

**Global Mobility of Talent from a Perspective of New Industrial Policy:
Open Migration Chains and Diaspora Networks**

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1. Introduction: Global Migration of Talent as an Opportunity

All the very valid concern about brain drain from developing countries notwithstanding, the paper argues for and demonstrates the possibility of win-win positive dynamics benefiting both sending countries and migrants themselves. Such a virtuous cycle is illustrated by India and greater China, where it is more relevant to talk about 'brain circulation' and 'brain exchange' rather than habitual 'brain drain' (see A. L. Saxenian in this volume). But even in cases of low-skilled migration, such as migration from Mexico, one can find evidence of mutually beneficial gains. Yet the 'win-win' dynamics we argue for is not automatic. It is a gradual step-by-step process which requires ingenuity and creativity to trigger. To stress the possibility of such virtuous dynamics, we introduce two key notions: open migration chains and Diaspora networks. Open migration chains are sequences of educational or job opportunities which allows a migrant to move to progressively complex educational and job tasks necessary to work in the global environment. Diaspora networks (or expatriate networks) are the locus of concerted action by expatriates to promote their collective interests or to help them engage in their home countries. The notion of Diaspora networks is not to be confused with a familiar notion of Diasporas – a totality of individuals living abroad (as illustrated by Jewish Diaspora or Armenian Diaspora). Diasporas are composed of a surprising variety of Diaspora networks, some of them constructive and useful from the perspective of virtuous cycle we discuss here, but some are not necessarily so (if for instance a central concern of certain Diaspora members is political and defensive, thereby dividing and alienating rather than bringing together the members for a shared agenda of change). By focusing on Diaspora networks (micro-level phenomenon) rather than Diasporas

(macro-level phenomenon), we stress this heterogeneity and spontaneity of action.

To understand open migration chains and Diaspora networks, we put it into the context of the profound change in the organization of firms and value chains. In the last quarter century the textbook firm has gone from centralized and closed to decentralized or networked and open. At bottom this transformation reflects a profound and general innovation in the way we address cooperative problem solving. It was axiomatic for the 19th and much of the 20th century that problems beyond the reach of our individually limited capacities could only be solved by decomposing them, according to a master plan, into narrow, easily learned tasks, and then combining the results into the desired output. Today, in contrast, we increasingly solve such problems by looking for others who are already solving (part of) the problem we are facing. The central organizational challenge is accordingly not the management of the hierarchy that decomposes tasks and assembles outputs, but rather constructing the **search networks that allow us to find and collaborate with those who are already learning what we need to know**. This shift from hierarchy to search network has profound effects on global supply chains, and therefore on strategies of economic development—new industrial strategies—in general, and on the role of high and low skill diaspora networks in particular.

Section 2 indicates how a shift in the mobility possibilities of immigrants/migrants leads to a transformative fusion of traditional migration chains (in which the success of one villager in a low-skill job abroad attracts first one neighbor or cousin, then the next) and internal job ladders (where high skill employers work and learn from one task to a hierarchically more demanding one within a closed corporation) into open migration chains: the pattern, characteristic of high-skill diasporas, where migration chains (including flows back and forth between host and sending countries) grow up where early migrants discover the possibility of acquiring at school and work the skills needed to participate at higher and higher

levels in many, loosely linked firms in some sector of the decentralizing world economy. Section 3 highlights a new role of Diasporas as search networks – as bridges between capabilities at home and opportunities abroad. Section 4 summarizes tentative lessons on how to organize deliberate action to institutionalize a variety of existing Diaspora networks into search networks. More analytical sections 5 and 6 put the strands together by examining the global context of profound restructuring of value chains. Section 5 presents a compressed account of the innovative institutional mechanisms that undergird the new forms of collaboration and shows how these mechanisms explain transformations in supply chains that elude other interpretations. Section 6 outlines respective policy implications which we call, provisionally and tentatively, new industrial policy. Interventions to promote open migration chains and Diaspora networks is one example of such ‘new industrial policy’. Section 7 provides conclusions.

We do not pretend to give a full theoretical account of the changes under consideration, and still less to weigh all the evidence for and against the conclusions we draw. Our purpose rather is to present a unified account of developments normally treated as distinct policy domains, and thereby to call attention to connections among current problems and possible responses to them that may be of interest to practitioners leery of both partial, potentially incompatible solutions and disjointed theoretical discussions that reinforce traditional distinctions rather than helping to overcome them.

2. From Job Ladders to Open Migration Chains

Much of labor market theory of the late 20th century was focused on industrial jobs. Within that broad domain, it was common, perhaps standard, to treat migration between countries as concerning low-skilled workers, and to treat skill acquisition as occurring through learning on the job within the large,

hierarchically organized corporation described above. Given the organization of production in those firms, moreover, most learning was plant or firm specific: It followed from the decomposition of large projects, such as design and production of a car, into small, linked tasks, that the *machines* needed for any step would be highly specialized and tightly matched in its specifications to the machine that produced its input and the machine that used its output. Machines designed to be used only with other machines in such a sequence are called asset specific—they have no value for any other use. By the same logic, the *skills* needed to operate each machine consisted in the largely tacit knowledge of the peculiarities of that machine in relation to upstream and downstream operations. (The knowledge was almost sure to be largely tacit, because the machines, in relation to their neighbors, were effectively unique, and formalization, at least in the then current view, was the statement of the general features of some process or situation.) Workers with little or no formal education learned these skills by progressing from machine to machine, and absorbing from more experienced colleagues, not from books, the highly specialized knowledge they needed. These job sequences were called job ladders. It was a sign of the importance of tacit knowledge in these job ladders and the economy as a whole that returns to formal education were low—for many workers in the US, for instance, there was little penalty, in lifetime earnings, for quitting high school or skipping college because the skills needed for responsible, high paying jobs could be acquired in many cases by an industrial “apprenticeship” in a particular factory or firm.

It was a further feature of this world that migration and skill acquisition were distinct phenomena. Migrants were presumed, correctly, to be seeking higher incomes, and vastly increased possibilities for savings, but not new skills, when they went abroad. Their goal was to remit as much as possible to their families at home while working in the receiving country, and to return as soon as possible, and with as much wealth as possible, to their home countries. They were not interested in investing in skill acquisition as they were not planning to stay abroad long enough to reap the returns in their investment. However unattractive, low-

skill jobs were acceptable because they paid wages that were extraordinary high by home country standards. Given these goals, they lived in effect in a no-man's land between their home and their (temporary) destination. Often they in fact circulated back and forth, as economic and family circumstances dictated. They were, in a famous phrase, birds of passage. The guest workers brought to Western European factories in the 1960s and 70s fit this pattern perfectly, but they had many forebearers from the late 19th century on.

A central problem for these birds of passage was, and remains, the identification of plentiful, geographically concentrated supplies of low-skill jobs over long distances. The jobs had to be plentiful and close together because, being low skilled and thus undifferentiated, there could be no guarantee than any particular one would prove stable. Migrants had to compensate for the potential instability of any one job by the easy availability of others, all so close to each other that changing jobs did not require changing homes. Finding such jobs required scanning many possible destinations for a single piece of information: are jobs available at this place for people "like us." An efficient way to scan was to rely on a network of relatives, friends and acquaintances from one's home village as they were also looking for unskilled jobs abroad. Members or nodes in this network know little about each other—they rarely have worked or done business together, for instance—but they know all that is needed to be known, for purposes of the joint search, about labor market conditions. Links of this kind—rich in information about a particular, thin slice of the world, poor in information about the character and abilities of the network members—are called weak ties; and the migration flows that result from a network of weak ties directing migrants from a given origin to follow the news of plentiful, low skill jobs to a common destination is a migration chain.

A key consequence of the shift to networked organization based on search networks rather than hierarchy is to "de-specify" machines and skills—to make both more general purpose. Assume, as we did above, that a firm knows in

advance that it cannot be sure what products it will be making two years from now, and how any of those products will be designed until many outsiders have revised initial projects. In that case it sacrifices some of the efficiency that comes with a machine that can do one thing and one thing only; rather it buys general purpose machines that can easily be reprogrammed to do many different operations. The shift means, however, that learning to shift from operation to operation with a given, large domain, and, more broadly still, learning to learn, become master skills, each based on substantial bodies of formal knowledge. There is less and less wholly unskilled work and even the relatively unskilled work is no longer plant specific—think of the general team-working skills needed by workers doing assembly work in just-in-time factories. A crude but revealing measure of this shift is the rapidly increasing returns to formal education, and the corresponding increase in the gap between the lifetime wages of unskilled and skilled, not to say professional workers.

Potential migrants, of course, notice this shift. Those with good educational prospects at home go abroad to get still better ones, and then jobs that enable them to learn even more. Those with lesser opportunities start to think about improving them abroad, fearing that their long-term employability depends on their doing so. Instead of looking for destinations with plentiful unskilled jobs, migrants begin to look for destinations that offer many possibilities for skill acquisition at work or in school. As job ladders are transformed into more open, inter-firm, and more formally skilled labor markets, and weak ties among migrants begin to communicate information about learning possibilities, migration chains become open mobility networks—means for discovering where to go to learn how to learn to prosper in the reorganizing economy. High-skill Diasporas are a conspicuous example of such networks.

Proliferation of professional association of Diaspora members is evidence of this transition from thin to thick search networks. Associations such as the association of doctors of Armenian origin in the US or the Association of

Engineers from Latin America are formed precisely as such 'thick' networks to help members identify opportunities for professional advancement. Mentoring – when more experienced and successful members who already 'made it' share their personal networks and knowledge with younger members who are just entering their migration chains – is a central feature of these associations. Perhaps the most famous and successful organisation of this kind -- the Indus Entrepreneurs (TiE) was started in 1992 as a conduit for experienced Indians to mentor others and to provide a broad forum for networking and learning for its members. TiE is an institutionalised search network to help its members to move up in their migration chains.

Even more significantly, this change affects not only professional associations; it now extends beyond skilled migrants defined as those with tertiary degrees. Hometown associations of migrants of Mexican origin (there are more than 70 of those in the US) were started in the 50's with a primary objective to defend the rights of (often illegal) labor migrants from Mexico, the vast majority of them unskilled. Hometown associations used to be paragons of institutionalized but thin search networks which identified job opportunities, provided mutual help (including practical ways to live and work as an illegal) from local communities of Mexico. Migrants from Zacatecas (a poor state in the center-North of Mexico), for instance, have a hometown association in almost every major US city. But with time, and as many migrants became legal and progressed in their migration chains from hamburger-flippers to supervisors of these hamburger-flippers two things started to happen.

First, an acute shortage of native-speaking supervisors and shop-floor managers has started to occur. Migrants from Mexico do not speak fluent English. If only for this reason, their managers better be their compatriots. Seizing the opportunity of migrants as a rapidly growing market is another compelling reason. So significant is the shortage of certain Spanish-speaking managerial positions that identifying and training such managers is now a central

task of the Association of Latin American professionals.² Naturally, open-ended migrants' organizations such as Mexico's home-town associations see this opportunity and contribute to this transformation but introducing mentoring too. For example, they direct their members to appropriate training programs and other job advancement opportunities. What started as a paragon of a thin search network of low-skilled migrants is showing signs of transformation to thick search networks to move the members along their migration chain.

But the story does not end here. As migrants progress along their migration chain and acquire self-confidence which comes with personal and professional success, they start thinking about giving to and helping not just their families but the communities they came from. Hometown associations from Zacatecas, in collaboration with the state government of Zacatecas, designed and co-financed a highly successful three-for-one program of investment in community infrastructure: small roads, schools, hospitals, etc. in their home communities (F. Torres, 2005). The program is called three-for-one because for every peso the hometown associations put in; state and federal governments contribute another peso each. Although the vast majority of members of hometown associations are not wealthy, surpassingly and counter-intuitively, the binding constraint for this program of collective remittances has always been contributions from the Mexico government, not the donations of the migrants (F. Torres, 2005). Financial transfers are not even the most important aspect of collective remittance – governance and monitoring is. Community infrastructure projects in question need to be identified, financed and managed through a network of very diverse stakeholders which (used to) have little trust in each other: municipal government, users of the infrastructure, migrants, etc. As migrants are contributing their own money, they are highly motivated to make the project succeed rather than decay as often happens with public work projects.

² A. Peralta – head of the association, conversation with the author Y. Kuznetsov during the meeting of professionals of Mexican origin with Mexico' president V. Fox. The meeting was organized by CONACYT (Mexico' Ministry for Science and Technology) and CEO of AMD (a Mexican himself) in New York on September 24, 25, 2003.

But to make them work, they need to monitor them, both from a distance and through frequent visits to their home town. The Diaspora network in this example is a transnational search network: Diaspora members work with stakeholders at home to design, co-finance and govern projects to benefit their communities at home.

The implicit evolution at work here mirrors one advancement in the migration chain. As migrants advance from low-paid and low-skilled labor to higher-paid and higher-skilled, they acquire confidence to think about club goods of giving back to the communities of their home countries. Thin search networks of simple job searches evolve first into thick search networks of professional advancement, mentoring and learning and then into Diaspora networks contributing to their home countries. Whether these three things – simple job search, professional advancement and engagement to contribute to home countries -- are stages of the process or its functions is an open question. Tentative evidence we have from Diaspora networks of India , Mexico and Armenia signals that it is difficult to skip stages and it is more accurate to think about them as a succession of stages. But it doesn't mean, for instance, that an association of, say, Argentinean professionals in the US should wait decades before designing a meaningful agenda of giving back at home or that it should mimic the evolution of other professional associations such as TiE.

Motivation to get engaged with the home country is decidedly intrinsic (i.e. it comes from inside rather than as a response to a set of incentives): participation is its own reward. Intrinsic motivation is a central concern of so-called third-force psychology -- it does not provide a conclusive answer. Abraham Malsow's hierarchy of needs argues convincingly that one needs to satisfy basic needs before indulging in the luxury of self-actualization (Maslow...). Yet on the other hand, Viktor Frankl provides a no less compelling personal account of how self-actualization became a pre-condition for mere survival (see his personal story of life in harsh environment of a concentration camp, V. Frankl...). To the extent that Diasporas are called forth in critical moments of crisis and transition (think about present-day Iraq and Afghanistan, Israel in the 1940s and 50s, and

Armenia in the 90's), these issues are central to a rapidly growing literature on how to elicit contributions from Diaspora members to benefit their home countries, yet they are rarely discussed. When asked why she abandoned the comfort and security of her home to come to a newly formed Israel, Golda Meir responded, paradoxically, that it was 'pure selfishness'. The task was so challenging and huge that 'I must be a part of it. Just pure selfishness, I suppose' (G. Meir quoted in A. Hirschman, 1975).

In what follows, we focus on Diaspora networks as transnational search networks that evolved enough to engage in projects in home countries.

3. Diaspora networks as transnational search networks

It is well known that expatriates have played a critical role in accelerating technology exchange and foreign direct investment in the economies of India, China and Israel. They have frequently taken the role of pioneer investors at a time when major capital markets regarded these economies as too risky. For some, there is non-financial intrinsic motivation for an early stage of participation. Others have effective mechanisms for risk mitigation that are not available to other investors. Many other nations now have the combination of successful expatriate communities and economies regarded as too risky for mainstream investors. Other economies have enjoyed significant FDI but face the challenge of moving to higher knowledge-intensive development (Latin American economies, new EU members). Expatriates abroad can serve as an entry point into new markets.

Yet there is something profoundly elusive in defining Diaspora contributions to home countries. First, when the role of Diasporas is most useful, it is most difficult to define. For instance, in the end of the nineties Korean chaebols such as Samsung were no longer able to obtain key technologies from USA multinationals through licensing which were their routine channels for decades:

Samsung was considered too advanced and technologies were too critical to warrant such licensing. An expensive government program – a pre-competitive stage consortium -- was put together by the Korean government to deal with the problem, and it failed because the chaebols have little trust in each other and experience in private-to-private concerted action. Yet where high intensity government program failed, light touch Diaspora intervention succeeded. A small network of Koreans working for cutting edge firms proved critical in identifying binding constraints and designing ways to obtain and transfer necessary knowledge. Some of them came back to Korea to work for the chaebols in question while others remained in the US as antennas for the expertise. A transnational search network again. Note that their contribution was not reverse engineering and much less industrial espionage. They helped to identify the critical constraints, ways to solve them and ways to identify the relevant technical knowledge in the US. They were a search network, but someone else – the Korean chaebols, the government and the spin-offs of the Korean chaebols -- needed to act on their leads.

Second, while the strength and magnitude of the talent abroad is important, the strength of home country institutions to utilize the talent abroad is critical. Thus Chile, Korea or Scotland – countries with strong institutions – utilize their Diasporas well, whereas Armenia or Argentina fail to take advantage of their talent in spite of many programs. Yet another set of countries such as Russia, Bosnia or Ukraine does not even see their talent abroad as an opportunity.

Third, although successful cases of Diaspora engagement are relatively rare, when they do happen it is not due to a deliberate intervention. In most cases Diasporas and expatriate networks emerge spontaneously as a manna solution. Serendipity – a happy coincidence – seems to be much more important than government interventions.

These are the three paradoxes of Diasporas. Our explanation of these paradoxes is the following. A prevalent view is that engagement of the Diaspora is about a well-defined full-time job (or its part-time equivalent): investor, consultant, lawyer, philanthropists, business angel is currently prevalent but it is

basically incorrect. That of course may happen but a lot of steps have to be taken before. We argue, however, that the expatriates are more important and useful as bridges, translators and midwives: they open the doors and make connections but someone else still has to do the job. In contrast, a common perception is that they are somehow best suited 'to do the job'. This is why government and the private sector of the home country are so crucial: they need to do the job, not the Diaspora members themselves. Diasporas may be crucial to help formulate new and innovative projects but it is up to home country organizations to implement it. But since those are often weak and rudimentary, Diasporas are viewed as substitutes of this weakness. This is an expectation which is understandable but wrong. Diaspora members are no substitutes, they are complements to activities of home country organizations. This of course means also that Diasporas can be very instrumental in strengthening home country organizations.

To illustrate how it works, let us give an example of an institutional and successful search network – GlobalScot, and two Diaspora networks in the making, one in Chile and another in Mexico.

GlobalScot is a highly innovative and highly successful program to form a network of about 800 high-powered Scots all over the world and use their expertise and influence as 'antennas', 'bridges' and springboards to generate a surprising variety of projects in Scotland. Box 1 conveys a gist of this diversity. Interestingly, although GlobalScot relies on all the strengths of Scottish Enterprise (its home organization -- a highly capable local economic development organization) even GlobalScot failed to utilize the ideas and connections from GlobalScott members. The GlobalScot is now increasingly forging connections between its members and businesses in Scotland by-passing Scottish Enterprises.

Chile takes inspiration from GlobalScot and is currently in the process of designing a program called ChileGlobal. It is housed in Foundation Chile, a premier and highly idiosyncratic business innovation organization which designs and finances business innovation projects. ChileGlobal – a network of about 60

(as of May of 2005) influential Chileans in USA, Canada and Europe -- is a natural extension of the core business of Foundation Chile. The Foundation is an incubator of search networks, and ChileGlobal is seen as yet another such search network, albeit special.

Box 1: How the Search Network is Useful for Home Countries: Examples of GlobalScot
an inward investment project was identified through one of the first founding members to respond to the invitation to participate in GlobalScot. It has now brought an internet licensing company to Glasgow, initially employing eight people which, according to the founder will “quickly become a multi-million pound business”.

An electronic engineering company that designs, tests and manufactures innovative condition monitoring systems, received, within a day of requesting, a full day’s advice on how to agree to a licensing deal with a large US blue chip company at a crucial stage of negotiations.

A specialist training provider to the international oil and gas industry, looking for an entry point into the Gulf of Mexico was connected to a global Scot (ex-President of Enterprise Oil, Gulf of Mexico) who introduced them to a number of oil and gas companies in the region leading to business with several of the companies and a firm foothold in the market.

A company specializing in the creation of virtual characters for gaming software was able to make valuable connections with a number of global Scots during a trip to California for an exhibition. A non-executive director at the company described the contacts as “an absolute bullseye target for the type of business advice needed...people you would never dream of trying to reach as there would usually be about a dozen gatekeepers between you.”

A GlobalScot member who is VP Production Procurement at IBM, donated one day a month to working with SE’s electronics team, providing insight into the global electronics sector by advising on new product developments, growing and shrinking markets and new opportunities.

A University of Strathclyde spinout company, developing the application of innovative 3-D display technology for use in medical imaging sectors and oil industries requested access to US-based GlobalScots who could advise on the commercial development of imaging technology. Thirty-two members in the medical imaging sector

responded immediately, resulting in valuable relationships which saved initial consultancy fees and opened doors into commercial entities that would have been inaccessible otherwise.

A GlobalScot member who is Chief Scientist & VP Research and Development for a West Coast US Biotechnology company undertook a two-day tour of the Scottish biotechnology sector which directly influenced SE's Biotechnology Framework for Action. Back in California, he engaged other life sciences members in implementing his report, resulting in a program to develop internships for Scottish life science students within Californian firms.

ITI Scotland is a £450 million, ten-year project to encourage and support pre-competitive research in key market areas with strong economic and business development potential. GlobalScot members were actively involved in the initial consultation process ensuring that final proposals were specifically targeted to address the particular strengths of the Scottish economy. One member, President of University of Maryland Biotechnology Institute, also delivered a virtual address at the launch of ITI Scotland, observing that "extremely innovative, cross-cutting research was already underway".

Source: M. McRae, Head, GlobalScot, Scottish Enterprise

Our point that search networks help uncover partial solutions that are working can be illustrated by the case of Mexico. Mexican Ministry of Science and Technology views about a million of tertiary- educated Mexicans in the US (about 400,000 of them in managerial positions) as a unique opportunity which Mexico hasn't even started to explore. Hence, with advisory assistance from the World Bank, CONACYT started 'Red de Talentos para Innovacion' – a network of talents for innovation – its own search network similar to ChileGlobal and GlobalScot.

But it very rapidly found itself in a catch. By its very nature search networks are inter-disciplinary and inter-organizational: they bridge boundaries and articulate new projects by finding previously unnoticed similarities. This is why bridge organizations such as Fundacion Chile and Scottish enterprise are so critical:

they serve as incubators of search networks. But in Mexico there is nothing similar exists to Fundacion Chile. Moreover, there is no tradition of meaningful inter-organizational communication and joint action. There is no dearth of inter-ministerial councils to coordinate issues but they tend to be cartels of established interests, an arena where each agency protects its turf. Moreover, in a corporatist structure every such action was mandated from the very top, and breakdowns of the corporatist system resulted in a governance paralysis at a federal level. To proceed, the Mexico Talent Abroad program required creative and day-to-day collaboration between Ministry of Foreign Relations, Ministry of Economy and Ministry of Science and Technology (CONACYT). A solution (an unintended one?) found by high-ranking official of CONACYT was simple yet brilliant. He instituted a series of meetings of relevant agencies which were held on Saturdays. The fact that the meetings were outside the established routines helped to open a meaningful discussion and to define a new agenda of concerted action. Management of the program is done by Mexican Enterprise Accelerator in San Jose, California which is established by the Ministry of Economy. All these are embryos of a possible future Fundacion Chile yet to be invented in the Mexico context. Hence, a humble and small (judged by its cost to the government purse) Diaspora program is an important organizational innovation to discover post-corporatist governance structure for the country.

This is an example of how Diaspora networks help formalize other networks while making them more effective as a means for incubating new programs as governance structures as well as new projects. Now that we have an idea of how serendipity in the formation of Diaspora networks can be transformed (through Saturdays-only meetings or otherwise) into more systematic 'guided serendipity', let us turn to the discussion of lessons of the design of deliberate programs to utilize Diasporas of talent for the benefits of the home countries.

4. Turning Diaspora networks into search networks: Interventions to trigger guided serendipity

This section provides some observation on how deliberate action can trigger Diaspora networks. We describe a series of light touch interventions which guide the serendipity of Diaspora networks and transform them into sophisticated search networks.

4.1 Turning 'transactions' into 'discussions: project development vs. project financing'

Diaspora members can be useful to their home countries in two broadly defined modes of involvement: 'discussions' and 'transactions'. 'Discussions' include websites, conferences, workshops, on-line communications and other activities helping Diaspora members get to know each other, connect with each other and define in which way they can contribute to the development of their home countries. 'Transactions' involve actions usually requiring time commitment and sometimes, although not necessarily, or even desirably, monetary contributions.

Diaspora activities are easy to start but very difficult to sustain. Enthusiasm to get involved is enormous and it feeds into Diaspora web sites, conferences and other meetings. Those do not require major commitments of either personal time or money. But initial enthusiasm tends to evaporate as easily as it emerges: people get tired of meetings and discussions alone. The most common mistake is to be carried away by discussions (organizing Diaspora conferences) without turning them into tangible outcomes like projects. People usually like to see tangible outcomes: joint research projects with home country scientists, helping a start up in the home country find new markets. Let's call these tangible activities 'transactions' or 'projects'. A project then is a set of discreet activities and outcomes which can be measured. A project can be as small as a visit of a

university professor to a home country but it does require active commitment in terms of personal time and money.

What we are after in Diaspora programs is eliciting commitments of Diaspora members. The commitment can come in terms of time related to development of project and in terms of money – financing a project. A project can be commercial or philanthropic, although this dichotomy is becoming increasingly obsolete.

The biggest and most typical case is 'feeling good' donations – small amount of cash from many dispersed members of Diaspora. Large 'showcase' donations are different as they come from a few wealthy individuals but in the end they share a common feature – they are all about money and require little personal engagement in designing and supervising the projects that these donations would be financing.

Triggering a process to transform 'discussions' into 'transactions' appears to be a key issue. Most of Diaspora initiatives run out of steam (and thus eventually fail) because they fail in this transformation from discussions to projects. Many Diaspora initiatives naively assume that initial enthusiasm would spontaneously result in something tangible and the enthusiasm will continue forever. The central issue is a long gestation period from initial discussions to commitments (particularly when large commitments are involved). All too often results are expected quickly. This is a valid attitude since visible demonstrable effects are what keeps the process going. A recommendation then is to start with small commitments and small projects and increase them gradually and incrementally, with accumulation of trust and experience. Commitments may start from occasional lectures at a home university, supervision of a project of a talented student and grow, gradually and incrementally, to a large research project (in case of scientific networks) or business project (in case of business network of managers and entrepreneurs).

This blend of trust and experience is credibility. Credibility is a central issue and must be earned by all participants in the process. Given that many Diaspora

members were involved in the past in many activities which started with good intentions yet failed because a key actor (usually the government) was unable to keep its commitments, it does pay off to start small and produce small but tangible outcomes as a demonstration effect to win the hearts and minds of skeptics. Such a demonstration effect can be celebrated in meetings, conferences and workshops. The proposed sequence then is from small discussions to small transactions and only then to large discussions which are convened to generate, gradually with time, larger transactions. The usual sequence is large discussions which gradually devolve into small discussions because there are no transactions to focus the energy of the participants and maintain the momentum of the process.

4.2 Key role of individual champions to initiate the process and organizations to sustain it

When credibility is not yet developed, key individual champions initiate the process by investing their own social capital: they bring people together for a cause, the mobilization of Diaspora in our case. It is difficult to overestimate the role of individuals in triggering a sensible process of Diaspora mobilization. When little else is available or can be trusted, they are the key institutions. They make connections, ameliorate skepticism and propose project ideas. They move the process forward against all odds. Usually such champions combine their commitment as an individual with a high position in a formal hierarchy: they use resources and organizational 'weight' to initiate the process.

Many Diaspora initiatives failed because they failed to identify such champions and make sure they stay involved for a sufficiently long time. In the absence of individuals with high personal credibility, there is very little that can lend credibility to an insipient Diaspora process, particularly because governments begin with very little credibility.

Individuals are crucial to initiate the process; it is home country organizations which sustain it. Quality of home country organizations appears to be the single most important determinant of Diaspora initiatives. Diasporas could be massive, rich, and entrepreneurial and have a lot of enthusiasm to get involved, yet it is home country organizations which invariably become binding constraints. A kind of paradox (don't Diasporas, by definition, reside outside the country?) but it shows, again and again, that Diasporas are no panacea. Diaspora members live outside the country but once they engage the home country, they become constrained by its institutions. True, they can do a lot; perhaps more than anyone else, to relax these constraints in the longer run but in the short-term they will feel its bite quite strongly. This is why Chile and Scotland have had much more success in interactions with their Diasporas, even though these Diasporas are small and less resource-rich than Diasporas of Armenia and Argentina (countries with weak governments and inconsistent policies).

Huge variation in quality and sheer diversity of home country organizations creates a tremendous number of organizational paths to generate credible commitments of Diaspora members.

One can see both induced developments when a government program serves as a trigger. The evolution is from individuals to government organizations to non-government organizations, and spontaneous development, from key individuals outside the government to professional Diaspora associations playing a key role, to government organizations gradually assuming an increasingly important role. Spontaneous development tends to be sufficient in the case of large countries and large Diasporas (China and India are two paragons) while the induced development is necessary for small countries and small Diasporas.

In the environment of weak home country institutions, donors could play a stronger role in Diaspora mobilization. Donors are engaged with the country anyway, despite its institutional weaknesses. Using Diaspora as a partner for development provides donors with one more instrument. This could be a cost-

effective channel to provide development assistance, with a considerable upside gain if things suddenly turn out well. As an example one could consider Iraqi transitional government as a major pilot for the US to use Diaspora for achieving development goals.

5. Why search networks are becoming ubiquitous? Implications of profound restructuring of value chains

5.1 From Hierarchies to Search Networks

In the traditional organization headquarters set broad goals and successively lower levels of managers decomposed those goals into narrower and narrower ones. Eventually organizational routines specified in great detail how to parse and execute tasks, and verify their execution. (Chandler, 1977).

After roughly 1980, the textbook organization became federated and open. Decisions of higher units are shaped by lower ones; the lower units can be formally outside the organization. As information in this new organization flows up and down as well as sideways, the organizations are said to be networked. General designs are set provisionally by the highest level and revised in light of proposals by internal and external “lower” level units responsible for executing key subsystems. Rule following no longer entails exact obedience to orders, as in hierarchies, but rather the obligation to propose a new rule when the current one arguably defeats its purpose (Nohria and Eccles, 1992).

The networked firms arises from and is built to facilitate the iterative process of co-design whereby internal and external suppliers contribute to the redefinition of specifications for (components of) new products based on their experience in manufacturing existing models. These collaborative, co-design disciplines are utterly familiar (to practitioners) under the name of Japanese production methods, although they are no longer limited to Japanese firms or those in close

association with them. So pervasive are these practices that it is almost impossible to survey recent writings about the global economy without stumbling across extended reference to them.³

These methods establish a first idea of what to produce (and how) through benchmarking: an exacting survey of current products and processes, supplemented by assessments of new and unproved techniques that might become available for use. Once benchmarking provides a provisional starting point, design follows a disciplined, decentralized process known as simultaneous engineering. Each subunit responsible for a constituent component proposes modifications of the initial plan, while also considering the implication of like proposals from the other subunits for its own activities. Provisional designs are thus evaluated and refined, and the cost of each attribute is compared to its contribution to functionality using the techniques of value analysis/value engineering. Once production begins, systems of error detection and correction use breakdowns in the new routines to trigger searches for weaknesses of the design or production process that escaped earlier examination.⁴ The goal of such root cause analysis is to trace disruption back to its original source, which may not be palpably linked to the proximate cause of the breakdown. Moreover, the exchanges of information required to engage in benchmarking, simultaneous

³ Thus, for example, in discussing the value of long-term collaborative relationships based on voice rather than exit, LRT (“Beyond Markets and Hierarchies”, 51), refer to Steven Spear and H. Kent Bowen, “Decoding the DNA of the Toyota Production System”, *Harvard Business Review* (Sept.-Oct. 1999), 97-106. This article provides a useful discussion of the disciplines by which Toyota tests and revises the assumptions.

⁴ Langlois notes the possibility of using disruption as a cue for problem solving and continuous improvement, but confuses the form of tight coupling by just-in-time inventory systems with the non-decomposability of production and erroneously concludes that it would be beneficial “only for some kinds of relatively stable systems where frequent change is not important” (Langlois, “Modularity”, 24). Any textbook on Japanese production methods will demonstrate that root-cause analysis and related problem-solving techniques are especially useful to reduce set-up times and otherwise facilitate small-batch production in volatile environments.

engineering, and error detection and correction also allow the collaborators to monitor one another's activities, closely enough to detect performance failures and deception before they lead to disastrous consequences. Ultimately, these information exchanges lead the actors to convergent understandings of the world they are exploring. We can think of these disciplines as pragmatist, in the sense that they oblige firms routinely to question the suitability of their current routines and continuously to readjust their ends and means to one another in light of the results of such questioning.⁵

Taken together, these new pragmatist disciplines play an important part both in mitigating the cognitive self-limitation at the heart of the innovator's dilemma and in shaping the links that connect firms in the new economy to each other. They increase the mutual transparency of the actors essentially by revealing to each how widely and rigorously the others scan for solutions in addressing joint problems of design or quality. In the form of benchmarking or root-cause analysis, for example, they require the actors to undertake searches that are unbounded ex ante (consider all the products "like" the one you want to build; assume that the root cause of a problem will have no direct connection to the proximate cause), yet sufficiently informative to produce a serviceable map of the available solution space. As each party monitors the others' search process, tacit knowledge is rendered at least partly explicit, easing long-range collaboration (by reducing the chances that the parties take incompatible things for granted) and reducing the chance that all the parties cling to the same dangerously limited assumption (by routinely disrupting the disposition to take the same things for granted). These disciplines thus decompose complex systems into recombinable chunks while providing elements of a form of governance of intra- and inter-firm relations that is based neither on traditional, highly detailed contracts (or relational variants of them) or on trust born of long familiarity. Put another way,

⁵ For a fuller discussion, on which this presentation draws, see Susan Helper, John Paul MacDuffie, and Charles F. Sabel, "Pragmatic Collaborations: Advancing Knowledge While Controlling Opportunism", *Industrial and Corporate Change* 9, 443-83.

these disciplines point towards a form of flexible or continuously corrigible formalization that blurs the distinction between tacit and fully explicit knowledge, on the one hand, and between informal and rigidly specified governance on the other. Linking actors in this way, the disciplines of iterative co-design create structures—search networks—that allow potential collaborators both to redefine the problems they face and make use of (partial) solutions that were unlikely to be counted as such until the problem itself was recast to reveal the connection.

Network organizations relying on such search networks manifestly outperform out-perform hierarchies in volatile environments, where goals change so quickly that reducing them to a seamless set of task specifications is highly risky, if it is possible at all. Specifically, in such environments the open, federated organization can produce a more useful and resilient design for a product or service by canvassing more alternatives in less time than a hierarchy with a like purpose (Eisenhardt and Tabrizi, 1995; Ward et al, 1995). Often the network organization can achieve simultaneously three goals—cutting development time while increasing the utility and reliability of designs—which hierarchies are thought to have to trade against each other, and that only in stable environments.

5. 2 Supply Chains, Modules and Clusters

This reading of the organizational transformation of the large firm suggests an understanding of global supply chains, and of the room for maneuver of suppliers in developing economies, at odds with two influential but contrary views of these structures. The first view assumes that subsystems and large components can be defined by the lead producer or by the large retailer who will sell the final product with sufficient precision that suppliers (and suppliers to the first-tier suppliers, and so on down) can produce what is needed simply by following instructions. This is the hierarchical division of labor dispersed on a global scale to take advantage of low wages and other locational advantages. It makes the developing country suppliers who participate in this “commodity chains” almost

completely dependent on the designs, in all senses, of the lead, rich country producer or retailer. But there is overwhelming evidence, in industries as varied as chip design, automobile parts, running shoes and sports clothing that the kind of robust modularity and fixity of design required for such a strategy is simply unsustainable given the rapidity of changes in markets and technology. Hence in all these industries suppliers are being pressed to expand their design capacities, or, better, their capacity to engage in iterated co-design; and as they do, of course, they increase their ability to engage new customers, enter new markets, and generally increase their autonomy.

The second and contrary view says that it is not (a new type) of highly detailed instructions that make possible global supply chain, rather the (new?) capacity to engage in highly informal relations, over long distances, that explains the current decentralization of production. Economists sometimes model this development as a variant of familiar repeat-play games. More often it is discussed in terms of clusters or industrial districts—geographically concentrated groups of firms in the same or related industries which together respond flexibly to changing demand based on their long history of collaboration. Global supply chains, on this view, are connecting into, or helping to create such clusters or districts, although it is unclear just how much autonomy they have with respect to their lead customers.

Although this view is right in seeing the current unit of production as groups of firms (and external organizations providing complementary services that small and medium-sized producers cannot provide themselves), and also right to see that geographic proximity is still relevant to production in a global age, it overlooks a substantial body of new evidence showing that mastery of the pragmatist disciplines is a precondition for participation in global supply chains as much for firms in established, advanced country clusters and as for firms in developing economy clusters that are just now forming or struggling to “upgrade” their position in the hierarchy of skill.

5. 3 Hybrids and their Implication for Governance

In arguing that pragmatic collaboration, and not modularity or informalism, is the distinctive structuring principle of the globalizing, new economy, we do not mean to suggest that all relations within and among firms in the new economy are, or will soon be pragmatically collaborative. On the contrary, it is evident that customers and suppliers within and outside of districts frequently maintain a mix of relations with their various partners, engaging in iterated co-design with some, repeat but informal collaboration with others, while working at arms' length—perhaps on the basis of modular standards—with still others. The reasons for the persistence of these “traditional” forms of collaboration are in part transitional—related to problems of strategic coordination between customers and suppliers both anxious to minimize the costs to themselves of moving to new forms of cooperation—and in part fundamental—related to the very nature of iterated co-design itself. In practice the two sets of reasons will often blur together, but it is useful to distinguish them for analytic purposes, as we will do briefly here.

The transitional problems of strategic co-ordination result immediately from the trade off faced by, say, a large customer entertaining dealings with a range of potential suppliers. From the customer's standpoint, of course, the ideal supplier would be the most capable designer as well as the lowest cost, most reliable producer. But even if pragmatic collaborators can offer bundles of design capacity, efficiency and reliability that cannot be matched by traditional suppliers, at any moment there are almost surely some modularizing competitors offering, say, a combination of minimally acceptable levels of design capacity and reliability at highly advantageous prices. Whether the customer contracts with the low-cost supplier rather than the pragmatic collaborator will depend at least as much, and probably more, on the conflicting short term concerns of operating managers—the need, for instance, to turn a big profit on this deal, rather than worry about next-generation design—as on the strategic vision of the higher ups.

Thus customers will engage in co-design with some—but only some, and not always the same—actors all the time, while dealing traditionally with the rest. Faced with the apparent inconsistency of the customer's relation to them, suppliers will hedge their own behavior to survive arms'-length as well as (different kinds) of cooperation. Their responses in turn permit, and may encourage, continuation of the customers' strategic vacillations.

This transitional confusion is compounded by an ambiguity at the heart of iterated co-design. We saw that iterated co-design emerges in response both to the need to formalize collaboration in volatile conditions and the impossibility of doing so completely. It uses devices such as benchmarking and error-detection and correction to trigger disciplined discussions of what can, at any moment, usefully be formalized, and how. But in the end these devices are only aides to discussion: They reduce the possibility of ignorant, complacent mistakes, without guaranteeing far sighted decisions. In the end, as usual, actors, not algorithms, decide strategic questions. In particular, what to formalize, even assuming the most benign collaborators imaginable, remains at the margin a matter of judgement, even if the judgement is informed by application of new, pragmatic formalisms. Large customers, with their highly institutionalized division of responsibilities between marketing, design, and sourcing are especially likely to get caught up in disputes about short-term advantages of different supply relations. Small and medium suppliers, lacking the resources fully to assess their long-term possibilities, or recover from badly misplaced bets, are especially likely to be daunted by deep strategic ambiguity, and hence to waver erratically between choices too timid and too bold. While iterated co-design is arguably central to the new economy in setting the standard by which other forms of collaboration are judged and providing the tools for refining those judgments, for the foreseeable future, traditional relations will continue to exist alongside the innovate ones (though, to raise a consideration we can not pursue here, the traditional character of these relations is likely to be colored and perhaps transformed by their association with the novel types).

A corollary to this clarification of the role of pragmatic collaboration is that governance—here the institutions that shape firms' decisions about their internal organization and relations to collaborators—matters at least as much in the new economy as in the old. Where the ground-level or first-order actors such as corporate purchasing departments or district firms face problems of short-term strategic co-ordination and long-term strategic uncertainty, the danger is particularly great that well founded local decisions will produce disastrous global outcomes. Governance institutions that reduce the chances of stumbling into such traps by providing the actors with information they would not otherwise have before they decide, and then helping them catch errors early through deliberate, periodic review of their decisions are in such circumstances especially valuable. We will see that the idea of search networks turns out to be as relevant to this economy wide problem as to problems of intra- and inter-firm organization

6. Policy implications: New Industrial Policy

Industrial policy is a set of instruments to upgrade firms and promote economic restructuring. Vertical industrial policy sometimes associated with 'picking winners' was focused on promotion of backward and forward linkages. Its successes (South Korea, Japan) are spectacular and well known, and so are the failures. Traditional industrial policy has three set of problems:

-- Cognitive limitations: 'picking winners' in modern fast-changing industries is next to impossible. 'Winners' are continuously evolving: this is a **self-discovery problem**

-- Very limited capacity of public sector to make an informed choice: **capability problem**

-- Capture by vested/ entrenched interests: **a problem of dis-entrenchment**

A key concept of new industrial policy – search networks -- allows a resolution to these problems. The example of creation of venture capital industry in Taiwan (see Saxenian, this volume, for more details) helps to clarify how. When the Taiwanese government decided to promote venture capital industry in the beginning of the 80's, it had neither the capabilities, nor a blueprint to do that. Furthermore, the concept of venture capital was foreign to traditional Taiwanese practice, in which family members closely controlled all of a business's financial affairs -- entrenched interests were strong. Through a process of intense interactions with the Taiwanese Diaspora in Silicon Valley, new institutions such as Seed Fund (with initial allocation of NT\$800 mln, later complemented by additional 1.6 billion) provided matching capital contributions to private venture capital funds.

Two American-style venture funds: H&Q Asia Pacific and Walden International Investment Group were created in the mid-80's. They were managed by US-educated overseas Chinese who received invitations to reallocate to Taiwan. Once first venture funds proved successful, domestic IT firms created their own VC funds. Once those started to pay-off, even the conservative family groups started to invest in venture capital funds and IT businesses.

A search network consisting initially of key members of Taiwanese government and leading overseas Chinese engineers in Silicon Valley was central in the emergence of modern venture capital industry in a very unlikely place dominated by conservative and risk-averse business groups. This search network didn't have a blueprint, yet did have a role model (Silicon Valley) and a clear idea of 'what to do next'. By defining each subsequent step along the road, the search network became wider, with eventual incorporation of skeptics and opponents. The venture capital industry in Taiwan was co-designed and co-created by this search network in exactly the same way as a new model of car is co-designed in Japanese methods of simultaneous engineering discussed in the previous section.

- The solution to the problem of creating new industries (?), when almost no elements exist to create it, is revolutionary incrementalism. This means step by step transformation of bad public and private features by drawing first on the exceptions from the general rule. This in turn requires using internal diversity to find better performing parts of each, and matching them
- This is just what search networks do.
- In the case of Taiwan venture capital industry, the Diaspora networks proved critical to trigger a dynamic and resilient search network. To be more specific, it was a case of dual (government and Diaspora) leadership. Yet in many instances search networks emerge in a more low-key way, with the government playing a supporting role. Supplier development programs in the case in point.

Supplier development programs are a joint effort of buyers (usually more capable and large companies) and potential suppliers (usually small and medium-sized enterprises) to upgrade potential suppliers so that they can meet buyer' requirements of quality and reliability. It tends to be a multi-year effort which starts with a lot of discussions between buyers and (potential?) but eventually leads to transactions. Private sector actors invest most of the resources and take most of the risk. The role of the private sector is to bring the two sides together and to provide a disciplined framework, with benchmarks for progress, for their dialogue. The search network in this case consists of representatives of buyer and supplier companies, the government and consultants assisting the process. This search network not so much 'picks' but nourishes the winners among SMEs chosen as qualified potential suppliers. A good supplier development program is not another 'SME program' in addition to a dizzying number of existing but rather a framework program allowing to draw on the overcrowded policy field to satisfy specific training, financing, quality upgrading and other needs of SMEs. In doing this matching of viable elements of existing programs to specific needs, a

concerted action between agents which rarely talk to each other – a central problem in most developing countries – is starting to emerge. Thus, drawing on heterogeneity of both private and public sector – and bringing together officials willing to experiment and take risks – supplier development programs (and search networks in general) create embryos of the new public sector.

The logic of Diaspora initiatives is exactly the same. A sending country is an analogue of SME in the supply chain and a central objective is generation of a ‘win-win’ between sending and receiving countries.

In a nutshell, new industrial policy is about generating missing connections. It is a response to unresolved issues of vertical and horizontal industrial policies: how to create growth-promoting connections without opening the door to rent seeking.

7. Conclusions

The paper views migration of skills from a perspective of new industrial policy. More specifically it introduces two types of search networks: open migration chains and Diaspora networks. Migration chains are sequences of educational or job opportunities which allows a migrant to move to progressively complex educational and job tasks necessary to work in the global environment. Diaspora networks are networks of Diaspora members to advance their collective goals, often (but not necessarily) for the benefits of home countries. Open migration chains are functional equivalent of value chains: they emphasize upgrading of individual human capital. Diaspora networks is about concerted action and clubs. They can be viewed as tools to upgrade open migration chains exactly the same way as supplier development program is a concerted action to upgrade value chains.

Although at the first glance, juxtaposing global migration of skills in the context of restructuring of firms and value chains obscures more than it clarifies: open

migration chains and Diaspora networks are not (yet) familiar concepts. Yet the parallels we outline is the main contribution of the paper.

First, from an analytical perspective, value chains, open migration chains just as deliberate interventions to upgrade them are the search networks that allow us to find and collaborate with those who are already learning what we need to know. Second, from a purely pragmatic policy perspective such a parallel may be helpful for a policy maker. Simply put, we know much more about the intricacies of designing good supplier development programs than about how to design good Diaspora initiatives. Lessons from a more mature policy experiment are therefore helpful to an incipient policy experiment – the design of Diaspora networks to benefit home countries.

Our perspective is both ambitious and humble. It is ambitiously optimistic because emerging migration ladders open an opportunity of a win-win situation – an evolving virtuous cycle of co-development of migrant human capital and home country institutions. It is humble, however, in recognizing intricacies of policy solutions to make it happen. As a previous section showed, creation of a robust Diaspora network as a search network requires substantial amount of time, patience and institutional capabilities. Above all, good expatriate networks -- as any search networks – tend to generate opportunities and projects but someone else has to act on those opportunities and finance the projects. Capabilities of government and private sector stakeholders remain the key: Diaspora networks are no panacea.

On an ambitious note, this paper contributes to a discussion on so-called new industrial policy viewed as a set of interventions which is distinct from the ‘old’ functional / horizontal industrial policy of the 80s and 90s, yet capable of avoiding familiar old pitfalls of ‘picking winners’ -- is becoming a subject of policy debate and experimentation. As our example of Mexico in section 4 highlighted, well-designed Diaspora programs can contribute both to the creation of new public

sector and new industrial policy. Their significance therefore extends beyond the narrowly defined issues of international mobility of talent.

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