants of the three target countries. In the Colombian case, the collective action of the Association of Colombians Researchers in Switzerland (ACIS) plays a key role in the provision of contacts, social and professional linkages and institutionalised relationships. This shows how the associative actions of immigrants may play a significant role in enabling integration given that they have the potential to facilitate their access to social resources. In the Indian case, while the good reputation of both the Indian higher education system and the Indian institutes of technology is a comparative advantage that facilitates student and scientific mobility from India to Switzerland, this advantage also showed an additional benefit by facilitating their first experiences in the host country. Indian PhD students and postdoctoral researchers who stated they benefited from scholarships or appointments as assistants in Switzerland declared that they had moved there without any hindrances.

In contrast, non-recognition of diplomas, housing problems, adapting to the new culture, being away from their families, the high cost of living, discrimination and language barriers were some of the main difficulties faced by the skilled migrants from the three target countries. Specific gender-related obstacles such as discrimination do arise. An Indian physicist working at a state-of-the-art centre on nuclear physics asserted, *"Being a woman and coming from a developing country, you have to have an edge over every equally qualified European. I had to work double hard. That was the real challenge".* For most women with children, balancing their responsibilities as mothers and as professionals in Switzerland represents a great challenge, and most of them expressed their disagreement with society's assumption that women have to stay at home to look after their children. A Colombian women scientist said, *"Switzerland lives in a major paradox, since it is very developed in many issues but it is still very conservative in terms of the society's mentality towards working mothers".*

Integration and transnational identity: being in Switzerland while thinking of somewhere else?

For the skilled migrants, social integration in the host country depends on diverse factors such as social and economic conditions, friends and social relationships, having a job, getting used to social and cultural realities, as well as understanding the local language and speaking it better. Favell et al. (2006) assert that integration in the host countries may differ considerably in its patterns from the experiences of less skilled migrants. Indeed, the evidence of the experiences of the skilled migrants from the three target countries show how skilled migrants have more choices thanks to their class position and that these facilitate their integration in the host country. In fact, with the creation of a portrayal of skilled migrants as

"more able to integrate", the Swiss state discourse on foreigners introduces a differentiation between immigrants depending on their class (Riaño and Wastl-Walter, 2006).

In the everyday life of most of the respondents, their transnational identity is apparent. Most Indians follow a strategy to get used to life in Switzerland whilst simultaneously maintaining a "feeling of India". Similarly, a South African entrepreneur and engineer elaborated on his transnational sense of belonging by stating, *"I have transnational thinking and interests: I keep my foot here when I am here but I also feel part of, and being somehow in, South Africa everyday".* However, the depiction of foreigners as a threat to Swiss identity (Riaño and Wastl-Walter, 2006) and to national security troubled some respondents. A Colombian senior consultant in economics pointed out, *"Swiss migration discourse shows how many foreigners there are in the prisons, but it doesn't show how many there are in the universities".* A South African social activist mentioned, *"(…) As long as you have racism and discrimination you cannot truly say that you are integrated".*

A remarkable point that was observed is that long-term migrants and those who have settled permanently in Switzerland were the groups most in favour of having a dual sense of belonging or transnational identity. This shows that transnationalism is not a phenomenon associated with recent arrival that tends to vanish as part of an inevitable process of assimilation, as confirmed by the study of Guarnizo et al. (2003).

Individual motivation and collective action

In all three cases, brain gain and other transnational initiatives towards the homelands tended to be informal and based on individual motivation and personal aspirations. While the motivation to act is defined as the desire to enhance solidarity and collectively exert influence, the ability to mobilise refers to the presence of a sense of community (Esman, 1986) (Brinkherhoff, 2006). For Brinkherhoff (2006), the incentive of identity expression can be addressed through the formation of diaspora organisations, and reinforced through activity on behalf of the homeland.

As Séguin et al. (2006) declare, skilled migrants feel a moral responsibility to give something back to their countries of origin. The information on the three case study countries provides evidence of this since all of the respondents showed a dynamic and impassioned sense of motivation to contribute to the development of their countries of origin. *"I would love to do something for my homeland"* was an often-repeated phrase among respondents. A Colombian researcher and lecturer with an outstanding record of many scientific projects in collaboration with Colombian institutions said, *"My initiatives are based on a strong affective capital I have for Colombia and in a need to fulfil the feeling that I am giving something back because I am not there".*

Where the three countries differed was largely in their ability to mobilise based on their aspirations and desires. The Colombian respondents represent a structured group working at both the individual and collective levels through the Association of Colombian Researchers in Switzerland (ACIS) and aiming to enhance scientific and technological collaboration between Colombians in Switzerland and research institutes and universities at home. ACIS has initiated many projects without institutional support, fuelled simply by their inspiration and desire to create positive change. In fact, the research uncovered a history of more than 15 years of collaboration experiences between Colombian scientists in Switzerland and their counterparts in the home country based on personal initiatives, interests and strategies most of them brought together in ACIS by their sense of community. Colombian respondents highlighted the lack of policies and structures to support these

endeavours designed to benefit Colombia as well as the lack of a bilateral scientific and technological agreement as some of their main difficulties.

The majority of the South African respondents were not involved in any associations. However, some indicated marginal involvement with associations that organise social and cultural events including the South African Club of Suisse Romande and the Club of Friends of South Africa. For South Africa, the ability to mobilise is lacking due to cultural and social fractures among the diaspora population. An MA student mentioned that *"On the one hand we are all Africans when addressed here, but put us together and we are all different. (…) especially for a coloured person in Switzerland it is still difficult since the diaspora is either white or black and one still feels the racial tensions from the past"*. In fact, the South African diaspora in Switzerland is a highly diverse group driven by different aspirations for going abroad and dissimilar desires for their home country. Thus, skilled South Africans do not function as a collective whole, enacting instead individual and personally motivated activities on a sporadic basis. With a scientific and technological bilateral research programme between South Africa and Switzerland, and the implementation of pro-diaspora policies by the South African government including the promotion of return, an enabling environment for initiatives by the diaspora is provided.

Most of the Indian respondents also highlighted their involvement in social associations that endeavour to recreate a "feeling of India" through social and cultural activities, like the Indian Associations in Geneva and in Lausanne. The Indian Students Association Zurich (InSAZ) highlighted as a supporter of Indian students. Like the South African respondents, Indians lack a structured, overarching scientific body to coordinate scientific and technological development endeavours. The Indian respondents face different difficulties. For this skilled diaspora group, the ability to mobilise is somewhat lacking due to few collective structures to facilitate skilled diaspora action for development. Still, an enabling environment, comparable to the case of South Africa, does thrive in Switzerland thanks to existing academic research programmes and scientific and technological research agreements. Moreover, the major role of the Indian diaspora in the USA and the UK has encouraged the Indian government to intensify positive measures to capitalise on its diaspora resources. Accordingly, diverse pro-diaspora policies in India in addition to the economic growth of the country and encouragement of the scientific and technological sectors, are some of the determinants behind the desire of many skilled Indians, particularly most of the PhD and postdoctoral researchers interviewed, to return to their home country in the near future. One PhD student said, *"India is the best in computer sciences. The government is increasing salaries by 3 to 4 times to bring good people into research"*.

Can skilled migrants promote development in their countries of origin?

The project identified some brain gain mechanisms[19] (knowledge transfer through scientific diaspora networks and associations[20]; investment strategies in research and experimental development (R&D)[21]; and North-South scientific collaborations[22]) and social

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[19] Prior to the execution of the fieldwork research, the project team identified these three brain gain mechanisms, based on the fact that in different country case examples, they have had a positive impact on development and poverty reduction in the countries of origin, through a systematic use of knowledge, experiences and resources (for example, through the contribution they made to creating micro-enterprises and employment, scientific and technical co-operation, implementation of community development projects, creation of scientific and technological centres, attraction of investment for R&D, etc.).

[20] Cases in point of scientific diaspora networks are the Colombian Caldas Network (Charum and Meyer, 1998) (Charum et al., 1997) and the South African Network of Skills Abroad (SANSA) (Brown et al, 1999) (Brown, 2003).

[21] The best-known example is that of highly skilled Indian expatriates, mainly those active in the information and communication technologies (ICT) sector, who facilitated sustained foreign investment and created economic hubs like the one that resulted from the link between Silicon Valley and Bangalore.

remittances (Levitt, 1996, 1999) as the main transnational practices operating between Switzerland and the three target countries that have a great potential to strengthen science and technology, as well as socioeconomic development, in the country of origin. To identify the extent to which these mechanisms and other scientific diasporas' transnational decentralised practices and initiatives have been used and/or promoted by skilled Colombians, Indians and South Africans in Switzerland, the interviews focussed on the relations between the migrants and their country of origin, while also bearing in mind the professional contacts and exchanges of these migrants in Switzerland at an international level.

Initiatives and actions of skilled migrants towards their homelands provide evidence of how migration influences development and specifically poverty reduction. Respondents from all three countries indicated that they were engaged in some form of knowledge transfer, including giving lectures, scientific conferences or training sessions during visits to their countries of origin. Respondents also mentioned working with research and scientific institutes in their countries of origin. While Indian respondents discussed the creation of scientific and technological institutes and the facilitation of exchange programmes, the South African respondents mentioned their efforts to share business knowledge with compatriots back home and to establish university exchange programmes. The Colombian skilled migrants stressed the fundraising efforts that were being made to support local researchers, organisations and entrepreneurs.

Concerning R&D initiatives, some of the Colombian respondents' efforts focussed on technology transfer at an industrial level, although this had scant success due to lack of support. Skilled South African interviewees mentioned diverse initiatives including transfer of technology through a spin-off enterprise on the application of nanotechnology for medical diagnosis. The three countries are implementing various North-South research partnerships. In the case of Colombia, the scientific collaboration undertaken have strengthened specific research areas because of their contribution to the creation of a critical mass on the environment, information and communication technologies, and medicine areas. While South African scientists have initiated work on epidemiological modelling and analysis to inform government legislation on public health issues and academics are involved in student and lecturer exchange programmes, both South Africa and India benefit from Swiss bilateral research programmes, as they are priority countries for Swiss bilateral scientific cooperation efforts. Some major institutional North-South collaboration programmes stand out as promoters of scientific cooperation with Indian partners and facilitators of capacity building and R&D partnerships between Swiss and Indian institutions and private companies with an important socioeconomic relevance. These are: the Indo Swiss Collaboration in Biotechnology Programme (ISCB), which promotes bilateral scientific cooperation in the field of biotechnology and technology transfer, mainly in the agricultural and environmental areas[23]; and the Indo Swiss Joint Research Programme (ISJRP), which supports cutting-edge research that brings students and faculty from both countries together[24].

Various examples of social remittances and philanthropic initiatives in which respondents of the three countries are involved highlighted, for example: making donations for orphanages and support to vulnerable children; making donations to schools; providing support to social organisations; and linking up resources in Switzerland with entities in developing countries. Aid efforts in mitigating the aftermath of natural catastrophes were

[22] North-South scientific collaborations encourage research between developing and developed countries, promoting temporary exchanges, joint publications and giving skilled migrants from the South access to the knowledge, infrastructure and equipment of the North. This mechanism has the potential to act as a bridge for the circulation of knowledge, skills and other valuable resources to the mutual benefit of the North and the South.
[23] http://iscb.epfl.ch/
[24] http://indo-swiss.epfl.ch/

highlighted by Skilled Indians. In addition, since most Indians PhD students and postdoctoral researchers wish to return to India, and the return of human capital is seen as a great development tool (Cassarino, 2004) (Gent and Black, 2005) (Tani and Mahuteau, 2008), capacity development and capacity building, encouragement of S&T, and business and investment linkages are only some of the significant poverty reduction outcomes that they could produce. This ambition to return was not apparent among the Colombian or South African PhD students and researchers.

Those respondents that do not maintain any contact or exchanges with their homeland mentioned as the main reasons: lack of a network of scientific or professional contacts there; lack of interest from their counterparts in the homeland; lack of time; shortage of opportunities and lack of availability to work in private initiative; restrictions of the private sector due to confidentiality agreements; bureaucratic obstacles and also because of the need to establish themselves professionally before being in a position to collaborate.

The examples described here illustrate how scientific diasporas and skilled migrants can be assets for the country of origin, yet the appropriate structures and institutional support are essential. A greater recognition of their value is also necessary. As one Colombian professor pointed out, *"Diasporas on their own cannot do much without the active participation of governments. Diasporas contribute with the human element "here", but the human element "there" is also imperative. Up to now, only one-off things have been achieved, but there is no continuity; a sustainable bilateral strategy is missing. The diaspora is the starting point, but it does not represent anything on its own."*

Table 2 presents transnational practices initiated by or with the participation of respondents from the three target countries that can be highlighted as good practices. They vary in their scope and specific activities, but the common underlying theme is a desire to contribute to the development of one's country of origin, in particular by having an impact on poverty reduction.

Table 2: Transnational practices of skilled migrants for the benefit of their homelands

Name of the project	National diaspora group	Type of practice	Description	Impact in the homeland
Creation of the Centre of African Studies at the University of Basle.	South Africa	Knowledge transfer and circulation	Academic centre promoting research in collaboration with institutions and researchers in the homeland, as well as academic and scientific exchanges and training programmes in African studies.	Potential impact on science and technology in South Africa and on the development or encouragement of its local individual and institutional capacities.
Establishment of South African Centre of Epidemiological Modelling and Analysis (SACEMA), and the African Institute for Mathematical Sciences (AIMS).	South Africa	North-South scientific collaboration	SACEMA and AIMS promote research in mathematics and epidemiology and, in a practical way, the mathematical application to public health issues.	Promotion of the development or reinforcement of local individual and institutional capacities; influence in the design of public policy on public health; contribution to the resolution to local problems related to public health.

Name of the project	National diaspora group	Type of practice	Description	Impact in the homeland
Bilateral agreement on S&T between the South African Department of Science and Technology and the Swiss State Secretariat for Education and Research.	South Africa	Knowledge transfer and circulation and North-South scientific collaboration.	The agreement aims at increasing bilateral scientific and technological interaction through joint scientific research, cooperation programs, exchanges and seminars on the areas of public health and bio-medicine, biotechnology and nanotechnology, and human and social sciences.	Aims to have an impact on social and economic development by providing resources for joint science and technology projects of strategic relevance to both countries.
Creation of the KIIT School of Biotechnology at the KIIT University in Orissa.	India	Knowledge transfer and circulation	The objective of this institution is to provide knowledge and skills in biotechnology to Masters students in accordance with international standards.	Development and encouragement of local institutional and individual capacities and knowledge in the field of biotechnology in India mainly in Orissa; enhancement of scientific and technological institutes in India in the field of microbiology; encouragement of return of the human capital to the country of origin; creation of jobs; contribution to the creation of a critical mass in a key development area.
Establishment of the Indo-Swiss Collaboration in Biotechnology (ISCB)	India	North-South scientific collaboration and R&D	The ISCB establishes equitable research partnerships between Indian and Swiss institutes focussing on innovative technologies in agriculture and environmental research. It aims to develop products and biotechnological processes that have an impact on poverty reduction and the sustainable management of natural resources in India through the establishment of R&D partnerships with strong economic, social and ecological relevance.	Advances poverty reduction and socio economic development and also contributes to sustainable development through scientific and technological bilateral partnerships, capacity building and the development of products and biotechnological processes; creation of jobs and of economic growth through the R&D partnerships established between Swiss and Indian institutions and private companies.

Name of the project	National diaspora group	Type of practice	Description	Impact in the homeland
Creation of the Association of Colombian Researchers in Switzerland (ACIS).	Colombia	Scientific diaspora association	Skilled migrants association aimed at facilitating exchanges among scientists and researchers living in Switzerland interested in establishing professional links with Colombia; promoting, supporting and disseminating activities related to the scientific and technological development of Colombia; establishing and reinforcing links with national and international institutions.	Potential impact on science and technology in Colombia and on the development or encouragement of its local individual and institutional capacities through training and education, influence on public policies on science and technologies, exchanges and establishment of programmes and projects in the country's key development areas.
Establishment of the Cooperation Programme in the Environmen field between EPFL and UNIVALLE.	Colombia	North-South scientific collaboration	Cooperation programme aimed at making a contribution to solve Colombian environmental problems through the launch cooperation projects between EPFL and Colombian institutions.	Creation of a critical mass in a key development area; reinforcement of the scientific capacity of Colombian institutions and researchers through courses, seminars, diverse exchanges, training and research[25].
Diverse	South Africa, India and Colombia.	Social remittances	Donations for orphanages, philanthropic activities, support to social organisations.	Contribution to poverty reduction in underprivileged social sectors.

Conclusions

Focussing on the current international debate on migration and development, the purpose of this paper was to show the innovative, decentralised transnational practices of skilled migrants from Colombia, India and South Africa in one country of destination, Switzerland, that have promoted poverty reduction in their home countries. Switzerland has experienced a substantial increase in the proportion of skilled immigrants over the last few years, while its internationally renowned scientific and technological research institutes as well as its hosting the headquarters of international institutions and private companies attract scientists and professionals from all over the world.

Considering knowledge as a core catalyst in the struggle against poverty, the paper provides a better understanding of the potential of skilled migrants from developing countries living abroad to foster development in their countries of origin through brain gain

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[25] This programme has achieved its objectives through 17 PhDs and Post Docs, 19 MA Diplomas, 5 undergraduate studies, 25 trainings, and the publication of more than 50 papers in international scientific journals and congresses, which have confirmed the value of its scientific and social achievements.

mechanisms, social remittances and other transnational practices. It provides knowledge-based evidence with regard to migration trajectories and migrants' living conditions in the host country by building up a sociological portrait of skilled migrants from the three target countries and explores the favourable conditions as well as the obstacles they encounter as they seek to implement initiatives intended to benefit their homelands.

The paper provides proof of skilled migrants' motivations and the ability to mobilise as key factors enabling transnational practices. Additionally, opportunity structures, access to infrastructure and institutional support - for Brinkherhoff (2006) all elements of an enabling environment - are necessary to create a helpful atmosphere to recover the resources present in the diaspora in an effective manner.

The empirical analysis of skilled migrants from Colombia, India and South Africa in Switzerland leads us to the following conclusions. 1) Long-term migrants and those who have settled permanently in the host country are those who feel a dual sense of belonging or transnational identity most. As such, we can conclude that transnationalism is not a phenomenon associated with recent arrival that tends to vanish as part of an inevitable process of assimilation, as confirmed by the study of Guarnizo et al. (2003). 2) The associative and collective actions of immigrants enable integration since they have the potential to encourage their access to social resources, as confirmed by Riaño and Baghdadi (2007). 3) Motivation, the ability to mobilise and an enabling environment are three key determinants of the extent to which a diaspora contributes to its home country, as anticipated by Brinkherhoff (2006). 4) The presence of a sense of community as part of migrants' identities and intensive interactions facilitate their ability to mobilise. This enabling mechanism is a prerequisite for diasporas to be able to contribute to their country of origin (Dutton and Lin, 2001). 5) Migrants' ability to mobilise and carry out collective action for the benefit of their country of origin depends on an array of factors including motivation, a common project, migration determinants, and their social situation and conditions in the country of origin prior to migration, as well as their social resources and class position in the host country. 6) Skilled migrants have more choices thanks to their more favourable class position in the host country, which in a way, facilitate their integration. Thus, integration in the host countries may follow a very different pattern from the experiences of less skilled migrants, as stated by Favell et al. (2006). 7) The diverse transnational practices of skilled migrants offer proof of their broad vision of development that includes encouraging science and technology and capacity building, promoting business opportunities and investment links, philanthropy and other similar socioeconomic poverty reduction actions in their homeland.

Additional studies on diasporas should explore these assertions further. Similarly, more in-depth, knowledge-based evidence about the interplay of motivation, migration determinants, social situation and conditions of skilled migrants in their country of origin prior to migration, as well as the social resources and class position in the host country, will help to create policies that could enable the assets of the diasporas to have some sustainable impact on the development of their homeland. Moreover, a deeper understanding of the perceptions, expectations and concerns of the skilled migrants concerning their country of origin and their country of residence on issues such as scientific and technological research, the economic and social situation, migration and integration policies, and bilateral cooperation can be of great importance.

The findings and conclusions of this paper have significant implications at policy level both in the countries of destination and the countries of origin. In the host country, it is necessary to make more information available about the position, activities, strategies and resources of skilled migrants from developing countries in order to show their value and potential, and to reinforce their class position. Further research into this topic should be

encouraged and supported. Both countries of origin and countries of destination should encourage the involvement of scientific diasporas in policymaking by appointing them as scientific and professional advisors and enhancing cooperation with Swiss scientific and academic entities. They should also encourage the establishment/creation of migrants' associations and networks to facilitate and promote collective action and assist them in the dissemination of good practice and activities to help motivate further initiatives by diasporas. Finally, only a suitable environment in the home country will make it possible to engage diasporas in local scientific and technological progress and socio-economic development.

To fully complement this study, it is of fundamental importance to carry out an analysis of skilled migration from the perspective of the country of origin in order to gain a better understanding of the risks and opportunities of the emigration of human capital. Accordingly, there is a need on the one hand for further research into good policies that reinforce and promote the development of skills at home (in developing countries) and, on the other, to encourage the knowledge transfer of skills abroad.

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