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THE ROLE OF MIGRATION IN RE-STRUCTURING INNOVATION SYSTEMS

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OF STEREOTYPES AND BANDWAGONS IN MIGRATION OF THE HIGHLY SKILLED

Generically speaking, the developing countries' losses arising from international migration of their highly skilled educated workers and tertiary-level students to the developed countries (popularly called the 'brain drain') are of two categories, viz., (i) loss of scarce resources invested in human capital formation (i.e., of inputs - costs and subsidies going into education and health of the workforce), and (ii) loss of essential skills produced (i.e., of output - the educated workforce and its enhanced productivity).[1] On the other side of the debate, three stereotypes of benefits arising to the developing countries of migrants' origin have been highlighted to establish that the unequal exchange is after all in favour of the developing countries: (a) Remittances, (b) Return migration, and (c) Transfer of technology.[2] Strangely, the benefits derived by the receiving countries are not being talked about at any meaningful length, but their costs in terms of cultural dilutions arising from allegedly slow integration of the foreign population have received lot more attention in the policy circles.[3]

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1 .Sen, Amartya. 1980. "Labour and Technology" in *Policies for Industrial Progress in Developing Countries, eds.* Cody, J., H. Hughes and D. Wall. Oxford: Oxford University Press, pp. 121-158

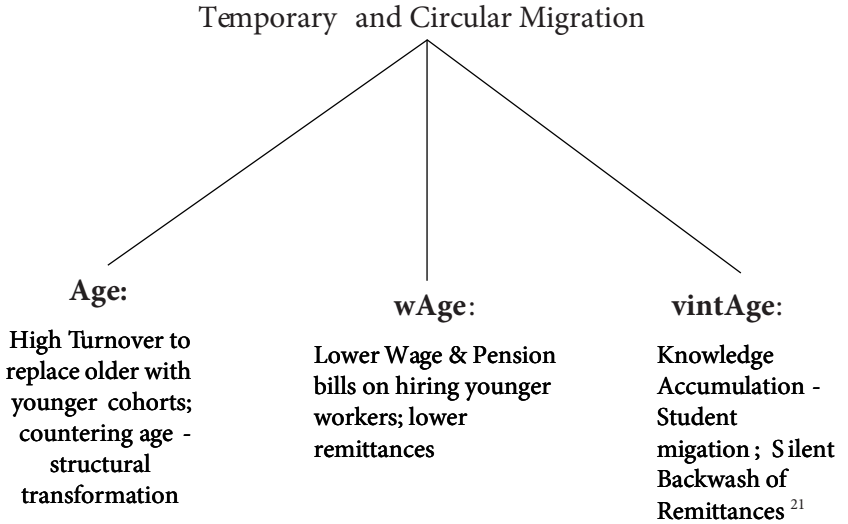
2. Khadria (1999) would call them 'money', 'man-hours' and 'machines' (or '3M') to introduce generic terms in place of the specific terms.

3. "Identified as a major policy challenge for EU Member States, integration of migrants is one of the growing areas of interest for the EU. In spite of the increasing focus by governments on the importance of economic migration, linked directly to labour shortages and demographic trends in Europe, there is increasing evidence of xenophobia and racism in our societies. The European context is marked by a serious backlash in attitudes against immigration and a tendency by politicians to foster the 'fortress Europe' by multiplying legal obstacles for migration." See, European Programme for Integration and Migration at http://www.epim.info/

Of the three stereotypes of benefits to the developing countries, the bandwagons of the first two have of late been attracting the proponents, of remittances and return migration, intrinsically to subdue the hue and cry about brain drain leading to the 'investment loss' and the 'skill loss' respectively. Ironically, these have underplayed the facts that (i) remittances have been arising mostly from unskilled and low-skilled migrants and that too from those going from the lesser developed to relatively more developed countries of the global South itself (relative to the high skilled migrants in the developed countries, who remit less and invest more for their own profit - not necessarily for development in the country of origin per se), and have many negative 'side-effects' on development if not on growth, and (ii) that return migration have mostly comprised the low-skilled aged migrants (who are hired as temporary migrants when young and then sent back to countries of origin or shunted around in other countries as 'circular migrants' when they get older). The "dynamic conflict of interests" (Figure 1)between the developed destination and developing origin countries over these two benefits have been analysed as of "age", and "wage" by Khadria in the inaugural 2009 issue of the *India Migration Report* (Khadria 2009b). Remarkably, the third possible benefit to the developing countries, viz. that arising from the transfer of technology, has been pre-empted by subtle mutations of accumulation of knowledge in the developed countries – through 'recruitment' (read 'enrolment') of tertiary-level students ('semi-finished human capital' a la Majumdar) from the developed countries as "future workers" (Tables 1 and 2), leading to what Khadria analyses as the third dynamic conflict of interest, viz., "vintage" (Khadria 2006a, 2009a, 2009b).

Figure 1

Dynamic Conflict of Interests leading to Mutation o f the Brain Drain



Source: Khadria

Table 1:

Top Countries of Origin of International Scholars in the United States, 2008 & 2009

Rank	Country of Origin	2008	2009	% of Total (2009)	% Change (2008-09)
	WORLD TOTAL	**1,06,123**	**1,13,494**	**100.0**	**6.9**
1	China	23,779	26,645	23.5	12.1
2	India	9,959	10,814	9.5	8.6
11	Brazil	2,071	2,363	2.1	14.1
15	Russia	1,945	1,628	1.4	-16.3
16	Mexico	1,396	1,371	1.2	-1.8

Source: Open Doors 2009 Report on International Educational Exchange

Table 2:
Top Countries of Origin of International Students in the United States, 2008 & 2009

Rank	Country of Origin	2008	2009	% of Total (2009)	% Change (2008-09)
	WORLD TOTAL	**6,23,805**	**6,71,616**	**100.0**	**7.7**
1	India	94,563	1,03,260	15.4	9.2
2	China	81,127	98,235	14.6	21.1
7	Mexico	14,837	14,850	2.2	0.1
13	Brazil	7,578	8,767	1.3	15.7
24	Russia	4,906	4,908	0.7	0.0

Source: Open Doors 2009 Report on International Educational Exchange

In the 1970s and 1980s, UNCTAD called 'brain drain' the "Reverse Transfer of Technology" from developing to developed countries. Thereafter, initially it was the UNDP's TOKTEN programme, which was considered the flag bearer for "transfer of knowledge" back to countries of origin "through expatriate nationals" visiting homeland for short periods of interaction with local counterparts.[4] Subsequently, suddenly in the late 1990s onwards the focus was shifted to give the term "brain gain" itself an altogether new meaning. The term henceforth ceased to imply the benefits the developed destination countries derived on the flip side of the losses that brain drain inflicted on the developing

4. Interest in mobilizing the experience of expatriate professionals from the third world remained unfocused until 1977, when UNDP started working with several developing countries to reverse losses caused by the massive exodus of their specialists and to transform part of the enormous brain drain into brain gain. TOKTEN began in Turkey following a three-week visit to the UNDP-assisted Karadeniz Technical University from a senior mechanical engineer of Turkish origin based in California. The engineer's remarkable success in communicating substantive know-how (as well as candid criticism) to his Turkish colleagues suggested that such expatriates were uniquely equipped to carry out consultancies in their homelands. On the initiative of the UNDP Resident Representative in Turkey at the time, the Government promptly set up the first TOKTEN project in 1977. In the twenty years since the programme's inception, 5,000 TOKTEN volunteers have completed assignments in 49 developing countries in a wide spectrum of fields. Nearly all areas are covered, from public administration to management of enterprises, from agricultural research to computer technology. Since 1994, the programme has come under the umbrella of the United Nations Volunteers (UNV) programme.

countries of origin. Instead, it became a catchphrase to imply the large scale return of those high skill migrants to their home countries like India who had lost their jobs in the wake of the American recessions that ended up in the bursting of the IT bubble at the turn of the century. Gradually, the focus shifted away from the unidirectional physical visits and returns home of the expatriates. The focus has since been more on the IT revolution-led high speed communications and networking that led to the emergence and feasibility of the business process outsourcing (BPO) to India, and some other countries of origin with noticeable stocks of highly skilled workforce. Subsequently, this has also given rise to the talk about diaspora knowledge networks, DKN in short.

Currently, emergence of the diaspora knowledge networks (DKN) have changed the way in which high skilled mobility is looked at [See Section 5 of this paper]. The debate surrounding the links between diasporic networks and its role in development in the home countries is divided into two distinct lines of arguments. On the one hand, there are scholars who take a pro-diaspora position while thinking the various ways to foster home country's economic growth (equating "growth" with "development"). On the other hand, some other researchers are skeptical about the straightforward link between diaspora engagements in homeland development. The former group tends to celebrate the success stories of diaspora activities leading to some kind of development (read 'growth') in source countries; whereas the latter group is more cautious about drawing aggregations and generalisations on the basis of a few select evidences. This divide provides a very pertinent context to situate and examine the role of migration in restructuring of the innovation systems in the countries of origin and destination from two different perspectives:

DIVERGING STAKES IN THE RESTRUCTURING INNOVATION SYSTEMS

The diverging pattern of development between the developed destination countries and the developing origin countries is not a new phenomenon at all. However, the formulation of the National Innovation System

(NIS), introduced by Freeman (1987, 1995), seems to contextualise these divergences due to restructuring of technology transferred by the migrants. It has been argued that differences in NIS are important explanations of uneven development patterns worldwide. "The NIS is a network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies" (Freeman 1987). Three key elements of NIS are *institutions, interactions and capacities* to create and use new and economically viable knowledge (Lundvall 1992; Nelson 1993).

Francis Bacon is said to have observed almost 400 years ago that three great mechanical *inventions* – printing, gunpowder, and the compass – had "changed the whole face and state of things throughout the world; the first in literature, the second in warfare, the third in navigation."[5] According to Rosenbeg, what Bacon did not observe was that none of these inventions, which so changed the course of human history, had originated in Europe, although it was from that continent that their worldwide *innovations* began.[6] What is seriously argued is that, historically, it was the European capacity to innovate new technologies irrespective of their origin that has been the vital factor. The Europeans engaged in aggressive innovations of inventions and techniques that had originated in other cultures (Rosenberg 1982, 246). The new innovations brought immense improvements in productivity that transformed the lives of all participants.

Rosenberg points out one essential aspect of innovations to be highly relevant to the prospects for successful transfer of technology (1982, p.246). According to him, one innovation could not be extensively exploited in the absence of others, or the introduction of one innovation made others more effective. Thus, part of the secret of the vast productivity improvements associated with the new industrial technology was that the separate innovations were often interrelated and mutually reinforcing, e.g., in metallurgy, power generation,

5. Francis Bacon, *The New Oragon* (The Bobs-Merrill Co., Indianapolis, 1960), p.118, cited in Rosenberg 1982, p. 245.
6. Rather, these inventions represented successful instances of technology transfer – possibly, in all three cases, from China.

and transportation. This also applies to high quality skill formation in software expertise leading to the production of world class IT professionals, scientists or sportsmen, because innovations require large number of enrolments, with a small number among them likely to become the innovators (Majumdar: 1983). This is how the British technologies had spread (combination of innovations and innovators, some of them even migrants, first to Western Europe, then to the United States and later, to other selected countries where conditions were favourable: skilled labour, entrepreneurship and, sometimes, capital playing a critical role - in the early stages in bringing in the new textiles, transport, power, and engineering technologies to Western Europe. The recipients of British technologies were, therefore, in a distinctly favorable position. They could industrialize through the mere transfer of already existing technologies, without having to reinvent them. This ability to industrialize through borrowing rather than independent invention is the basic advantage of being a latecomer. But this ability is neither universally nor homogeneously distributed across the world, and certainly not among the developing countries.

Rather, economic coexistence with advanced industrial societies entails a continual threat for the lesser nations (Rosenberg 1982 p. 247): "Sophisticated, dynamic technology in the possession of such societies will generate innovations with very deleterious consequences to the less developed countries." Rosenberg has referred to numerous examples of the substitution of new products for old ones upon which some less developed countries had been heavily dependent – synthetic fibres for cotton and wool, plastics for leather, some nonferrous metals and other natural products, synthetic for natural rubber, synthetic detergents for vegetable oils in the manufacture of soap, and so on. He stressed the point that an economy with no command over advanced technologies may be highly vulnerable to sudden changes in demand generated by these technologies abroad, and may have only limited opportunities for adjusting.

Moreover, the transfer of technology and innovations have never been easy. Typically, high levels of skill and technical competence are needed in the recipient country (See Figure 2). It is hardly a coincidence that, in the nineteenth and early twentieth centuries, the countries that

were mostly successful in borrowing foreign technologies leading to innovations were those that had well-educated populations. Furthemore, technologies …function within societies where their usefulness is dependent upon managerial skills, upon organizational structures, and upon operation of incentive systems like patents (Rosenberg 1982, p.249; Khadria 1990; Khadria 1993). These caveats are intended to suggest that the successful transfer of technology depends greatly upon the specific domestic circumstances in the recipient country. There are barriers in the local adaptation of technology – poor infrastructural facilities, lack of standardization, red tape, and corruption affect the transfer of technology even to India.

Figure 2

Generic Categories of Knowledge & Service Workers

Transnational Skills: Labour Market for Knowledge Workers						
Occupation -tied Career -specific	EducationK	now-ledge	Experi - ence	Train-ing	Activity	Occupation -wide Generic Category
Scientist, Engineer	Third Level R & D	Oo		o	Invention, Innovation	Creator & Innovator IT Professionals
Educator, Trainer	Third Level S & T	Oo		o	Communication, Transformation	Teacher Students
Executive, Supervisor	Third Level Business, Commerce	OO		O	Finance, Management	Manager Nurses
Localized Skills: Labour Market for Service Workers						
Semi - Professionals, Technicians, Craftsmen	Second Level - Vocational	oo		O	Facilitation, Operation, Correction	Operators
Semi -skilled, Unskilled	First level - Literacy	oo		o	Production, Construction	Labourers
Knowledge: Know -why		E xperience: Do-how		T raining: Know -how		

Source: adapted from Khadria (1999).

In discussing the migration-induced innovations in the country of origin, certain distinctions are highly important. Perhaps the most basic question is whether these technologies occur in industries that compete

directly with those of the initiating country, or whether the relationship between the technologies is complementary (Rosenberg 1982, p.260). Much of the technology that was transferred from Britain to other developed countries in Western Europe, for example, was in competitive industries, whereas most of the technology transferred to developing countries (mostly the colonies) was in industries that complemented British industry. In the future, one of the key stakes of the industrial countries when technology is transferred to the less developed countries will be their capacity to continue to generate new technologies, especially new products – and the rate at which these can be generated (Rosenberg 1982, p. 276). There are now powerful forces at work, many themselves the result of technological innovations – improvements in communication and transportation – that are speeding up the diffusion of new technologies from the center to the periphery. These centrifugal tendencies are powerfully assisted by the multinational firms, which, through their large-scale foreign investments and licensing activities, have become the most powerful institution for the spread of new technology in between the World War II and the new millennium.

The hype about the positive role of high skill migrants the multinational firms engage in the "north-south" flow of innovations often distracts attention from the fact that large majority of foreign investment of multinational firms has continued to go to *other* advanced industrial economies (Rosenberg 1982, p. 234). Economic theory tells us that capital should flow from capital-abundant rich countries to capital-scarce poor countries. In practice, that has not been the case as developed countries have consistently attracted the bulk of global FDI flows.[7]

Lingering risks in many emerging markets of developing countries, and the benefits of advanced *institutions, interactions and capacities* created by infrastructure and a superior overall business environment in developed countries have tended to outweigh the attractions of greater market dynamism and lower costs in the home-country markets. Even the high-skill migrants and diaspora groups, who prefer to diversify

7. "World economy: Global FDI - the rocky road to recovery", Economic Intelligence Unit, *The Economist*, 15 March 2010.

their investments across various developed parts of the globe, invest smaller volumes of innovative resources in homelands. This activity has been an integral part of the new pattern of industrial specialization that have come to characterize the most advanced economies: "Advances in IT, telecommunications, biotechnology, new materials, and nanotechnology are directed by the needs of large corporations in search of increased profit. Scientific and technological research is restructured under mechanisms such as outsourcing and offshore-outsourcing, which allow corporations to have southern scientists at their service, transfer risk and responsibility (like the Bhopal gas disaster), and capitalize on the benefits by amassing patents. This has led to an unprecedented mercantile approach to scientific work under a short-term perspective and with little social concern."[8] Thus, if we consider FDI of American enterprises in manufacturing subsidiaries in 1969, about 73 percent went to Europe and Canada, 15 percent to Latin America, and 12 percent to all other areas. See Raymond Vernon, *Sovereignty at Bay* (Basic Books, New York, 1971, p. 65]. Today, in 2008, some 80 percent of cross-border merger and acquisition sales were still in developed countries (*The Economist,* 15 March, 2010).

Indeed, the pervasiveness of uncertainty in the innovation process is ignored by most of the empirical studies. The innovation process surely comprises an area of economic behaviour in which uncertainty and complexity are absolutely central characteristics of the environment; empirical approaches to the problem must therefore take far greater cognizance of the processes that underlie the ouput of innovation. Given the possibility for more rapid diffusion of technologies, the capacity to generate new technologies will play an even greater role in the economic destinies of the industrial countries. This is because the time available to exploit their lead with respect to any given technology is bound to decline.[9] However, the importance of these disadvantage should not be exaggerated. For one thing, the coin has two sides (Rosenberg 1982).

8. Lester and Piore 2004, cited in Delgado Wise et al 2010, *Concept paper for PGA*
9. This is why MNC firms have shown a strong preference for FDI over other options, such as licensing.

THE CHANGING GEOPOLITICS OF S&T: FROM THE TRIAD TO THE MULTI-POLAR WORLD

The traditional mobility of the highly skilled used to be aligned on the North-South divide of S&T capacities. Since the post-second World War, the brain drain reflected this global asymmetry, with international flows of scientists and engineers mainly shaped by a centre periphery relationship (Oteiza 2010). Until the late 1990s this scheme prevailed. However, in 10 years time, the situation has changed and a dramatic evolution towards a global redistribution of S&T capacities is currently underway. Interestingly, the mobility of knowledge workers is a crucial factor in these processes which, in return, deeply modify the conditions and directionality of future flows.

Up to 2000, scientometrists (specialists of S&T statistics) used to describe the world as dominated by the so-called "Triad", constituted of North America, Western Europe and Japan (Unesco 1998). Input as well as output indicators showed a sharp contrast between this set of countries and the rest of the world. Investments made in R&D and human resources, as well as publications and patents were massively concentrated in the 3 major blocks (see 1995 figures below, table 3).

Table 3:
World share of GERD (Gross Domestic Expenditure in Research and Development), scientific publications and patents by main regions

Regions	GERD 1995	GERD 2005	Publications 1995	Publications 2006	Patents (USPTO) 1995	Patents (USPTO) 2005
Western Europe	28.0	24.2	35.1	39.3	20.0	15.5
North America	37.9	35.6	38.0	30.2	51.5	53.5
Latin America	1.9	1.8	1.1	2.6	0.2	0.1
Arab States	0.4		0.1		0.0	
Sub-saharan Africa	0.5		0.8		0.1	

Japan & NICs	18.6	13.2	10.1	7.6	27.3	21.3
China	4.9	11.8	1.6	7.0	0.2	0.4
India	2.2		2.1		0.0	
Oceania	1.3	1.3	2.8	2.6	0.6	0.7
Others	4.3	12.1	6.1	10.7	0.1	8.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source Unesco 1998 et OST 2008

Consequently, these places of highly intensive knowledge production used to foster and polarize innovation dynamics. The number and proportion of scientists and engineers in these regions were much higher than in other parts of the world (see table 4 below, 1995 figures).

This was a stable system fed, maintained and reinforced by an equivalent and parallel higher education asymmetric distribution worldwide. The major provider of university degrees and biggest magnets of foreign students were located in Triad countries, mainly the United States and Western European countries, especially the UK, France and Germany. These alone concentrated more than half of the flows (see below and Graph 1).

Table 4
(S&E workforce per main regions of the world)

Regions	S&E 1991 (thousands)	S&E/pop (°/°°) 1991	S&E 2005 (thousands)
EEC	611,4	1,9	1314
USA	949.3	3.8	1395
Latin America	162.9	0.5	
Sub-saharan Africa	35.0	0.1	
Japan	582.8	4.7	705
China	410.5	0.4	1120
India	119.0	0.1	
Oceania	47.5	2.3	99

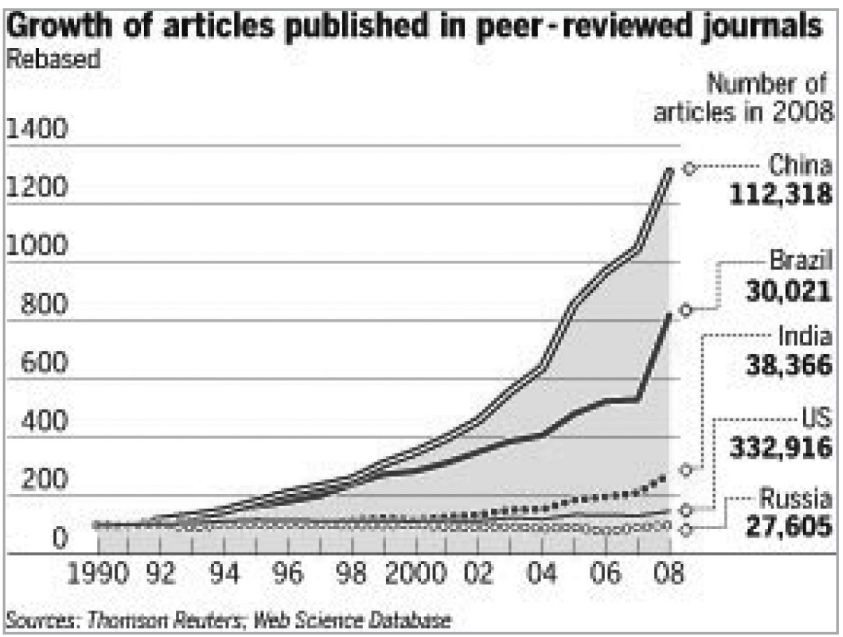
(Source OST 1994 et 2008)

Today, the situation is quite different yet and it is evolving quickly.

First, since the mid-2000s, the classical input output scientometric indicators refer to a "Quadriad", including China in addition to the 3 traditional powers (OST 2008). In a context of massive investment in R&D in many places in the world, the share of China has increased considerably (table 3, 2005 figures). This translated quickly into a surge of publications and –though a bit more slowly- of patents. At the same time, the increase of science related personnel was of 273% for China while of only 215 for Europe, 148 for the USA and 121 for Japan. China has become a major provider of R&D employment (table 4).

Interestingly, more recent and partial data show that this expansion is not isolated and that it is accelerating. A study requested by the Financial Times to Thomson Reuters shows a noticeable and rapid increase of emerging countries compared to the US and Russia (to be thus distinguished in the BRICs dynamics; see graph 1):

Graph 1:



Though the US still publishes, in 2008, 3 times more than China, 9 times more than India and 11 times the quantity of Brazil - in mainstream international science - the difference in trends is striking (Cookson 2010): stability on the one hand and marked growth on the other hand.

The emerging place of China is frequently underlined (Hepeng 2007, Padma 2010) and it is indeed the most outstanding. Various reports focusing on competitiveness highlight the technological breakthrough led by this country which has passed Germany and is 3rd behind only the USA and Japan in patents records today (Hepeng 2008, Sri Raman 2009, Le Monde 2010) However, China is not alone in this process and the developments witnessed there may increasingly be observed in other countries and regions of the world. India and Brazil seem to be, indeed, on similar tracks though with some differences (Fan 2008, Massarini 2008). The big emerging giants lead the way in a significant and substantial effort of the developing world to catch up with knowledge based economies in the North (Ogodo 2009). Investment has increased a lot between 2002 and 2007: three times more rapidly for R&D spending, while the number of researchers more than doubled during the same period (compared with 9% in the rest of the world, Dickson 2009). However, this effort is unequal, with some countries especially LDCs (less developed countries) being left behind.

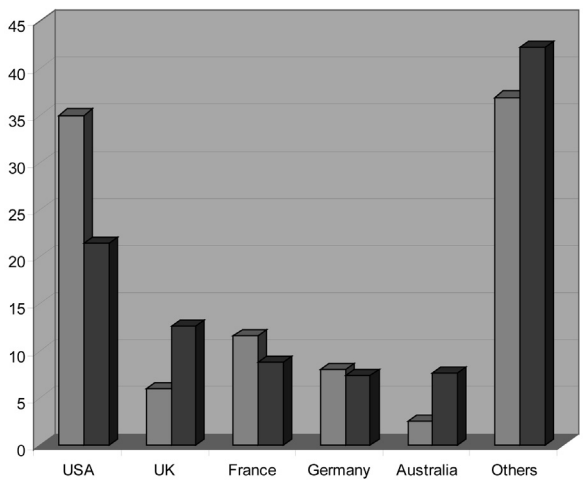
In higher education, the evolution to a more balanced distribution is also perceptible. In 1970, the USA and Western Europe represented almost half of the world student population in higher education. Today, they are less than the 4th part of it. Meanwhile, the part of Latin America has increased 2 fold (from 6 to 12%), the one of Arab & sub-saharan countries has almost multiplied by a factor of 3 (from 3 to 8%) and Asia/ Pacific has jumped from 24 to 43% (Unesco 2009).

This shift of gravity centre is having an incidence on the relative attraction of students in international mobility. For the last 20 years, 5 countries have been the magnets of foreign students. However, changes are visible: while more than 1 out of 3 international students used to go to the USA in 1990 they are only slightly more than 1 out of 5 today; meanwhile the share of Australia went up from 2,5 % to 7,6%, overtaking one of the 3 major traditional host in Europe: Germany.

And other newcomers are closing the gap. During the last ten years, traditional attractors have lost 6 points. And while traditional followers are still there (Russia and Japan for instance) others like South Africa, China, New Zealand and Korea are gaining significance and influence.

What all these fast, though irreversible, changes indicate is that the conditions shaping the flows of S&T personnel are going through major transformations. Therefore, the actual moves are likely to evolve along the same lines : less concentration, more actors, diversity of situations. This is what new reports with prospective dimensions underline (EU 2009, Global Market Institute 2010). The pattern of migration will correspond to the global circulation paradigm even more than today, with displacements of people according to knowledge specialization rather than to overall educational asymmetrical developments. To think of the world mobility tomorrow, no doubt the global brain drain approach should not enjoy any revival. The picture has become more complex and deserves more descriptive dynamic analysis than ever before, to draw relevant public policies.

Graph 2
Major receiving countries of students in international mobility between



1990 (grey) and 2007 (black)

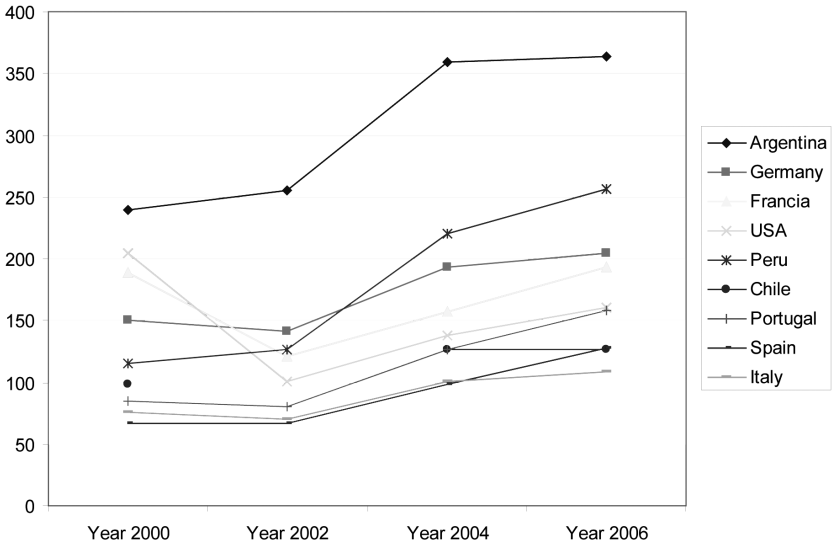
(Source : Unesco 1990 and 2009)

MOBILITY AND COOPERATION : BEYOND NATIONAL SYSTEMS OF INNOVATION?

The prospective reports mentioned above highlight the importance that mobility and migration of the highly skilled will have in the near future, as well as for longer term developments of S&T production systems. A concern for EU or US innovation systems so far, is the current relative depreciation of S&E careers in these areas combined with aging workforce in the same fields, which might require compensation through sectoral international mobility (Global Market Institute 2010). At the same time, complementarities might be organized, between EU countries strengths in chemistry, astronomy, pharmacology or physics and US or Asian abilities in information technology, electronics or biotechnology (EU 2025). The expected expansion of Chinese and Indian student population in western countries will certainly go hand in hand with new inflows towards the 2 Asian countries (EU 2009). This phenomenon is already perceptible in the last Unesco Global Statistics of Higher Education (see above and graph 2). But beyond students and not exclusively in Asia, the new attraction of emerging poles is also noticeable in anecdotal evidence or particular statistics. The Chinese Academy of Science has, for instance, announced it aims at attracting 1500 high level foreign scientists for temporary or durable stay on collaborative research projects. Meanwhile, the 100-Talent programme, which has already attracted more than 1300 Chinese scientists back to the country, is expanded (Zhiguo 2009). At the same time, Brazil, a country attracting Latin American advanced students in droves, is seeing an increase of foreign scientists entries. While, the total number increases of 30% between 2000 and 2006, from 2105 to 2733, the share of Europeans alongside American neighbours is sharply rising up (Nunes and Batista 2010).

Graph 3 :

Major countries of origin of foreign scientists in Brazil (2000-2006)



Souce: census 2006

At the same time, the compulsory grant system ensures a high return rate of students, especially Phd holders (Ramos and Velho 2010).

In many ways, what the emerging countries are doing is to take advantage of a normal mobility of scientists. Science has indeed always been characterized by a circulation of its individual carriers/practitioners (Dedijer 1968, Gaillard and Gaillard 1997, Meyer et al. 2001).

The reason why scientists' mobility is intrinsic to scientific activity lies in the complex operations implied by research practice. If scientific results are indeed codified knowledge, *par excellence*, science in the making is highly localized and involves a lot of tacit knowledge. This can almost exclusively be exchanged through human contacts and continuous collective work. For the last decades, numerous authors have emphasized the importance of networks in all activities linked to S&T innovation. Their international dimension has significantly increased for the last 20 years as the growth of co-publications involving authors from various countries testify.

How are national states coping with such a phenomenon? How is mobility concretely used in ever more interdependent national systems of innovation (see paragraphs above on this NSI)?

For some authors, the internationalization of science and technology happens through a pattern of unequal relationships. Subjects defined by strong teams in OECD countries dictate the orientations for those less equipped, staffed and connected, poorer and not on the very front of pioneering activities, located elsewhere. Even if scientists in these countries manage to obtain good results through creative activities, they always act in fields largely shaped by the others (in theoretical or conceptual terms, for instance). This corresponds to a subordinated integration into the international division of scientific labour, according to some authors (Kreimer and Zabala 2007, Losego and Arvanitis 2008). In this scheme, the return of a junior researcher to the country of origin after graduating (Phd) abroad, means dissemination of the laboratory's (where this person was trained) standards and practices and therefore, the subordination of subsequent researches to these external influences. In such a position, the peripheral lab works on a limited scope of tasks while the central one combines various inputs and coordinates the others. Mobility and scientific exchanges are not neutral and may thus lead to some kind of subcontracting, in that perspective.

The functional division of labour is particularly visible in the US academic system and its recruitment of advanced foreign students, not only to attend courses but also as research or teaching assistants (Baghwatti 2006). These are able to follow on their studies and develop individual research projects for doctorate degrees, thanks to the professional position they get and the resources that go along with it. At the same time, university departments may continue with their scientific programmes, in spite of a lack of interest and sluggish enrolment of native American students in S&E fields. These are arrangements between migrant populations and United States organizations taking benefit of it, which have been identified in other fields of activity, in the case of Mexico (Delgado Wise 2007). Interestingly, this symbiotic logics has been highlighted as, possibly, the next step of the US capitalist system development. Scientific services provider in emerging countries

will constitute a strong supply to all firms and industries in the US, at a cheaper price and better conditions than if based in the US and with domestic workforce. Ultimately, this integration of both new scientific giants abroad and "post-scientific"

America will even mean less reliance on foreign talents at home (Zachary 2008). Without going that far, several authors recently point to the shared benefits involved by the multiplication of networks of interdependence among scientific poles through, students and scientists exchanges. The emergence of Oceania/Far East transnational dynamics (between China and Australia for instance) are described as very stimulating for all parties growth prospects (Turpin et al. 2010). In the same manner, Brazilian authors plead for a larger opening up of their country, to guarantee quality improvement in addition to resource major endowment. They recommend to facilitate studies abroad, to avoid compulsory return and, instead, to develop expats connections and diaspora knowledge networks, to avoid parochialism at home and upgrade intellectual standards (Balbachevsky 2009, Ramos and Velho 2010).

IMPLEMENTING REDISTRIBUTION: DIASPORA KNOWLEDGE NETWORKS

Today, hundreds of highly skilled expatriate networks of all sorts connect dispersed human resources in S&T with their countries of origin. In order to understand how they can have a significant impact on innovation processes back home, we analyse one example, highly significant: the development of the IT industry in India and its linkages with the dynamics in North America, through NRI (non-resident Indians) there[10].

The Indian IT revolution may be sequenced into three waves:

1. 1965-1980: the birth of an Indian IT industry;
2. 1980-1995: the 'body-shopping' stage; and
3. 1995 to the present: the outsourcing turn.

10. Following pages are part of an article written with Eric Leclerc (see Leclerc and Meyer 2007)

The first wave saw the slow growth of an indigenous IT industry and the emigration of fresh graduates to complete their studies in American universities, some of them coming from prestigious Indian institutions like the Indian Institute of Technology (IITs). At that time, the excellence of these institutions was known only amongst academic circles; their current fame is partly due in fact to the successful migrants' retrospective evaluation of the institutions. In these pioneers' biographies (Deb 2004), it appears that they had been convinced to move to the USA either through the contact with some visiting American professors or through networks of Indian academics both in India (e.g. Professor Ramamurthy in IIT Madras) and in America (Professor Amar Bose in MIT). Following the emigration path of Indian medical students, these engineers found job opportunities in the American IT labour market through the links between academic and entrepreneurial networks. To experience successes in the entrepreneurial world, they have had to break down the so-called glass ceiling.

Indian software engineers have then become reputation builders because of the increasingly well known quality of their work. During this first wave, the impact of the diaspora factor on the IT industry in India was weak. The nascent Indian IT industry was substituting import in the hardware segment with the withdrawal of IBM, and creating indigenous software behind a heavy import-duty barrier.

The second wave strengthened the links between the diaspora and the home industry with the growth of the 'body-shopping' activity, induced by the expansion of the global information economy. The human resource software shortage, first in the United States, and later in other OECD countries, has attracted a foreign workforce on site. India has been the main source country for these cyber workers or ironically called 'techno-coolies'. Derogatorily labelled as 'body-shopping', Heeks (1989) describes this practice in the following terms: 'This is the process by which Western firms send a list of staff requirements to Indian software companies, who then send the required 'bodies' overseas to work for that client'. But Heeks ignored the central role played by the diaspora in the mobilisation of their countrymen, through informal

contacts at the beginning, revealing the job opportunities in the United States. The analysis of the body-shopping model (Xiang 2002) reveals the pivotal role played by the diaspora as gate-keepers at the receiving end of this international movement of IT workers. At the peak period in 2000, there were nearly 1000 firms engaged in body shopping in the United States. The diaspora was more than a reputational intermediary during the second wave; it had become an actor in this international production system. Even though it is difficult to assess the national origin of the firms hidden behind the less derogatory term of consultancy, all the observers attribute a large share to Indians.

This model had a tremendous impact on the Indian IT industry whose exports grew from US$ 12 million in 1982 to US$ 4 billion in 1990. All the major Indian firms—even some hardware firms like HCL—converted themselves to this business model. With the OECD countries' shortage of human resources appeared the mushrooming of new IT training firms like NIIT, Aptech etc. that spread all over the subcontinent. During the entire second wave, these private training firms built the Indian comparative advantage in the low end skill segment that complemented the prestigious IIT. As the body-shopping model has been identified in different countries like Australia (Xiang 2004) and Malaysia (Leclerc 2006), i.e., not only in the United States, it is a robust proof of the involvement of the Indian diaspora in the growth of its home industry. Under various labour markets and different immigration policies, indeed, we might have expected more efficient actors than the diaspora members to manage these foreign workers, but it has not been the case. They also had an influence on the political agenda in India, one well-known case being the technology missions initiated by Sam Pitroda, a high profile NRI, under the prime ministerial tenure of Rajiv Gandhi in the mid-eighties. Chakravarty (2000, p.5), arguing that 'the American high-tech NRI also plays a pivotal role in legitimating a relatively new technocratic development agenda in India', contradicted the statement by Lucas (2004, p. 224) that 'the more fundamental economic reforms came to India after 1990 with little participation from the Indian diaspora'. It is analytically not justified to separate the liberalisation process of 1991 from the first attempt of

economic reforms that occurred precisely in this sector with the new IT policy of Rajiv Gandhi in 1984.

The mid-1980s have also constituted the starting point of the third wave, the outsourcing turn, with a new business model of Overseas Development Centre (ODC), the first one set up in Bangalore by Texas Instrument and General Electric in 1984–85. It took a decade for this movement to pick up, with the previous body-shopping model continuing alongside. Pandey *et al*. (2004, p.11) noted that 'It is worth pointing out that the shift to the new business model was gradual because the savings even after sending Indian IT programmers to the US were quite large and many IT companies continued to follow the old model and send their programmers to the US, the UK and Canada'. The diaspora factor became more important during this third wave for two reasons. Firstly, it was more convenient for the multinational corporations (MNCs) to send employees of Indian origin to manage these ODCs to leverage the local difficulties. To handle the bureaucracy at various levels and the incomplete infrastructure, the MNCs required their cultural and linguistic skills. The members of the diaspora at managerial position even played a crucial role to convince their American colleagues to engage in this adventure (Sahay *et al*. 2003). Secondly, the pioneers who had by this time achieved big successes in the Silicon Valley started to invest their time and money to open firms in India. Through associations like TiE (Lal 2006, p. 79) or SIPA (Saxenian 2000), they helped new IT entrepreneurs in India with their advice and contacts in the Silicon Valley to find capital. A recent survey of their involvement in venture capital in Bangalore shows that nearly 50 per cent of the new Indian firms received some money from the diaspora (Upadhya 2004) and the city served as a "corridor" for return of many Indian IT professionals from abroad (Khadria 2004; Khadria and Leclerc 2006).

Summarizing the 3 sequences, a growing involvement of the Indian diaspora in the development of the IT industry at home may be observed. The export-oriented model of the Indian IT industry after 1980 is strongly related to the share of the Indian diaspora in the American IT industry. In the second and third waves, the Indian IT diaspora became a catalyst in building new business models, rescaling the IT industry in

India from the nation-state level to a global size. This is not to portray the Indian diaspora as the one and only factor—MNCs and Indian firms have also to be reckoned with—but to recognise that it played a role as pro-active mediator and not only a dormant intermediary.

A second argument about the diaspora factor is its involvement in the creation of knowledge intensive activities at home. For the vast majority of the Indian students during the first wave, and for the Indian IT engineers during the second, their sojourns in America was an opportunity to update their technical knowledge. The second and third waves served not only towards updating knowledge but also to change their work habits when they worked onsite in US firms. This was done with the help of the Indian diaspora through specific programmes designed to cater to their needs. The former completed their graduation in prestigious American universities and became researchers (and even directors e.g., Dr Arun Netravali) for the US government or private laboratories like IBM, Microsoft and Bell Labs, and in certain cases became renowned inventors.

From figures of the US National Science Board, Pandey *et al.* (2004, p.8) remarks that 'Between 1985–2000, Indian students constituted the largest group among all foreign-born communities in terms of the number of US doctoral degrees awarded in computer and information sciences' and concludes that 'the Indian presence is likely to grow even further in the US technology sector'. Therefore, if the Indian IT industry plans to use cutting-edge technology, it has to collaborate with labs in America, where it interacts with members of the Indian diaspora, unless they produce these technologies on their own. As the US R&D budget is $265 billion compared to India's $3.15 billion, the relationship will certainly last for some time. Today, some of them are financing Indian students in US universities, like Venkatesh Shukla who helped 900 students with his "Foundation for Excellence", or Prabhu Goel and Kanwal Rekhi who decided to sponsor 15,000 students.

But since 2000, a new trend is developing rapidly in India, the outsourcing of R&D Centres on the previous model of Business Process Outsourcing. In 2003, around 100 MNCs had already decided to implement R&D facilities in India, mostly in the IT sector but also in other fields like automobiles (DaimlerChrysler, Delphi, etc.) and

chemicals (Akzo Nobel, DuPont, Monsanto, etc.). In this latest phase, the Indian diaspora has had the same importance as during the process of outsourcing business. Members of the diaspora initiated the movement, and set up new labs in India on behalf of the MNCs.

Knowledge has also been transferred through donations from successful diaspora members to higher education institutions in India. Obviously the IITs have in the past been the prime beneficiaries. Many Indian professors abroad spend their sabbatical year teaching there. Management skills are a very important input for the Indian IT industry to compete on the global scale.

The process of knowledge transfer from the diaspora to the Indian IT industry occurred in various ways along the time line. In America, this transfer started with the programmes conducted by members of the Indian diaspora to update the knowledge of cyber workers. Today, cutting edge knowledge is acquired by Indian students directly in American universities and laboratories, like that of the IT pioneers, and with their financial help. But knowledge activities are also reaching India directly with the outsourcing of R&D facilities by MNCs. This trend might convince more members of the diaspora to return to India with their embedded knowledge. That is what occurred after the downturn of the US IT industry in 2001. Nearly 40,000 IT workers on H-1B visas became unemployed and had to fly back to India. These people who had already spent two or three years in America found job opportunities back home because Indian firms needed middle level managers. In contrast to the workers from Kerala who had to escape from the Gulf in 1991, and who became unemployed back in India, the IT workers were in a better position with the outsourcing turn that coincided with their return. This combination of outsourcing and return boosted the industry's developments, with India being a direct beneficiary but with worldwide expansion too. In their recent study of 225 IT firms, Commander *et al.* (2004, p.25) observe that although only 8.5 per cent of Indian firms are owned by Indians abroad or return migrants, between 45 to 55 per cent of the managers, conceptualisers and developers had a relevant experience abroad (p. 27). Even in Indian IT firms, half of the top rank employees have for some time been a member of the Indian diaspora abroad.

The Indian case presented above does not pretend to be a model or to exhaust the possibilities and methods for synergies between diasporas and local innovation systems. It shows without ambiguities that such transnational networks can have positive impacts on both origin and host countries, transferring capacities in the former while stimulating restructuring in the latter. This win-win virtuous circularity, made of long distance trans-spatial mutual adaptation, has been noticed more generally beyond the Indian case (Saxenian 2006). To take advantage of such a potential also requires definite public - migration, innovation and social- policies (Meyer 2010).

CONCLUSIONS

Are the transnational knowledge networks pointing towards post-national systems of innovation? We may, in fact, notice that the upsurge of emerging S&T capacities in the South do result from a massive governmental involvement emphasizing thus the role of the State. However, this rapid expansion is also the result of diasporas inputs and dynamics, therefore of transnational initiatives, along with MNCs strategies. What is needed nowadays to help organize relevant policies is to know more about these mix of actors and their relations and to start designing instruments to monitor and support their promising activities[11].

The diaspora option, because it is holistic in identity, would also foster the emphasis that the GCIM (2005) report has made in stating, "…the traditional distinction between skilled and unskilled workers is in certain respects an unhelpful one, as it fails to do justice to the complexity of international migration…While they may have different levels of educational achievement, all of them could be legitimately described as *essential workers* (emphasis added)." While the dichotomy between skilled and unskilled migrant workers is unwarranted, lately India has drawn disproportionately high worldwide attention to the success stories of its highly skilled human resources doing remarkably

11. The CIDESAL research and development project is an experimental initiative in this direction : Creation of Knowledge Diasporas Incubators in Latin America, http://wwww.msh-m.fr/cidesal

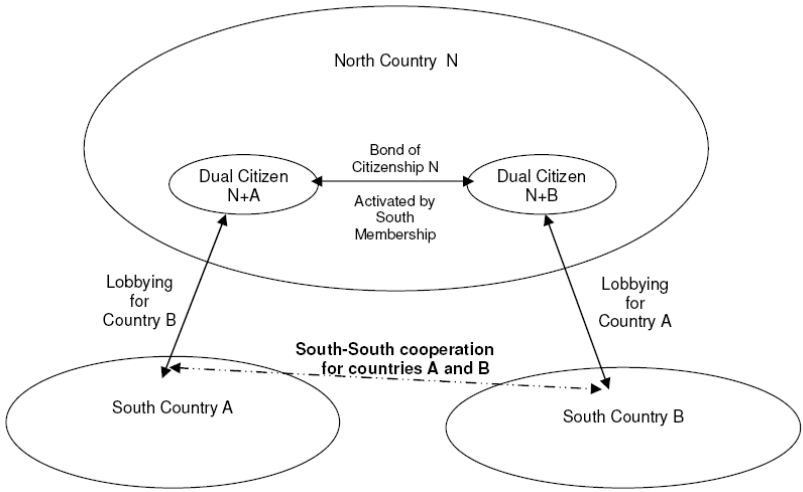
well in the world labour markets abroad – the IT professionals, the nurses, the biotechnologists, the financial managers, the scientists, the architects, the lawyers, the teachers and so on – there being almost a fray for them amongst the developed countries – the German Green Card, the American H1-B visa, the British work permit, the Canadian investment visa, the Australian student visa, the New Zealand citizenship, all mushrooming to acquire Indian talent embodied in workers as well as students. In comparison, the Indian labour migrants in the Gulf had for long been considered more of a responsibility for India. To neutralise this imbalance and empower the Indian labour migrants, the interest of the stakeholders in the Gulf (and South-east Asia too) are gradually being looked into, and innovative programmes are being introduced[12]. The developments following the institution of the "Pravasi Bhartiya Divas" (*Expatriate Indians Day)* and constitution of a separate ministry of the Government of India reflect a break from the past – a confidence emanating from a paradigm shift towards India taking pride in its diaspora, and vice-versa.

The role of migration in restructuring innovation systems in origin or destination countries thus has debatable twists! But because there are always two sides of the coin, it depends upon how one tosses it, to get to see the side one wants up – both sides vying for "heads I win, tails you lose" kind of outcome. In other words, the debate requires a balanced perspective for arriving at a win-win situation, which can be brought about through what Khadria proposed as the Equitable Adversary Analysis or EAA.[13] EAA will facilitate a balanced debate and

12. The Ministry of Overseas Indian Affairs, Government of India, for example, has taken several initiatives including signing of Memorandum of Understanding (MoU) with the UAE (December 2006), with Kuwait (April 2007), with Oman (November 2008), and with Malaysia (January 2009). The MOUs mainly intend to enhancing employment opportunities and bilateral cooperation in protection and welfare of workers and lay down the broad procedures that the foreign employer shall follow to recruit Indian workers (MOIA 2009). Government of India had also set up the annual Rs.16 million India Community Welfare Fund (ICWF), which will be operated through India's diplomatic missions in 18 nations mostly in the Middle East and Africa. Initially established for three years, the fund will be utilized for carrying out welfare activities for overseas Indian citizens who are in distress (Economic Times August 22, 2009).
13. Khadria 2009a, 2009b; see Sen 1980, 1997; and Applbaum 2000.

discussion on what are the stakes for the developed and the developing countries both. It involves stepping into each other's shoes and trying to defend the interest and position of the adversary rather than oneself. This would bring forth a better appreciation of the costs (or the likely 'injuries' or harm) of each of the two contending parties by the other side rather than one's own, which normally occupy the minds of the negotiators in bilateral (and multilateral) negotiations. Adversary analysis would, thus, provide a sympathetic analysis of the problems associated with remittances that a source country receives, and the problems of social harmony and unemployment possibly created in a destination country when its labor market is thronged with foreign skilled workers. However, what is required would be not only a level playing field but, going beyond that, an equitable commitment allowing the stronger party to have empathy for the weakness of the other side. In fact, the equitable adversary analysis in migration need not be limited to bilateral negotiations, but could be custom-designed as a strategy of multilateral negotiations as well, where all or most southern countries can together represent the South as a whole, provided it is preceded by successful consolidation of south-interests through South-South cooperation. "Equitable adversary analysis" could also be the right and most balanced instrument to operationalise what Khadria calls "a third-country development model of migration" (Khadria 2009b).

Figure 3:
South-South Cooperation in Innovations for Third-country Development
Source: Conceived and drawn by Khadria (2009a).



To operationalise such "third-country development model of migration" through cooperation between members of the South countries, it should be possible to create regional or sub-continental umbrella networks of the diasporas across countries (Figure 3). For example, other than overseas Chinese investing in *homeland* China, the Korean diaspora has invested in *host land* China. The rapid economic growth of South Korea has made it a significant source of foreign investment in China. One Chinese region that has received significant attention from South Korea investors is Yanbian. Yanbian Prefecture, bordering North Korea, has a total population that has increased from 0.83 million in 1950 to 2.14 million by 1993. While Koreans are still the largest ethnic group in Yanbian, as a proportion of the total population, it has steadily declined from 63 percent of the total in 1949 to 40 percent in 1993. Nevertheless, available information indicates that the South Korean diaspora is still the one that has bestowed its resources on the Chinese prefecture and its towns (Wu 1998, 94-97).

Table 5:
Comparative Labour Force Characteristics in Select Countries (1999/2000)

Brain drain (Survey 2000)		**Labour productivity: Gdp/employee Per hour**	**Health, safety and environment: Management Takes care**	**Social responsibility: Private business Takes care**	
Rank	Country	Ppp-us$	Score (0-10)	Rank (1-47)	Score (0-10)
1	Us	32.60	7.181	15	6.646
6	Germany	30.30	7.690	19	6.400
7	Ireland	32.56	6.700	22	6.167
9	Japan	24.45	6.364	27	5.879
10	Switzerland	25.62	7.933	14	6.653
11	Austria	29.74	7.933	22	7.593
13	Uk	24.39	6.900	26	5.880
14	Thailand	4.83	5.581	36	5.395
18	Australia	28.33	7.361	17	6.515
21	Israel	23.42	6.000	32	5.692
23	Brazil	8.26	6.167	24	6.042
24	France	32.35	6.489	25	6.000
25	Singapore	21.10	7.443	5	7.377
26	Italy	32.35	4.976	38	5.200
27	Mexico	11.48	5.838	21	6.222
30	South korea	14.79	5.200	39	5.029
32	Malaysia	10.09	5.657	30	5.714
33	Taiwan	18.66	6.533	23	6.067
35	Turkey	7.92	5.290	28	5.871
36	Argentina	16.23	4.574	40	4.959
37	Indonesia	2.80	4.898	45	4.163
38	Sweden	25.71	7.789	9	7.193
39	Canada	27.21	7.516	11	4.709
40	China	2.87	6.733	20	6.292
41	New zealand	20.60	7.754	7	7.193
42	**India**	**2.15**	**4.152**	**43**	**4.709**
43	Venezuela	7.30	4.952	37	5.268
44	Philippines	4.21	5.474	29	5.789
45	Russia	8.09	2.902	47	3.415
46	Colombia	7.95	5.080	35	5.440
47	South africa	20.20	6.367	18	6.433

Source: IMD World Competitiveness Report 2009; and *World Economic Forum, Global Competitiveness Report 2009.

Table 6:
Comparative Labour Force Characteristics in Select Countries (2008/2009)

Brain drain (2009)		**Labour productivity: Gdp/employee Per hour (2008)**	**Health, safety and environment: Management Takes care***	**Social responsibility: Private business Takes care (2009)**	
Rank	Country	Ppp-us$	Score (0-10)	Rank (1-57)	Score (0-10)
7	Us	47.78	5.88	38	4.88
18	Germany	41.26	6.01	26	5.51
6	Ireland	49.63	6.23	30	5.35
10	Japan	37.28	6.13	9	6.52
4	Switzerland	36.59	6.10	13	6.32
3	Austria	44.71	6.14	6	6.61
26	Uk	39.08	6.07	25	5.53
30	Thailand	6.76	5.52	14	6.21
13	Australia	39.24	6.20	11	6.35
31	Israel	35.78	5.82	37	4.88
14	Brazil	11.01	5.24	19	5.86
28	France	50.14	6.22	39	4.82
15	Singapore	36.36	6.22	16	6.13
47	Italy	41.47	5.99	53	3.71
37	Mexico	14.37	5.48	36	4.94
57	South korea	25.33	5.99	15	6.16
29	Malaysia	16.51	5.90	10	6.39
32	Taiwan	29.70	6.20	34	5.02
22	Turkey	21.06	5.32	32	5.21
35	Argentina	17.36	5.54	57	3.26
25	Indonesia	4.09	5.20	43	4.56
9	Sweden	40.48	6.22	5	6.65
23	Canada	37.33	6.30	8	6.55
52	China	4.70	5.72	46	4.38
54	New zealand	29.50	6.43	12	6.34
16	**India**	**3.27**	**4.82**	**29**	**5.39**
56	Venezuela	14.40	5.22	20	5.83
42	Philippines	4.22	5.07	22	5.72
55	Russia	17.95	5.65	55	3.63
46	Colombia	9.59	5.34	31	5.26
57	South africa	17.32	3.60	4	6.88

Source: IMD World Competitiveness Report 2009; and *World Economic Forum, Global Competitiveness Report 2009.

The above tables (Tables 5 and 6) set a "double challenge" of public policy for the sending countries of the South: First, to convince their own "capable" scientific diaspora communities abroad to rethink the innovation system in homeland as a "bottom up" creation and enhancement of sustainable productivities of labor through development of *institutions, interactions and capacities* for education and health rather than "top down" innovations in business and industry - one comprehensive, the other dispersed; one long-term, the other immediate. It is not just a matter of willingness; in many instances, it would entail long periods of struggle in creating those decision-making and priority-setting discerning capabilities amongst the leaders of the migrant community to appreciate the logic that a large population with purchasing power in pocket only would provide the sustainable market in which they would be able to sell their products of innovation effectively and profitably. Secondly, they must be able to convince the countries of destination in the North (and the other countries of origin within the South as well) as to where lies the distinction between most 'painful' and most 'gainful' socio-economic development impacts of the migration of citizens – whether skilled or unskilled: For the high-income receiving countries of the North, the winning situation would arise because these destination countries would then be able to continue to attract knowledge workers from South countries like India, China, Pakistan, the Philippines and so on - both young professionals and youthful students - and ameliorates their own problems of aging population, cumulating pension liabilities, as well as of sustaining their lead in innovations through latest vintages of knowledge embodied in the latest generations of graduates and students –what Khadria calls the advantages of Age, Wage, and Vintage respectively (Khadria 2006a).

The "equitable adversary analysis" of costs as well as benefits of restructuring innovation systems would help countries of the South press and persuade for international norms in the Mode 4 negotiations of the GATS in WTO on the issue of movement of 'natural persons' as service providers under trade, which is just another description for propagating the temporary entry route for non-nationals, as opposed to circular mobility through permanent migration and dual citizenship.

That the temporary route – operationalised by the "open and shut" migration policies of the recipient countries of the North - has been full of *vulnerabilities* for their migrants at the micro level (those beginning with the varying consular practices), and one that leads *to instabilities* of the 'cobweb disequilibrium' variety in their education, skill formation and R&D, as well as the labor markets at the macro level must be conveyed emphatically. Frequent policy changes in the destination countries further put the migrants at a great disadvantage. British migration policy, for example, has seen many trials and tribulations lately. This kind of instability leads to policy asymmetry. One way of taking the first concrete steps towards upholding a demand for guaranteed removal of these two key elements from practice would perhaps be that the South countries must not only think but actually show South-South cooperation, rather solidarity in creating intra-south innovation systems. Possibilities from new configurations like BRIC (Brazil, Russia, India, China) or emerging configurations like, what Khadria (2010) would call, the RSEs or 'Rising Southern Economies' (BRIC plus South Africa and Mexico) could be the new ground for such hope about South-South cooperation in innovations of what he calls the 'third-country development model' of migration.

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