

## Global Mobility of Talents: What Will Make People Move, Stay, or Leave in 2015 and Beyond?

**VIJAYAKUMAR IVATURI**, Wipro

**BRUNO LANVIN**, INSEAD, eLab

**HRISHI MOHAN**, Wipro

It is estimated that, around the world, some 200 million people currently live and work outside of their country of origin. The OECD countries alone host some 75 million migrants (persons having adopted a residence outside of the country where they were born). Broader access to transportation combined with disparities in income and labor markets have contributed to create a growing global market for migrant workers, who stay outside their country of origin for a limited time. This time is generally linked to the nature and duration of their work contract.

As shown in Figure 1, however, the world of migrations and labor movements is far from even. A number of countries (such as the United States) continue to attract a significant proportion of people seeking residence outside of their countries of origin. Some smaller or less-populated countries, while hosting a comparatively smaller number of foreign-born individuals, face unprecedented situations whereby the proportion of migrants is particularly high compared with their home-born populations (22.4 percent in Canada, 25 percent in Switzerland, and 27.7 percent in Australia). On the labor front, fast-growing countries have attracted a number of migrant workers in sectors such as construction or domestic services. In many cases, such movements have been compounded by significant in-flows of highly skilled foreign workers (“expats”) providing services as consultants or managers in local or international businesses, and sometimes in government. A country such as Qatar, for example, has a population of about 1 million, of whom only 20 percent were born in Qatar.

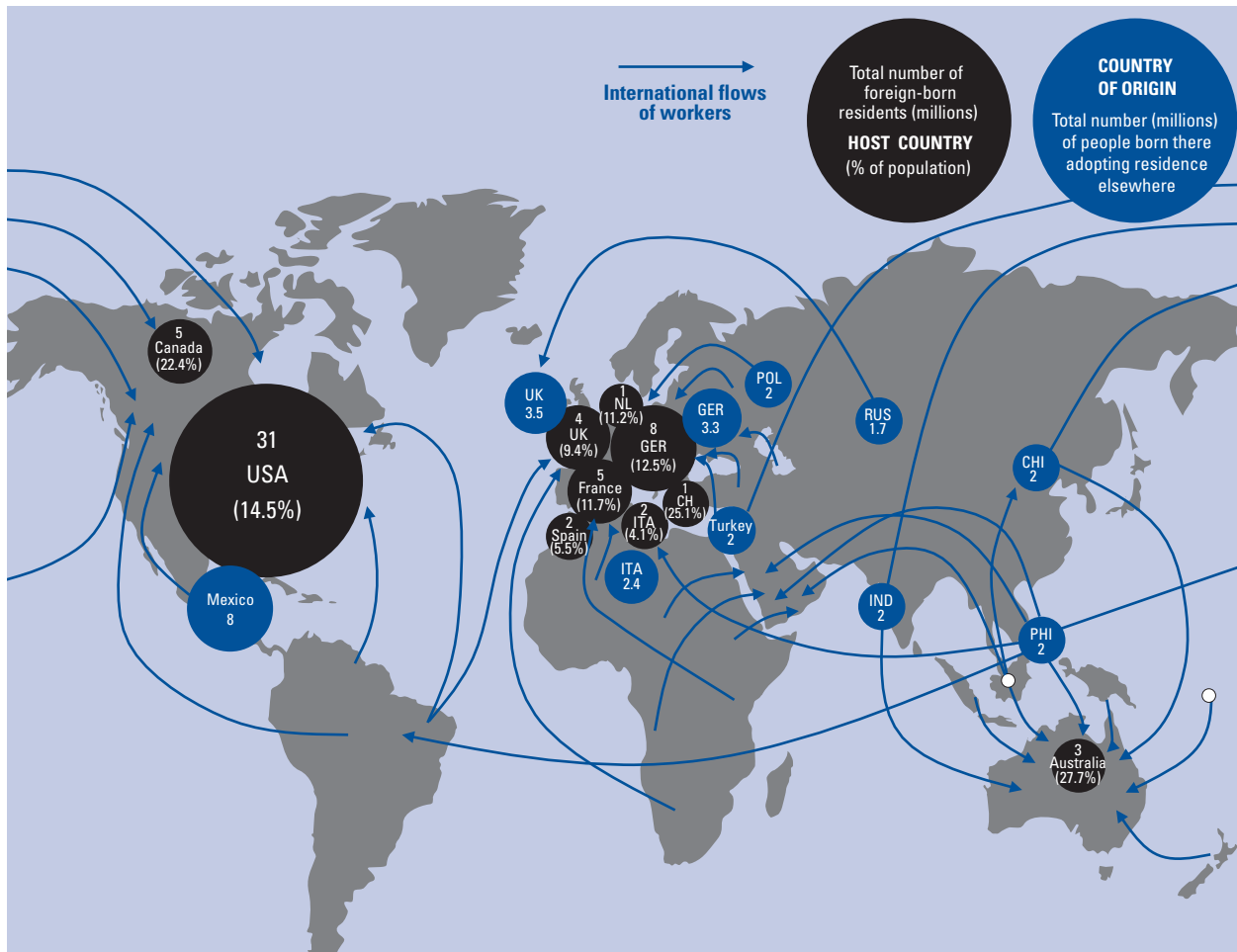
For a growing number of skills and talents, a global labor market has emerged. The international mobility of workers has grown accordingly. However, over the last few decades, accelerated growth in large economies such as those of India and China has radically altered the landscape of resulting labor movements.

Information technology (IT), on the other hand, has allowed new forms of production to take place through the use of telepresence, teleworking, virtual teams, and shared information and knowledge resources. Increasing concerns about the environment and the “carbon footprint” of any business decision have contributed to a growing preference for moving bits and bytes rather than atoms and humans across borders.

How are those different drivers likely to combine, compound, or offset each other in the future? What will be the main directions of labor flows? How is the “war for talents” going to be waged, and who is likely to win it? These are some of the questions that this chapter tries to address.

Through the consideration of longer-term trends and the analysis of recent changes in the way companies and individuals buy, produce, and sell, some avenues will be identified that may help define new dimensions of

Figure 1: Migration and labor movements in 2007



Source: Authors, based on OECD and Manpower.

Note: Country names are as follows: POL = Poland; RUS = Russia; CHI = China; PHI = Philippines; IND = India; GER = Germany; CH = Switzerland; NL = Netherlands; ITA = Italy; UK = the United Kingdom; and USA = the United States.

talent mobility. Other avenues will identify some of the most urgent issues to be faced by business and governments regarding the skills that their competitiveness (or survival) may require in the years to come.

### Moving beyond the “brain drain vs. brain gain” controversy

Traditionally, migration flows have been regarded as composed of three major streams: labor migration, refugee migrations (economic or political), and rural-urban migration. More recently, the issue of “environmental refugee” has been added to this panoply, in view of the dramatic situation faced by countries such as the Maldives that are threatened by the rise of sea level.

Mobility has affected production factors in an uneven fashion. Among the production factors to be mobilized and combined, some are tangible (land, raw materials, capital) while others are intangible (technology, ideas, creativity, innovation, entrepreneurship). For several centuries, labor has been considered to be part of the first category: most of the workers who crossed

international borders exported their physical strengths or manual abilities rather than their intellectual talents. This can largely explain why available literature is quite abundant on the mobility of tangible factors of production, while analyses of the global circulation of ideas and talents remain relatively scarce.

In this latter domain, much of the debate has focused on trying to determine whether the collective benefits of moving intangible factors of production internationally could justify the undeniable damage caused to the countries (mostly developing countries) that, intentionally or not, let their best-educated and most creative citizens move abroad. The so-called “brain gain vs. brain drain” controversy remained a recurrent theme of development economics until recently.

In the course of the last few decades, several significant changes have altered both the nature and the focus of this debate. One of them has been the success of emigrated elites in their countries of adoption (a case in point being that of the Indian diaspora in the US Silicon Valley), which has generated significant spillover effects in their respective countries of origin.<sup>1</sup> Another

change has been the advent of outsourcing (with its variations from near-shoring to global sourcing), which has allowed some developing countries to compete globally while retaining talents at home.

Such phenomena, however, are still too recent to have generated a full re-balancing of the literature about labor mobility. Data remain scarce and often lack international comparability. The size and direction of international movements of highly skilled individuals are still under-documented and under-measured.

Yet, some trends can be identified on how, where, and why talents cross borders. To try and identify such trends, we will adopt in the rest of this chapter the following working definitions:

1. In order to build an initial measurable proxy for international mobile talents, we will focus on scientific and research and development (R&D) staff, IT professionals, and academics (scholars and students).
2. Our concept of *mobility* focuses on “movements resulting from opportunities, ecosystem strengths, and/or incentives created to encourage such movements.” This working definition will enable us to make a methodological distinction between talent mobility (which is multi-directional) and migration (which is uni-directional—that is, with no intent or possibility of returning to one’s country of origin).

### What makes talent move across borders: A simple model

The 20th century has seen a progressive re-balancing between the “push factors” of migration (diseases, poverty, and conflicts) and the “pull factors” of labor movements (better wages and better opportunities to acquire new skills or develop a business). Over the last few decades, however, international labor mobility has been greatly facilitated and encouraged by factors such as the following:

- **Significant differences in earning potentials for similar skill sets.** Classic examples are those of Indian software developers (Indian salaries being a fraction of those paid in the United States or Western Europe). This has also applied to professionals trained in Eastern Europe (whose wages are far below those of their western counterparts).
- **Ecosystem attractiveness.** One of the major non-monetary reasons for talents to move outside their country of origin is the presence of an ecosystem that provides an enabling environment for professional growth and self-development. For

example, R&D professionals may wish to go abroad in search of better laboratories, a more stimulating research environment, more peer-to-peer interaction, higher funding, or better relationships between universities and business.

- **Interdependence among capital, competence, and talent flows.** Available evidence shows a strong correlation between growth opportunities on one hand and the ability to attract both capital and talent on the other.
- **Increasingly important roles of governments.** When it comes to attracting or retaining talents, governments have a key role to play in designing and implementing proper fiscal and immigration policies; more and more, they tend to do this in accordance with the relative shortage (or relatively high costs) of the skills required by the enterprises of their respective countries. For example, in the United States, a special class of visas (H1) is being granted to IT professionals: a large proportion of the beneficiaries of such visas come from India’s IT industry.

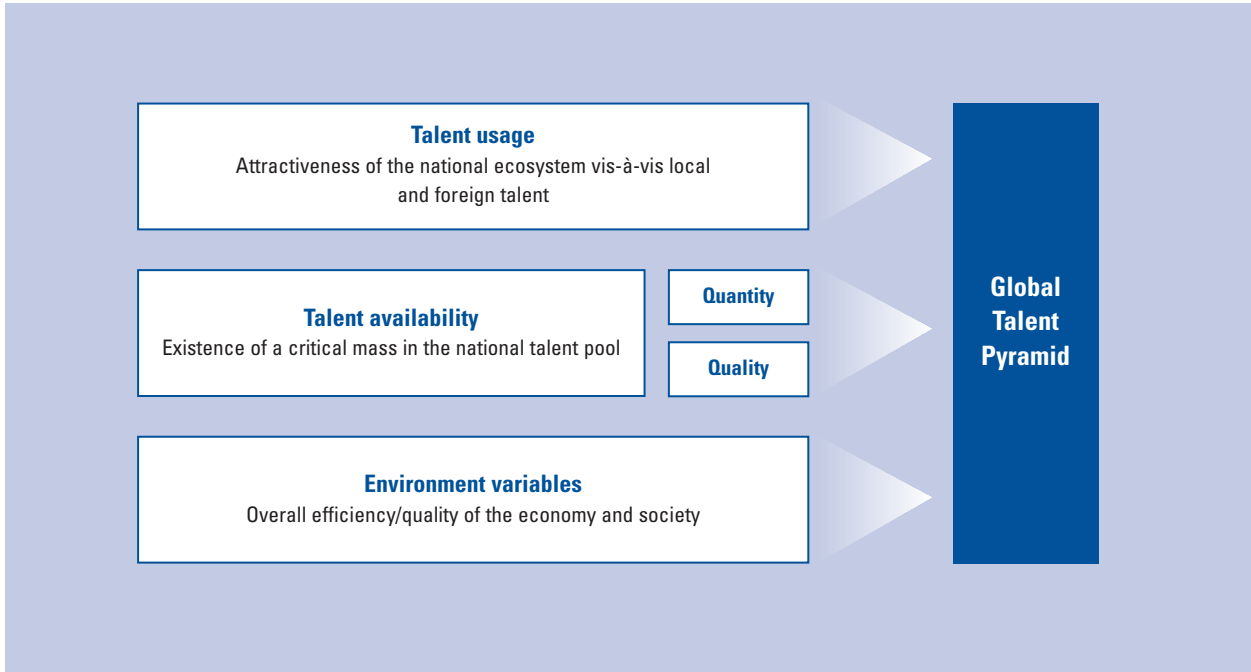
Based on this first list of explanatory factors and building on a selected set of variables mostly included in the Networked Readiness Index (NRI) presented in this *Report*, a simple model—the Global Talent Pyramid Model (GTPM)—has been constructed (Figure 2). In this model, the ability of a country to attract talents internationally is determined by three main factors, namely:

1. attractiveness of the national ecosystem vis-à-vis local and foreign talent,
2. the existence of a critical mass in the “national talent pool” (stock and flow), and
3. overall efficiency/quality of the economy and society.

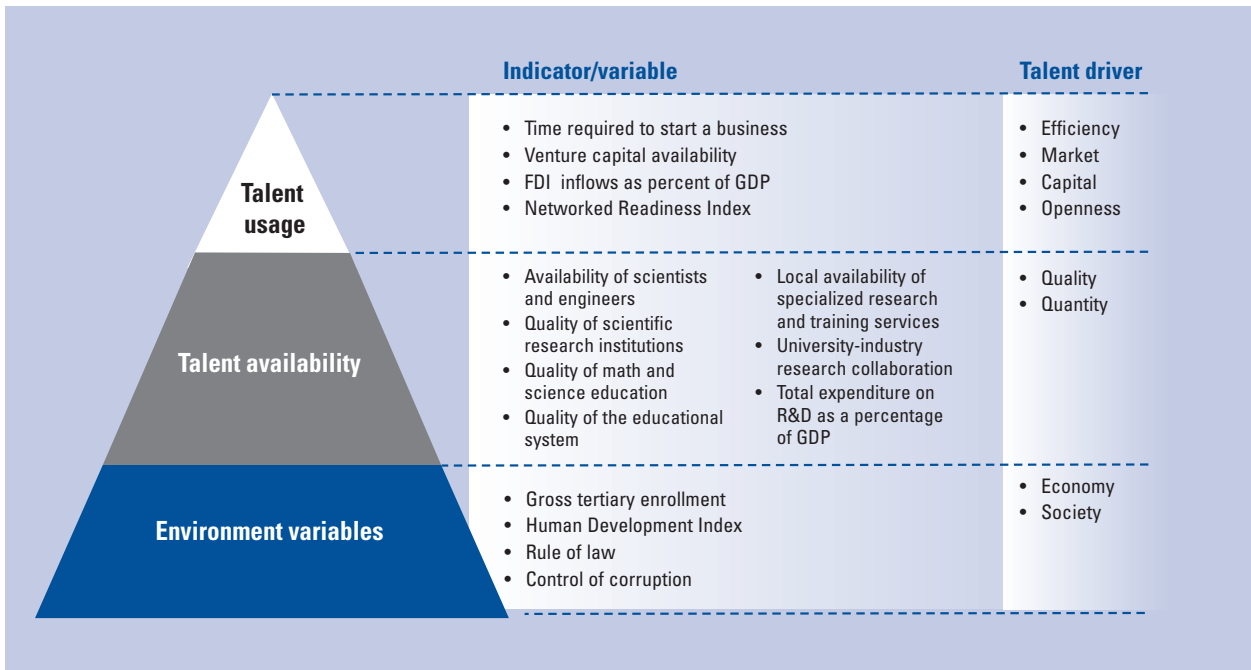
In order to get a first approximation of those three pillars, a certain number of existing variables has been selected for which sufficient international coverage was already available. Figure 3 summarizes the attribution of such variables to each of the three pillars of GTPM.<sup>2</sup>

The resulting model suggests that, in building its own talent pyramid, each particular country will benefit from specific advantages and encounter unique challenges. For example, in Europe as a whole or in Japan, the issue of e-skills (i.e., skills for the knowledge society) has started to attract priority attention: a number of companies, and also a growing number of governments, are increasingly worried about Europe’s inability to produce the number of programmers, analysts, and

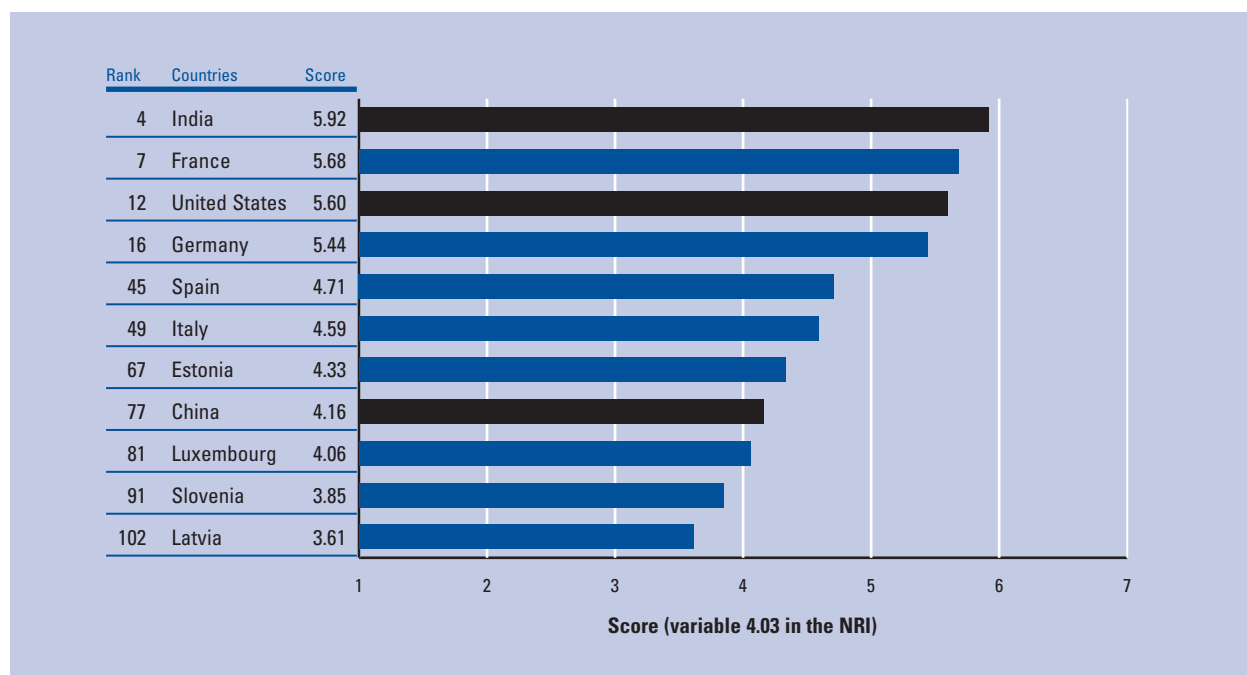
**Figure 2: The Global Talent Pyramid Model (GTPM)**



**Figure 3: The Global Talent Pyramid variables**



Source: UNCTAD, various years; UNDP, 2007; UNESCO, 2007; UNESCO Institute for Statistics; The World Bank Group, 2008; The World Bank, Governance Indicators; World Economic Forum, Executive Opinion Survey 2007, 2008.

**Figure 4: Availability of scientists and engineers, selected countries**

Source: World Economic Forum, Executive Opinion Survey 2007, 2008.

software architects that its industries will need in coming years.<sup>3</sup>

However, this inability may be the tip of a much larger iceberg. The lack of engineers has recently become a major concern in countries such as Germany and the Czech Republic, as it has already been for some time in Japan. Some of those countries may be looking to places such as India to obtain the talents they need; however, the expected rates of growth of the Indian economy (even once this growth has been discounted by the effects of the current crisis) are such that it is likely that Indian scientists and engineers will have less reason to leave their own countries in the future than they have had in the past. One consequence of the GTPM is, hence, that the talent pool available in a country such as India is likely to increase, while its international mobility will decrease.

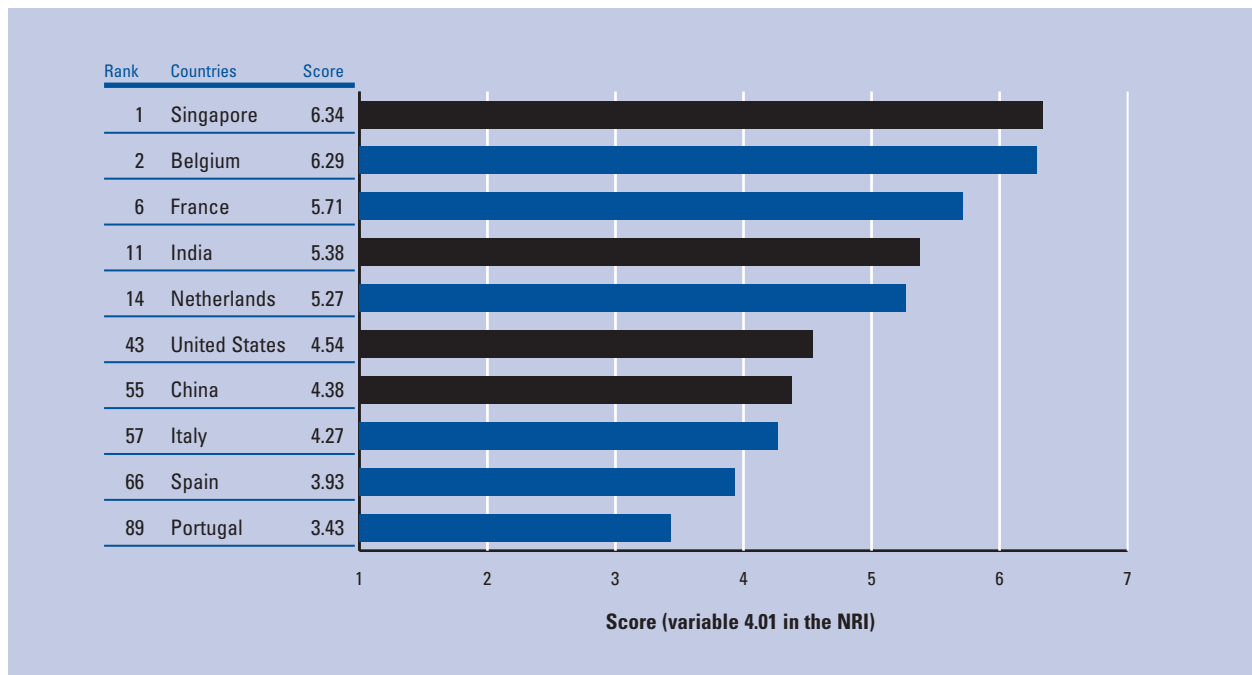
In countries less equipped with the ability to produce enough scientists and engineers (such as China, Spain, Italy, or smaller European economies—see Figure 4), local companies are likely to continue paying a premium to attract necessary talent, and to pressure their respective governments to improve dimensions at the bottom of the Global Talent Pyramid (environment), as well as at the top (e.g., by attracting more presence by foreign companies, or by enhancing outsourcing capabilities through better IT infrastructure). In some countries, especially in Western Europe, stimulating the production of larger numbers of scientists and engineers will require addressing social and cultural factors at the root of the

significant decrease in the attractiveness of such careers for younger people witnessed in recent times, especially among female students.

Another factor likely to affect the ability of various countries to produce the talents required by their own development strategies will stem directly from the degree of investment they have made in the past decades in their respective educational systems. Tertiary enrollment in this respect is not the only variable to consider. The quality of education in mathematics and science will also likely have an increasingly important impact on the value that a particular society can provide for itself, as the expansion and improvement of global information networks create more opportunities to share such value.

In this area, countries such as Singapore will continue to benefit from a comparative advantage built relentlessly over the years, while India and China seem to be quickly moving up that same ladder. Relatively low scores should be of particular concern in countries such as Italy, Spain, or Portugal, and to some extent the United States (see Figure 5).

By and large, such partial indicators point to issues shared by many economies around the world. It is clear, for example, that in coming years the availability of talented knowledge workers will not grow as quickly as the global demand for their skills. In such a situation, mobility will be key for narrowing the existing gap between supply and demand. Such mobility will be both physical (e.g., through temporary or permanent migrations) and virtual

**Figure 5: Quality of math and science education, selected countries**

Source: World Economic Forum, Executive Opinion Survey 2007, 2008.

(through a more intense usage of information networks, telepresence facilities, and virtual teams across networks).

In such a context, some fundamental dimensions of the world economy—such as geography or demography—will take on a renewed importance. As an example, the next section will focus on the different situations of two countries with marked differences in those two respects: India and Singapore.

### Age pyramid vs. talent pyramid: The examples of India and Singapore

Applied to India and Singapore, key GTPM variables display sharp differences. For example, Singapore has a strong advantage over India in terms of its business environment: it takes almost 10 times longer to enforce a contract in India than in Singapore; similarly, the time to start a business is less than a week in Singapore, versus a month or so in India. India, however, is ahead of Singapore for its number of scientists and engineers available, and education expenditure (see Table 1).

Such differences in variables take on a different meaning when considered against the longer-term background of demographics. Current data and projections to 2025 point to almost symmetrical situations between the two countries, with a marked aging of Singapore's population, while India's population is only starting to "narrow at the base" and will still display an age pyramid with a majority of the population below 45 years of age (see Figures 6 and 7).

**Table 1: Some key GTPM variables for India and Singapore**

Variable	NRI variable	India value	Singapore value
Time required to start a business (days)*	1.10	30	4
Time to enforce a contract (days)*	2.09	1,420	150
Venture capital availability	1.01	3.97	4.45
Availability of scientists and engineers	3.04	5.67	5.03
Quality of scientific research institutions	3.05	4.84	5.63
Quality of math and science education	4.01	5.16	6.32
Quality of the educational system	4.02	4.27	6.17
Local availability of specialized research and training services	5.02	4.66	5.40
University-industry research collaboration	5.05	3.60	5.47
Education expenditure as a percentage of GNI*	3.07	3.95	2.48
Tertiary education enrollment*	3.06	11.85	55.90

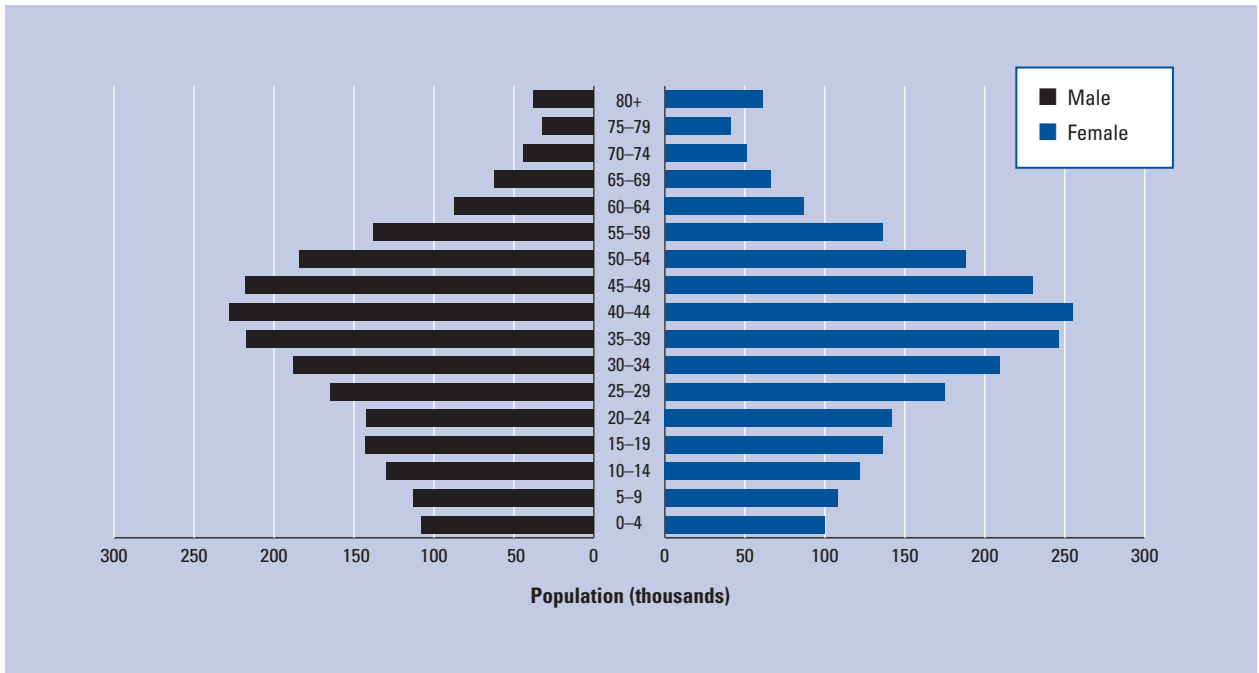
Source: NRI 2008–2009.  
\*Hard data.

Combining talent data and demographic information, one can identify some striking challenges and questions regarding talent availability in those two countries:

1. By the year 2025, India's population will be largely concentrated in the age group of 20–50; combined with its current high level of education

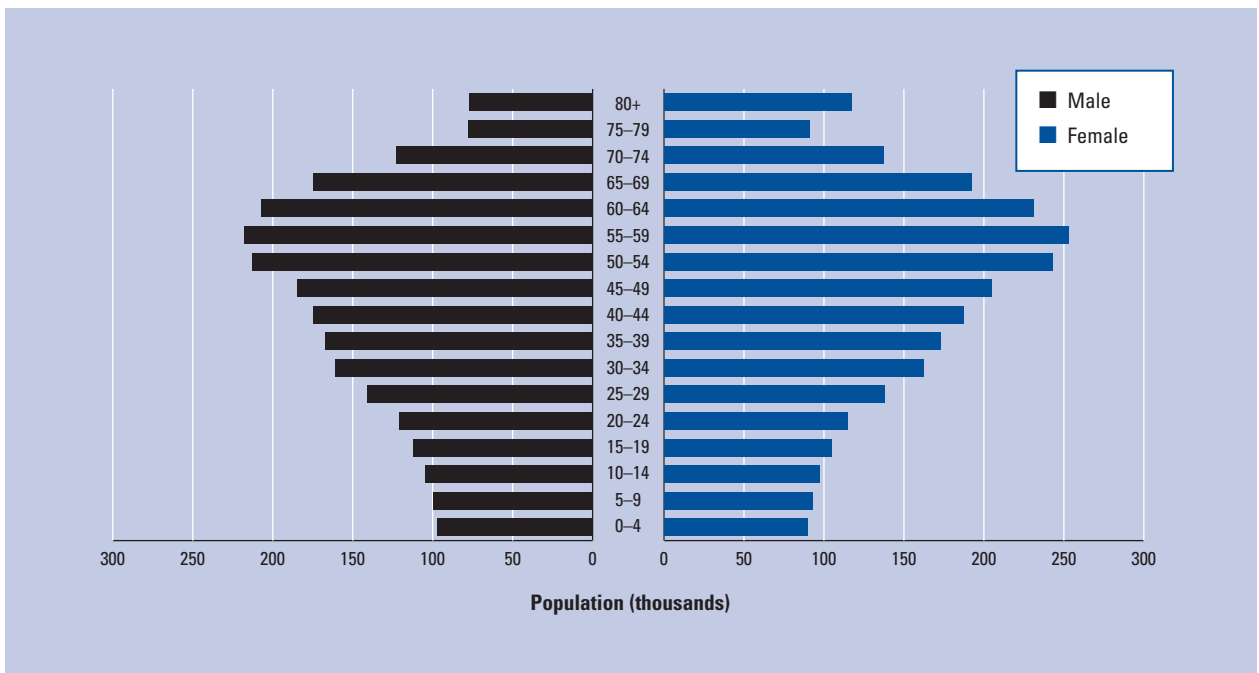
Figure 6: Singapore's age pyramids

6a: 2008



Source: US Census Bureau, International Database, available at <http://www.census.gov/ipc/www/idb/pyramids.html>.

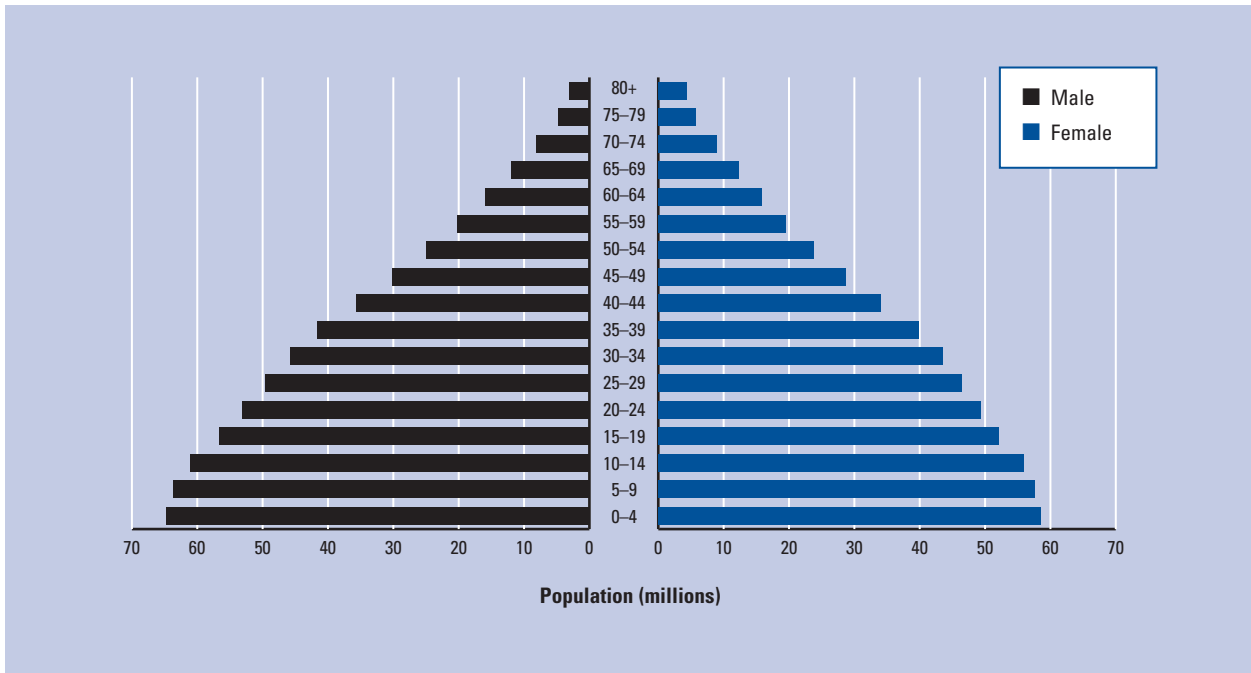
6b: 2025



Source: US Census Bureau, International Database, available at <http://www.census.gov/ipc/www/idb/pyramids.html>.

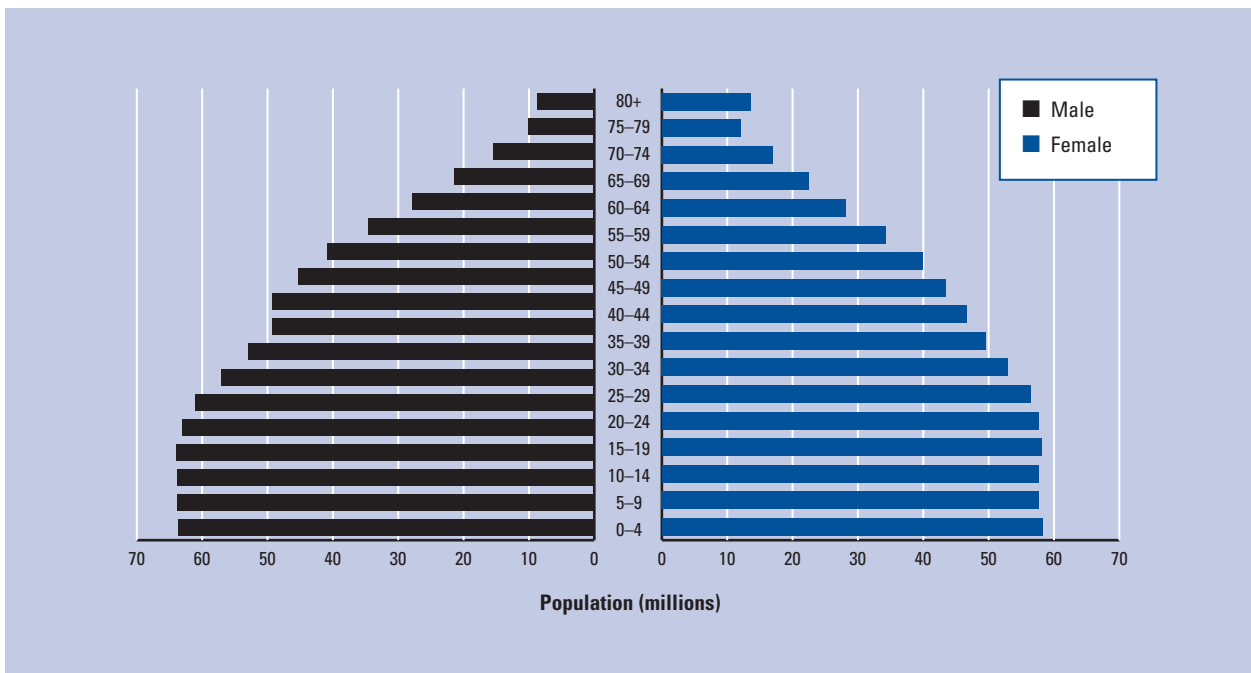
Figure 7: India's age pyramids

7a: 2008



Source: US Census Bureau, International Database, available at <http://www.census.gov/ipc/www/idb/pyramids.html>.

7b: 2025



Source: US Census Bureau, International Database, available at <http://www.census.gov/ipc/www/idb/pyramids.html>.

expenditure, this will translate into a very large talent pool in India. Will India be in a position to leverage the growth and competitiveness potential of such a large talent pool? Assuming that the country maintains its current rate of growth, improvements in the business environment may become a crucial condition to achieve this goal.

2. The same demographic data indicate that India may still enjoy a surplus of talented workers in some areas, such as IT. However, it remains to be seen whether such a surplus will continue to benefit Australia, Canada, the United States, and Western Europe, as is the case today. If the needs of India's economy continue to grow at today's pace, and if other Asian economies (such as Singapore) continue to exhibit a structural deficit in the area of talent, one can envisage that Indian talented workers will move progressively closer to home, and possibly stay home.
3. Current values of some key GTPM variables (such as university-industry research collaboration, time needed to start a business, and the quality of scientific research institutions, for example) seem to indicate that, in the near future, India's talent pool will be more effectively utilized in neighboring Asian countries (and possibly in the Middle East) than in India itself. This should lead to the emergence of a regional India-based nebula (e.g., in IT services) rather than to a set of large Indian companies with headquarters in India.
4. In such regional nebula, advantage will be made of combining areas of national excellence. For example, it is likely that—in exchange for direct access to the large and fast-growing Indian market—Singapore could provide capital and infrastructure from its companies and universities for the development of high-end research activities. In return, talented Indian citizens could provide complex IT services at a competitive cost.
5. Similar cross-border ventures could be developed within Asia and with other regions of the world. In some sectors (aerospace and nuclear industries, for example), India could provide talent to international private ventures, based on volume and high-end R&D.

Such observations point to significant shifts in the ways in which talented workers will flow within Asia in the coming years. Some other studies confirm that similar changes will also affect the global picture (see Box 1).

### Box 1: Global distribution of talent and major shifts ahead

The trends discussed above (e.g., in demography) and policies (e.g., in education) will clearly generate regional opportunities. However, and more importantly, some of the talent-related data available indicate that some of the most striking differences among countries may trigger rapid adjustments, reinforced by the increasing global mobility of talents.

For example, the Global Talent Index (GTI), developed by Heidrick & Struggles with the Economist Intelligence Unit, assesses the talent situation of individual countries by combining seven main variables: demographics, quality of compulsory education systems, quality of universities and business schools, quality of the environment to nurture talent, mobility and relative openness of the labor market, trends in foreign direct investment, and proclivity to attract talent. Based on this approach, the following conclusions emerge:

- While the United States will maintain its position as the world's leading country for nurturing and developing talented workers over the next five years, it will face increasing competition from the United Kingdom, which will rise to second place by 2012.
- Asia-Pacific countries will offer tough competition to the United States and Europe in attracting and nurturing talented workers.
- When it comes to talented workers, BRIC countries appear less homogenous than in other areas. While China and India rank among the top 10 talent hotspots worldwide, Russia is expected to fall from 6th to 11th place by 2012, with Brazil slipping from 18th to 19th.
- Asia is well positioned to move ahead in the talent rankings: apart from India, other countries are expected to continue to feature at the top of such rankings, or to improve by 2012, such as Malaysia (remaining in 12th place), Korea, Rep. (improving from 15th to 13th), or Japan (from 16th to 14th).
- The same study points out that China is set to exploit its natural demographic advantage by significantly improving its compulsory education system and developing a much better environment for producing and nurturing talent. This will enable the country to build on its manufacturing base and attract increasing numbers of foreign-owned businesses.
- Despite the strong performance of the United States overall, its labor market is still likely to become less open and flexible over the next five years amidst fears of terrorism. Under such hypothesis, the United States would rank 9th worldwide on the GTI—only one rank ahead of China.

Source: Heidrick & Struggles/Economist Intelligence Unit, 2007.

## A few conclusions and six priority actions to fight the upcoming talent crunch

From the analysis and examples provided in this chapter, several conclusions emerge:

- Different countries have different talent endowments linked to their demography; educational system; and ability/will to attract, retain, or export talented workers. While many industrialized countries will face serious “talent crunches” in the coming years (particularly in areas such as e-skills and scientific and engineering professions), several large emerging countries (such as India and China) will themselves be increasingly faced with a talent shortage at home, brought about by their fast economic growth. These countries will need to develop appropriate national talent pools. Further exploration (and quantification) of the proposed GTPM should help identify the specific advantages and weaknesses of national economies and draw a “world map of talents.” Such an exercise would likely help anticipate main flows and forces in the increasingly fluid world of mobile talents.
- Physical mobility is a double-edged sword in this respect. Associated with migration, it may mean brain drain. Linked with temporary labor movements, it may mean exports, acquisition of foreign knowledge and culture, and establishment of business and personal links across borders, all of which are potentially beneficial for the country of origin.
- IT and the emergence of global networks are radically changing the mobility equation by introducing new ways to combine talents across national borders. In the recent past, outsourcing (especially business process outsourcing) has been one of the main beneficiaries of this phenomenon, as well as all sectors in which virtual teams can be organized for the production, maintenance, marketing, sales, or distribution of complex products and services.
- Virtual mobility has become a key element in the development of exporters of IT services (e.g., India), and in that of importers of foreign expertise (e.g., fast-growing economies in the Gulf area). In both cases, large multinational groups have been among the fastest growing users of the resulting new opportunities arising around cross-cultural and cross-national virtual teams.
- With the advent of new capacities to obtain and share information (either physical, such as ubiquitous broadband, or of a more qualitative nature, such as in the context of Web 2.0/social networks),

new business models and new modus operandi are emerging. Many examples are found in the realm of collaborative and open innovation.

- Many of these trends will be reinforced by the readjustments made necessary by the current global economic crisis. Others may be hindered or limited by some of the measures that business and governments will take as a result of the same crisis.

These conclusions point to some serious tensions and difficulties regarding the ways and means by which national economies will compete for globally mobile talent pools in the near future. They also call for some immediate actions. The following list identifies six possible areas for action, under three major headings.

### Reducing barriers to the mobility of people and information

Considering the slow pace at which demographic constraints (and, to some extent, educational system constraints) can be altered, physical and virtual mobility must be encouraged as a key instrument to ease some of the most serious inadequacies in terms of global supply and demand for talents. Physical mobility should not be hampered by restrictive visa and immigration policies, and virtual mobility should not be limited by unevenness in global connectivity. At the global level, one of the most detrimental effects of a persistent digital divide between rich and poor countries would be to limit the world’s ability to benefit from the possible combinations of talents across cultures and geographical borders. In the case of poorer countries, such a divide would contribute to the resilience of the negative effects of physical migrations (brain drain).

**Action 1:** In deciding on visa and immigration issues and policies, governments in industrialized countries should take full account of the cost of limiting the global mobility of talented workers; more open policies are likely to benefit all economies.

**Action 2:** Developing broadband infrastructure worldwide (especially in developing countries and regions such as sub-Saharan Africa) should be considered a priority for the coming decade. This will allow more virtual mobility of talents and benefit developing countries in at least two ways: (1) by better integrating them in global production processes while offering a productive outlet to local talents, and (2) by counterbalancing the negative effects (brain drain) of physical mobility. For advanced and fast-growing economies, bridging the digital divide is key to benefitting from the innovative ideas, designs, and services that still lie underused across the global talent pool.

### Upgrading the protection of workers and intellectual property

In a more fluid world of physical mobility, the current major economic crisis is likely to increase the willingness of low-skilled workers to offer their labor worldwide. This may well lead to a global weakening of their individual and collective bargaining power. Although pressures on wages may be temporary and properly addressed by market forces, other forces may require legal and regulatory safeguards. Specific efforts will need to be deployed—in particular, to avoid the emergence and the spreading of irreversible restrictions to workers' rights and protections. Similarly, if virtual mobility is developing quickly across virtual collaboration networks, intellectual property rights will require specific protection to ensure that innovators worldwide are duly recognized and their efforts properly rewarded. The current approach to intellectual property regimes needs to be upgraded to fully reflect the new realities of our global networked economy.

**Action 3:** Governments need to agree to international standards regarding the rights, working conditions, and living environment of migrant workers. Conventions already in existence (e.g., those in the purview of the International Labour Organization) should be reinforced and reaffirmed in order to avoid further deterioration in times of crisis.

**Action 4:** Intellectual property regimes should be revisited, taking into account the rapid development of collaborative and open innovation networks.

### Education, education, education

As our societies and economies evolve toward more knowledge-centric activities and structures, education is playing an ever more central role as a source of comparative advantage and an engine of social equity and inclusion. The current situation points to some growing gaps between the needs of our "knowledge ambitions" and our ability to generate the skills and talents needed to support it. In industrialized countries, diminished interest for mathematics and science (especially among girls) is a growing concern. On the other hand, the rapid pace of technological change accelerates the process of knowledge obsolescence in an increasing number of areas, creating unprecedented challenges for teachers and educators in the formal educational system.

**Action 5:** Governments, business, and educational institutions (at primary, secondary, and tertiary levels) need to join forces to change the image of scientific and engineering careers among young people; curricula must be developed and harmonized to improve the quality and quantity of e-skilled and science-skilled workers and managers, both in the IT and non-IT sectors.

**Action 6:** Fuller advantage and use need to be made of the opportunities created by IT and networks in the areas of distance learning and life-long education. Governments, business, and educators have a common

mission and interest in making fuller use of existing instruments not only as a tool to continuously upgrade workers' skills, but also as a tool to stimulate upward social and career mobility and to fight inequality and exclusion.

Whether it is physical or virtual, mobility will be a key factor in our collective efforts to bring about an equitable, multicultural, open, innovative, and sustainable kind of globalization. To do so, however, we need to (1) become fully aware of the potential benefits of taking collective action to encourage and allow such mobility on a global scale, and (2) consider the current crisis as an opportunity (and an incentive) to take such action, rather than an excuse to procrastinate.

### Notes

- 1 For example, it has now become common for analysts and observers to describe a world in which Indian and Chinese nationals, after completing higher degree education in California and becoming successful Silicon Valley entrepreneurs, become a bridge between American and Asian markets.
- 2 For details on the definitions and sources of the variables included in the GTPM, please refer to Appendix A and the Technical Notes and Sources section at the end of this *Report*.
- 3 The area of e-skills has been one in which the European Commission has been particularly active in the recent past. See, in particular, the outcome of the recent European e-Skills 2008 Conference in Thessaloniki, October 9–10; information available at <http://eskills.cedefop.europa.eu/conference2008/>. On the same subject, also see Lanvin and Passman 2008.

### References

- Arabian Business*. 2008. "A Rupee Reprieve for Gulf Recruitment Crisis?" 9 (44): 19.
- Cedefop (European Centre for the Development of Vocational Training). 2008. European e-Skills 2008 Conference: Implementing a Long Term E-Skills Strategy in Europe. Thessaloniki, October 9–10.
- Cheese, P., R. J. Thomas, and E. Craig, E. 2008. *The Talent Powered Organization: Strategies for Globalization, Talent Management and High Performance*. Philadelphia: Kogan Page.
- Coe, D. T. 2007. "Globalisation and Labour Markets: Policy Issues Arising from the Emergence of China and India." *OECD Social Employment and Migration Working Paper* No. 63. Paris: OECD.
- . 2008. "Jobs on Another Shore." *Finance and Development* 45 (1, March). Washington, DC: International Monetary Fund.
- Fraser, M. and Dutta, S. 2008. *Throwing Sheep in the Boardroom*. Chichester: John Wiley and Sons.
- Giridharadas, A. 2007. "Outsourcing Works So Well, India Is Sending Jobs Overseas." *The New York Times*, October 6: 5.
- Hartung, R. 2008. "It's Talent Fusion At Work." *NewsToday*, Singapore. August 9–10: 36.
- Heidrick & Struggles/Economist Intelligence Unit. 2007. *Global Talent Index 2007–2012*. Available at <http://www.weknowglobaltalent.com/gti/window/gti>.
- Institute of International Education. 2008. "Open Doors: Report on International Educational Exchange." Available at <http://opendoors.iienetwork.org>.
- Kirkegaard, J. F. 2007. *The Accelerating Decline in America's High-Skilled Workforce: Implications for Immigration Policies*. Washington, DC: Peterson Institute for International Economics.

- Lanvin, B. 2008. "E-Skills, Competitiveness and Employability: Knowledge Societies' Next Frontier." White Paper. Available at <http://www.insead.edu/elab/eskills>.
- Lanvin, B. and P. Passman. 2008. "Building E-skills for the Information Age." *Global Information Technology Report 2007–2008: Fostering Innovation through Networked Readiness*. Hampshire: Palgrave Macmillan. 77–90.
- Le Monde*. 2008. "L'atlas des migrations: Les routes de l'humanité." Special Issue, November.
- Manning, P. 2005. *Migration in World History. Themes in World History*. New York: Routledge.
- Manpower. 2008. "The Borderless Workforce: 2008." White Paper. Available at [http://www.elanit.com/imm/pdf/NEW\\_080624\\_BorderlessWkforce\\_WhitePaper\\_A4\\_FINAL.pdf](http://www.elanit.com/imm/pdf/NEW_080624_BorderlessWkforce_WhitePaper_A4_FINAL.pdf).
- Mattioli, D. 2008. "More Americans Vault Overseas to Search for Jobs." *The Wall Street Journal*, October 14: 32.
- McKeown, A. 2004. "Global Migration, 1846–1940." *Journal of World History* 15 (2) 155–89.
- OECD (Organisation for Economic Co-operation and Development). 2008. *The Global Competition for Talent: Mobility of the Highly Skilled*. Paris: OECD.
- Premji, A. 2008. "Le travail du prochain président américain ne va pas être facile, je n'aimerais pas être à sa place." Interview given to Annie Khan, *Le Monde*, September 21–22.
- Ready, D. A., L. A. Hill, and J. A. Conger. 2008. "Winning the Race for Talent in Emerging Markets." *Harvard Business Review* 86 (11): 62–70.
- Solimano, A., ed. 2008. *The International Mobility of Talent: Types, Causes and Development Impact*. New York: UNU-WIDER Studies in Development Economics, Oxford University Press.
- Tapscott, D. 2008. *Grown Up Digital: How the Net Generation Is Changing your World*. New York: McGraw Hill.
- UNCTAD (United Nations Conference on Trade and Development). Various years. *World Investment Report*. Available at <http://www.unctad.org/Templates/Page.asp?intItemID=1485&lang=1>.
- UNDP (United Nations Development Programme). 2007. *Human Development Report 2007/2008*. Houndsmills, Basingstoke, Hampshire: Palgrave Macmillan. Available at <http://hdr.undp.org/en/reports/global/hdr2007-2008/>.
- UNESCO (United Nations Educational, Scientific and Cultural Organization). 2007. *Education for All Global Monitoring Report 2008—Education for All by 2015: Will We Make It?* Paris: UNESCO.
- UNESCO Institute for Statistics. Available at [http://www.uis.unesco.org/ev.php?URL\\_ID=2867&URL\\_DO=DO\\_TOPIC&URL\\_SECTION=201](http://www.uis.unesco.org/ev.php?URL_ID=2867&URL_DO=DO_TOPIC&URL_SECTION=201).
- Veloo, R. 2008. "Our Talent Blindspot." *NewsToday*, Singapore, August 9–10: 10.
- Wagstyl, S., J. Cienski, K. Eddy, and T. Escritt. 2008. "Gone West: Why Eastern Europe Is Labouring under an Abundance of Jobs." *Financial Times*, January 17: 9.
- World Bank Group. 2008. *Doing Business 2009*. Washington, DC: World Bank. Available at <http://www.doingbusiness.org/>.
- World Bank, Governance Indicators. Available at <http://web.worldbank.org/WBSITE/EXTERNAL/WBI/EXTWBIGOVANTCOR/0,,menuPK:1740542~pagePK:64168427~piPK:64168435~theSitePK:1740530,0.html>.

## Appendix A: GTPM variable descriptions and sources

### Time required to start a business, 2008

Duration of all procedures required to register a firm.

Source: The World Bank Group, *Doing Business 2009*. Available at <http://www.doingbusiness.org/>.

### Time to enforce a contract, 2008

Number of days required to resolve a dispute

Source: The World Bank Group, *Doing Business 2009*. Available at <http://www.doingbusiness.org/>.

### Venture capital availability, 2007, 2008

This is based on the average score on a 1–7 scale of a large sample group in a particular country responding to the question of whether entrepreneurs with innovative but risky projects can generally find venture capital in their country (1 = not true, 7 = true).

Source: World Economic Forum, Executive Opinion Survey 2007, 2008.

### FDI Inflows as percent of GDP, 2001–05 (average)

Inflows of FDI in the reporting economy comprise capital provided (either directly or through other related enterprises) by a foreign direct investor to an enterprise resident in the economy.

Source: UNCTAD, *World Investment Report*. Available at <http://www.unctad.org/Templates/Page.asp?intItemID=1485&lang=1>.

### Networked Readiness Index

Source: World Economic Forum, *The Global Information and Technology Report 2008–2009*.

### Availability of scientists and engineers, 2007, 2008

This is based on the average score on a 1–7 scale of a large sample group in a particular country responding to the question of whether scientists and engineers are available in their country (1 = nonexistent or rare, 7 = widely available).

Source: World Economic Forum, Executive Opinion Survey 2007, 2008.

### Quality of scientific research institutions, 2007, 2008

This is based on the average score on a 1–7 scale of a large sample group in a particular country responding to the question of whether scientific research institutions in their country are (1 = nonexistent, 7 = the best in their fields internationally)

Source: World Economic Forum, Executive Opinion Survey 2007, 2008.

### Quality of math and science education, 2007, 2008

This is based on the average score on a 1–7 scale of a large sample group in a particular country responding to the question of whether the math and science education available in their country's schools (1 = lag far behind most other countries' schools, 7 = are among the best in the world).

Source: World Economic Forum, Executive Opinion Survey 2007, 2008.

### Quality of the educational system, 2007, 2008

This is based on the average score on a 1–7 scale of a large sample group in a particular country responding to the question of whether the education system in their country (1 = does not meet the needs of a competitive economy, 7 = meets the needs of a competitive economy).

Source: World Economic Forum, Executive Opinion Survey 2007, 2008.

### Local availability of specialized research and training services, 2007, 2008

This is based on the average score on a 1–7 scale of a large sample group in a particular country responding to the question of whether specialized research and training services are (1 = not available, 7 = available from world-class institutions).

Source: World Economic Forum, Executive Opinion Survey 2007, 2008.

### University-industry research collaboration, 2007, 2008

This is based on the average score on a 1–7 scale of a large sample group in a particular country responding to the question of whether, in its R&D activity, business collaboration with local universities in their country is (1 = minimal or nonexistent, 7 = intensive and outgoing).

Source: World Economic Forum, Executive Opinion Survey 2007, 2008.

### Total expenditure for R&D as percent of GDP, 2006

Included are fundamental and applied research and experimental development work leading to new devices, products, and processes.

Source: UNESCO Institute for Statistics. Available at [http://www.uis.unesco.org/ev.php?URL\\_ID=2867&URL\\_DO=DO\\_TOPIC&URL\\_SECTION=201](http://www.uis.unesco.org/ev.php?URL_ID=2867&URL_DO=DO_TOPIC&URL_SECTION=201).

### Tertiary education enrollment, 2006 or most recent year available

The reported value corresponds to the total enrollment in tertiary education expressed as a percentage of the population of the five-year age group following on from the secondary school-leaving age. Note that the gross enrollment rate (GER) can exceed 100 percent due to early or late entry and/or grade repetition.

According to UNESCO, tertiary education is composed of two stages. The first stage of tertiary education, ISCED level 5, includes level 5A, composed of largely theoretically based programs intended to provide sufficient qualifications for gaining entry to advanced research programs and professions with high skill requirements; and level 5B, where programs are generally more practical, technical, and/or occupationally specific. The second stage, ISCED level 6, comprises programs devoted to advanced study and original research, leading to the award of an advanced research qualification.

Source: UNESCO, Institute for Statistics (retrieved January 12, 2008); UNESCO, *Education for All Global Monitoring Report 2008—Education for All by 2015: Will We Make It?*

## Appendix A: GTPM variable descriptions and sources (cont'd.)

### Education expenditure, 2006 or most recent year available

This variable refers to public current operating expenditures in education, including wages and salaries and excluding capital investments in buildings and equipment.

Source: The World Bank, *World Development Indicators Online Database* (retrieved November 4, 2008).

### Human Development Index (HDI), 2007

The HDI provides information on the human development aspect of economic growth. The HDI is based on three indicators: longevity, as measured by life expectancy at birth; educational attainment, as measured by a combination of adult literacy rate and the combined gross primary, secondary, and tertiary enrollment ratio; and standard of living, as measured by GDP per capita (purchasing power parity in US dollars).

Source: UNDP *Human Development Report 2007/2008*, Table 1. Available at <http://hdr.undp.org/en/reports/global/hdr2007-2008/>.

### Rule of law, 2006

This indicator includes several indicators that measure the extent to which agents have confidence in and abide by the rules of society. These include perceptions of the incidence of both violent and nonviolent crime, the effectiveness and predictability of the judiciary, and the enforceability of contracts.

Source: The World Bank, Governance Indicators. Available at <http://web.worldbank.org/WBSITE/EXTERNAL/WBI/EXTWBIGOVANTCOR/0,,menuPK:1740542~pagePK:64168427~piPK:64168435~theSitePK:1740530,00.html>.

### Control of corruption, 2006

This indicator corresponds to “graft” measures of corruption—notably, corruption measured by the frequency of “additional payments to get things done” and the effects of corruption on the business environment.

Source: The World Bank, Governance Indicators. Available at <http://web.worldbank.org/WBSITE/EXTERNAL/WBI/EXTWBIGOVANTCOR/0,,menuPK:1740542~pagePK:64168427~piPK:64168435~theSitePK:1740530,00.html>.