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Adjusting to Globalization: Japan and the Mobility of Asian Technical Talent

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Anthony P. D'Costa

The purpose of this paper is to understand the transition that Japan must make to regain its global economic competitiveness. It examines the significance of foreign technical talent to the Japanese high technology sector, specifically, the information and communications technology (ICT) industry. Japan is the second largest ICT market in the world. And since ICT services such as software development is labor intensive, under unfavorable demographic developments, Japan is likely to confront shortages of talent and thus competitive challenges. Given that both the Chinese and Indian economies and ICT sectors are growing rapidly, albeit differently, my hypothesis is that there will be greater mobility of technical talent to Japan and by extension greater engagement of Japanese businesses with Asian ICT firms. This study aims to shed light on why and how Japan must adjust to globalization by bringing out the patterns of talent movement from Asian countries to Japan.

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INTRODUCTION

The rise of Japan in the contemporary capitalist world economy has been nothing less than spectacular. From the swift unification of decentralized fiefdoms under the Meiji Restoration of the 19th century to rapid reconstruction of the war-ravaged economy during the 1950s and 1960s, Japan transformed itself within a century from an agrarian society to an industrial, technological, and economic power. There are several interrelated factors behind this transformation, such as Japan's nationalism and its reliance on state-business partnerships, inter-firm kereitsu structure, buyer-supplier long-term cooperation, labor market stability through on-the-job training and lifetime employment in large firms, and a favorable international security and economic environment. These internal institutional arrangements and external stability have effectively shielded Japanese businesses from global competition at home and allowed Japanese firms to pursue international competitiveness through foreign technology assimilation, technical education, domestic competition, and sustained incremental innovations.

Thus the contemporary character of Japan's selective globalization is consistent with its nationalist moorings. There is two-way trade but it is dominated by Japan's exports of high-value manufactured goods and technology. Its high outward foreign investment is influenced by its export surplus and rising production costs at home but inward foreign investment in Japan has been limited by institutional barriers. Foreign firms find it trying to penetrate the Japanese market as they do not offer competitive products to Japanese consumers, and Japanese firms as well as the government express reservations toward a visible foreign economic presence. Most importantly, unlike other OECD countries, Japan has continued to insulate itself from foreign workers despite concerns about an ageing population, declining fertility rate, an absolute projected decline in its population, and rising costs of services. It is no surprise then that unlike American or European firms, Japanese businesses have been slow to employ foreign technical professionals either at home or abroad. Instead staffing is largely done by Japanese personnel via intra-company transfers (Iredale 2000). The decade-long recession of the 1990s has further discouraged cross-border outsourcing of information technology (IT) services, jeopardizing the future competitiveness of Japanese industry

(Anchordoguy 2005, Kim 2002).[1] Today in matters of Asian global competitiveness it is China and India that draw most of the headlines, while Japan remains mired in the social and political dilemma of how to open doors to immigration (Iguchi 1998, Kuwahara 1998).

The purpose of this paper is to understand the transition that Japan must make to regain its global economic competitiveness. It examines the significance of foreign technical talent to the Japanese high technology sector, specifically, the information and communications technology (ICT) industry (D'Costa 2004, 2008). ICT goods and services markets remain one of the most dynamic sectors in terms of current growth, diffusion, and innovations (Taichi 2001). Japan is the second largest ICT market in the world. And since ICT services such as software development is labor intensive, under unfavorable demographic developments, Japan is likely to confront shortages of talent and thus competitive challenges. Given that both the Chinese and Indian economies and their ICT sectors are growing rapidly, albeit differently, my hypothesis is that there will be greater mobility of technical talent to Japan and by extension greater engagement of Japanese businesses with Asian ICT firms. This position stems from the theoretical understanding of the benefits of talent mobility for innovative capabilities and how Japan is currently missing out on the benefits. By bringing out the patterns of talent movement from Asian countries to Japan it also suggest how Japan might adjust to contemporary globalization challenges.

This project is motivated by the fact that there are few studies that explicitly treat the movement of technical talent to Japan. Those that do (Fuess 2003, Kobayashi 2001, OECD 2003a, 2003b) do not have a sectoral focus. Their concern is largely with broad flows of the highly-skilled from various regions and the growing importance of Asia, without identifying specific source countries for technical talent. Excessive reliance on published data are rarely combined with primary data to capture industry-specific dynamics. This is a major shortcoming since ICT sectoral shifts at the global and regional levels are quite dramatic (see Aspray, Mayadas, and Vardi (eds.) 2006). Furthermore, because much of the discussion has been focused on the US, the emerging regional interconnections between China, Japan, and India have been underplayed. Also, if progress is made on Mode 4 for trade in services under

[1] In the US an outsourcing surge would be a typical response under recessionary conditions as firms would try to reduce costs.

the General Agreement on Trade in Services (GATS) we can anticipate increased temporary flows of high technology service workers (World Bank 2004, OECD 2003c).[2]

The rest of the paper is divided as follows. Section two presents a rationale for studying global talent mobility from development and competitiveness points of views. The next section briefly provides an understanding of Japan's ICT sector and its relationship to demographic predicaments. The fourth section identifies the patterns and trends in the mobility of talent to Japan and analyzes their variation. Section five offers some broad policy outlines to facilitate Japan's adjustment to the reality of talent mobility.

WHY STUDY TALENT MOBILITY?

It is widely accepted that foreign labor contributes to national economic well-being of the sending countries, as evidenced by the experiences of workers in the Middle East, the US, Singapore, and Europe, even as cultural assimilation and political acceptance on the part of receiving countries remain major impediments for less-skilled workers, while issues of brain drain dog sending countries (Castles 2004). However, the presence and mobility of Indian and Chinese engineers, students, and entrepreneurs in the US and elsewhere suggests such high-skill technical talent can contribute significantly to the economic vitality of both sending and receiving countries and their innovation centers (for example Silicon Valley, Bangalore, Shanghai, Hsinchu) (Saxenian 1999, 2003, Leng 2002). Paradoxically, Japan, which has institutionally responded pragmatically to past external challenges, has not come to grips with impending competitive challenges in an era of intensified global economic integration. It also has not recognized the importance of global talent for national development.

The movement of technical talent in the global economy is integral to the overall economic integration process (D'Costa 2008). With increased flows of goods, services, investment capital, and technology the international flows of human resources are inevitable. The latter comprises both working professionals and students. These flows could be either temporary or permanent, with students, should they remain, contributing to the future stock of talent in the

[2] Mode 4 is a pending proposal under the WTO, which is designed to enhance exports of services by allowing temporary migration of workers from the developing world to the rich countries. Leading developing countries such as India, which stands to gain large remittance income flows from the temporary export of people, are spearheading this demand. Smaller developing countries are also expected to benefit as remittance income for many of them exceed foreign investment flows (Ratha 2003).

receiving country (Solimano 2002). These forces of globalization no doubt induce economic instability and social uncertainty in both receiving and sending countries, but economies failing to accommodate or adjust to them flexibly are likely to find economic restructuring challenging and socially disruptive.

While there are economic, social, and professional reasons for the international movement of technical talent, the economic imperatives of globalization, such as trade and multinational investments compel the deployment of foreign talent overseas (Iredale 2000). Consequently, intra-company transfers of employees are quite common among multinational firms. Increasingly, highly skilled professionals for multinational corporations are recruited on a global basis (Castells 1998). Also, as cross-border services become routine, the physical presence of technical professionals to provide "face to face" services, such as software development, accounting, finance and banking, management, and consulting becomes necessary (D'Costa 2003). More pertinently, as several OECD countries face serious demographic challenges and as the popularity of technical education declines because of affluence, alternative career paths, and employment uncertainties due to globalization, labor market imbalances have become more pronounced. Business strategies have ranged from automation to overseas outsourcing, while national policy in the case of the US, Canada, the UK, and Australia has been to encourage the inflows of foreign technical talent through managed immigration (Zhao, Drew, and Murray 2000, Cornelius, Tsuda, Martin, and Hollifield (eds) 2003).

Japan, unlike other OECD economies, has not viewed immigration favorably, thus making it a "negative" case for studying immigration (Bartram 2000). Both official policy and societal acceptance of foreigners have been lukewarm, at best. Not only have business practices such as favoring long-term local partners and state policies limited foreign participation in the Japanese economy but institutional factors such as language and culture and perceived quality of its higher education system have made Japan less attractive for foreigners than the US and other countries, such as tiny Singapore, that actively seek foreign talent. Japanese businesses, for their part, are unfamiliar with global outsourcing practices, are stymied by social obligations toward permanent employees, and feel uncomfortable working with foreign languages and in non-Japanese environments (Author's Field Research, Japan 2005 and 2006). However, Japan's demographic problem is severe enough and its proximity to other labor-abundant Asian countries such as China and the Philippines close enough that there has been a de facto inflow of foreign workers in labor-intensive industries (Piper and Ball 2001, Ahmed 2000, Brody 2002). Official indifference to the mounting number of visa overstayers suggests labor shortage in Japan's labor-intensive industries. Yet, Japan's high technology outsourcing is muted, with only a handful of Japanese firms engaged with small Chinese firms and a scattering of Indian firms (Author's Field Research, Japan, 2005, 2006).

Japan's impending technical labor market imbalance is further compounded by the lack of foreign students pursuing advanced degrees in Japan. Of those who study in Japanese institutions, many do not remain (Kobayashi 2001). This situation is different from Anglo-phone countries such as the US, UK, Canada, and Australia, where superior university infrastructure attracts highly motivated students from around the world and encourages employment and entrepreneurship (see Espenshade 2001). This would not be an issue for Japan if there were a sufficient number of domestic students pursuing technical degrees. However, informal discussions with academics in Japan suggest that enrolments in technical education in Japan are dropping, universities are faced with cutbacks, and there is little effort to encourage women to enter technical professional fields. Other sources show that shortages in software engineering have already emerged in particular high technology areas such as embedded software, a niche in which Japan is the largest market (Kojima and Kojima 2007). Japanese technical training, especially in software engineering, is weak (Fuess 2003:245).[3] The business practice of converting non-technical people to highly skilled technical talent based on rigorous on-the- job training is no longer adequate. These workers develop firm-specific expertise but are unable to cope with the contemporary demands of dynamic knowledge-intensive activities, which require deep formal academic technical training and considerable flexibility in dealing with changing technologies.

While Japan reformed its immigration policies since 1990 and made work visas easier for foreign professionals, the policy response has been too little and too slow to address the looming demographic and labor market crisis. Globally the competition for technical talent is fierce. Hence, at the minimum Japan must take stock of its ICT labor market, revisit the immigration question, and come to terms with both global and Asian dynamics of technical talent mobility.

[3] Keidanren (Author's interview, Tokyo March 2006).

The benefits of talent mobility accrue to not just receiving countries but also to sending countries. Increasingly, professional networks, driven by industry and college alumni, have become important sources of information for would-be migrants, would-be job seekers, and professional mobility. These social networks ease the flow of information, especially of technical and commercial knowledge pertaining to ICT markets. The formation of an "epistemic community" (Cowan 2004:8) in various locales add to the "density" of networks. The links between users, suppliers, manufacturers, research and development (R&D) centers, and universities could theoretically support a gamut of interrelated industries that tap into the knowledge pool. For example, interlocking corporate directorships, representing a high density of networks, contribute to knowledge transfer (O'Hagan and Green 2004:131-132). Networks thus have a "social" dimension to them as they tend to generate knowledge that spills over from the immediate economic activity and multiplies across other economic activities (Maskell and Malmberg 1999).[4]

Compared to unskilled and semi-skilled workers, there is a high probability that technical talent, on their return, is likely to bring back high-value professional and technical expertise. There is high entrepreneurial propensity among returned professionals, whose motivation to return home, among other things, is driven by increasing professional and business opportunities in sending countries. This suggests that emigration over the medium term could contribute to knowledge transfer to expanding sending countries. The longer professionals stay in the adopted country the more difficult it is for them to return. This, however, does not rule out the circulatory movement of talent between two or more countries as businesses adopt a more decentralized but globally integrated model of service development and delivery. There is evidence that movement of talent back and forth, linking markets, professionals, and institutions contribute to the vitality of businesses in both sending and receiving countries (Saxenian 2006). When professionals return temporarily or permanently they transfer tacit knowledge and thus contribute to national development largely through their technical expertise. Working through networks they are likely to generate a stream of economic benefits which could presumably exceed the initial investments made for their education. Network externalities would arise as more professionals return and establish links with not only the receiving economy they left but also the wider sending economy. These

[4] There is a growing recognition that technical networks are important to innovative capability and bringing back expatriate scientists are perceived to enhance national competitiveness (see Carvajal 2004).

links are of course contingent on several factors, the principal one being an expanding economic base, including structural change and industrial upgrading.

The more dense the networks and the larger the number of nodes in the network, the greater is the overall production of knowledge within the network. The possibility of knowledge diffusion through multiple channels linking the various nodes is also high. The access to both volume and high quality of knowledge is critical to network externalities. An integrating economy is likely to have more links to the various knowledge nodes representing technical, organizational, market, and infrastructural information at the global level. However, it is possible that the links to the nodes are weak, as is often the case with economies that suffer from structural dependence and confront adverse terms of trade of their primary exports. Even in the case of India, despite its global prominence, still suffers from weak innovation links (Personal Interview, Future Technology Design, Singapore 2007, D'Costa 2007, D'Costa 2002, Lema and Hesbjerj 2003). Only under certain favorable conditions, such as substantial learning-by-doing and by interacting at home and abroad could an upward movement in the value chain be possible (D'Costa 2003).

Two types of flows could make this possible. First, when skilled workers and professionals go abroad temporarily they not only embody particular forms of academic training and technical expertise but their mobility exposes them to specific types of technical work abroad. This experience complements the individual and team skills and presumably enhances social interaction between migrant professionals and their hosts. On their return, the temporary migrants are likely to embody enhanced understanding of certain knowledge-intensive sectors, which is greater than what they left with in the first place. This added expertise could contribute to the national economy if the demand for such expertise materializes.[5] With this circular flow the link between sending and receiving countries is maintained and the contribution of returning professionals to knowledge-intensive sectors in the sending country is expected to be substantial.

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5 Lucas (2004) finds mixed evidence on the relevance of skills acquired overseas for local economies. However, it is crucial to distinguish not only the types of workers who return but also identify any accompanying knowledge networks.

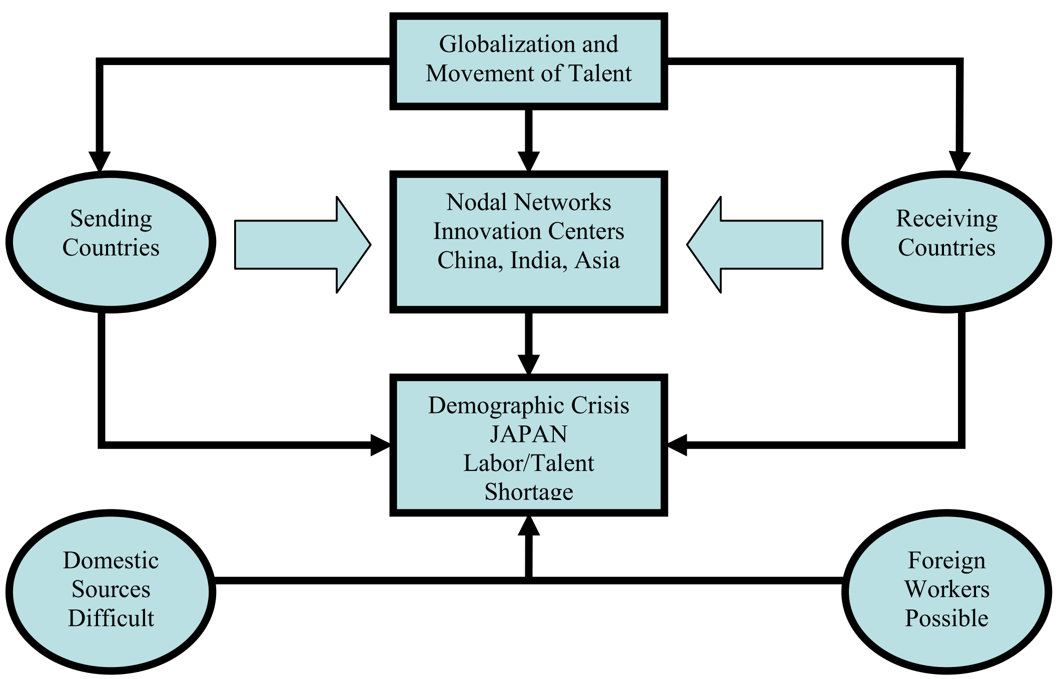
The second type of flows is comprised of students, who also embody specific technical knowledge and whose mobility is dictated by the desire to upgrade knowledge. This movement has several implications. First, there is increased social interaction within the science and engineering peer groups that contributes to technical knowledge at the individual and collective level. Second, as a high percentage of students tend to remain in the receiving countries their contribution to the host economies is substantial (Burrelli 2004). This permanent migration adds to the stock of talent and thus knowledge in the host country, which in static terms is seen as brain drain for the sending country. Third, this stock today can be seen as "brain gain" for the receiving economy and "brain bank" to be tapped in the future to benefit sending countries. Fourth, as economies expand and the demand for technical services increases globally, sending countries become viable sites for off-shore development of such services. In this scenario, migration of talent is met by an expanding pool of technical professionals in the sending country who find new opportunities both at home and abroad. Conversely, many expatriates find expanding opportunities in the sending countries attractive enough to return home permanently or temporarily (see Lucas 2004:18).

Since the flow of students, which often becomes permanent stock of talent in receiving countries, there is an implicit policy on the part of receiving countries to encourage such flows. Structurally, the receiving countries also exert influence over this flow because of superior technical institutions, research and development opportunities, and professional advancement. However, for sending countries this brain drain (a flow) is now perceived as a brain bank or brain trust (a stock) by those countries whose economies are poised to take advantage of the collective expertise of its overseas reservoir of talent. If indeed such talent flows back to the sending countries then the initial outflows of technical talent in the form of students from the developing countries need not altogether have an adverse impact, especially if they return with new knowledge.

Under globalization, as economies become linked, the circulation of talent becomes an essential feature to organize production (Davenport 2004). By stimulating national economies, research and expatriate networks become actively involved in linking talent in both sending and receiving countries (Meyer and Brown 1999, Saxenian 1999). Students are also part of such networks as they seek admission to universities abroad through various institutional channels (Tremblay 2001:61). Sending countries thus stand a better chance today to attract such talent from their overseas brain bank, even if temporarily. They also stand to gain permanently from the talent that stays at home but which is part of wider epistemic communities. It is difficult to predict the reverse flow of talent and whether they are temporary or permanent. However, familiarity with sending (or home) countries becomes a critical condition for the return of talent. Professional experience in receiving countries contributes to technical and entrepreneurial links. Exploiting such connections is intrinsically beneficial to the sending country as professionals and entrepreneurs take advantage of the knowledge links they have been part of while being residents of the receiving country.

Schematically, the dynamics of talent movement is presented in Figure 1. Globalization entails the movement of people. The growing concentration of talent in particular places and its mobility create global innovation centers that can be argued to be networked. Thus Shanghai (China), Bangalore (India), and Singapore can be considered to such nodes. Japan is peculiarly positioned in this scheme of networks in that it has failed to work with foreign talent. This is all the more curious as it faces labor shortages emanating from its demographic crisis. But it does open up the possibility of absorbing foreign talent should the institutional barriers are either eliminated or minimized.[6] Sending countries are also likely to benefit as they interact with Japanese clients, talent, technologies, and markets.

Figure 1: Dynamics of Talent Mobility and Japan's Predicaments



6 It may be mentioned that increasing domestic sources of talent, though desirable, is difficult in the medium term.

THE JAPANESE ICT INDUSTRY AND DEMOGRAPHIC PREDICAMENTS

The Japanese ICT industry is legendary when it comes to hardware manufacturing. Based on IBM mainframe clones, several large firms such as Hitachi, Toshiba, and NEC became dominant players in the Japanese ICT industry (Kokuryo 1997). These firms relied on the kereitsu model with numerous interdependent domestic suppliers, building up solid economies of scale in manufacturing, servicing, and network externalities. They bundled software with hardware, charging little for the software. This has had a long-term effect on slowing down the development of an independent software industry in Japan (Anchordoguy 2000). However, the industry as a whole has continued to grow due to buoyant demand from a variety of emerging sectors such as telecommunications, mobile phones, and increasing computerization worldwide. For example, in 2002, the value of IT-related goods such as cell phones shipped by manufacturing industries was nearly $12 billion and communications equipment $17.5 billion (Japan Electronics and Information Technology Industries Association (JEITA) 2002: 28, 26). Using 1995 as the base year, Japan's IT services industry sales increased from 100 to nearly 250 in 2004, while nominal GDP has remained virtually stagnant (Japan Information Technology Services Industry Association (JISA) 2006: 1). In 1992 total sales of IT services were ¥10,152 billion ($85 billion) compared to ¥14,271 billion ($119 billion) in 2004 (JISA 2006: 4).[7] The number of workers in this sector more or less remained constant between 1999 and 2004 to around 530 thousand (JISA 2006: 5). This, however, does not include temporary transferees, dispatched personnel, and temporary staff, which effectively raises the total number of workers in the IT services sector.

By any account Japan's IT industry is large and is expected to grow even further. Consider the government's e-Japan strategy launched in 2001. It is designed to make Japan by 2005 the "most advanced IT nation in the world" (JISA 2006: 18). While actual outcomes have fallen behind targets, Japan has significantly narrowed its gap with the OECD average by drastically enhancing its broadband infrastructure, widening and deepening the use of IT, and increasing e-commerce. It is now aiming to spread the use of IT for delivering government services, healthcare, and education, address digital divide and disaster prevention, integrate IT in business management, and strengthen global competitiveness of industries, among other things. Yet, Japan faces challenges in the IT sector. A recent presentation by an official of the

[7] An exchange rate of US$ 1 = ¥ 120 has been used for all conversions in this paper.

Ministry of Economy, Trade, and Industry (METI) (Ogawa 2007) indicated that the Japanese labor market in the information services industry is tightening up, with many employers voicing concern over inadequate availability. Some projections made by the World Information Technology and Services Alliance (in Ogawa 2007) point to Japan's relative decline way below China's share and not that much larger than India's in world IT market shares by 2015.[8]

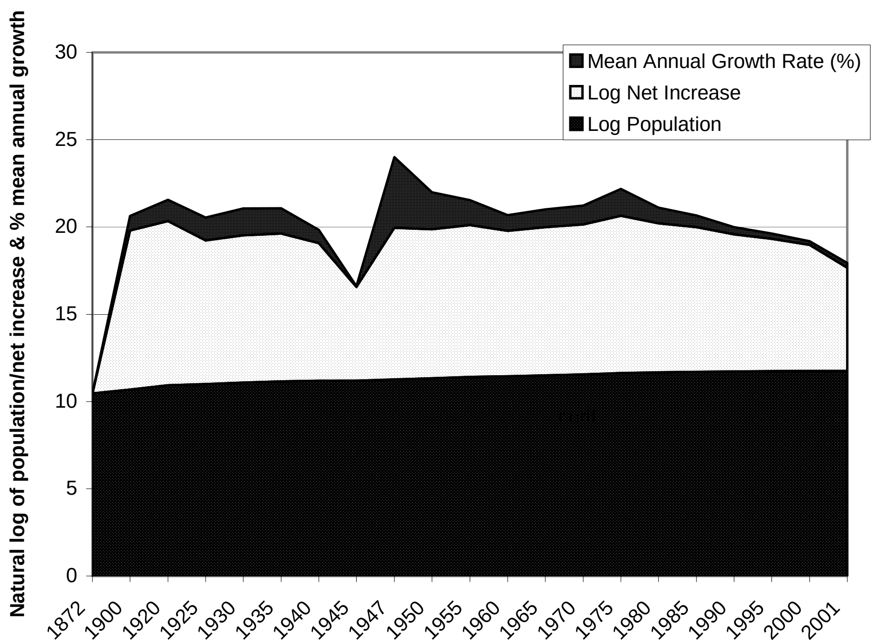
While it would be difficult to project precisely the trajectory of the ICT industry, given Japan's leading role in this sector, the emerging technologies associated with it, and the government's ambitious plans it is safe to anticipate continued expansion of the industry. Thus far investment by both government and private business has been quite aggressive. For example between 1996 and 2001, the ratio of IT-related annual expenditures to revenues increased consistently, from 0.99% to 1.2% (Japan Electronics and Information Technology Industries Association (JEITA) 2002: 58). The average IT-related expenditure per enterprise in 2001 was ¥ 9.4 billion ($78 million). The questions are then whether Japan is producing enough technical talent to keep up with this anticipated growth and, if not, does it have easy access to foreign talent. There are two principal ways by which we can investigate this. The first is to examine demographic developments and draw some tentative conclusions on the future supply of technical talent from domestic sources. The second would be to capture the patterns of foreign talent inflows into Japan by source and identify some principal reasons for their mobility.

Japan's population, soon after the Meiji Restoration, stood at 35 million (National Institute of Population and Social Security Research 2003: 2). The year-to-year growth rate of population has fluctuated but in most years between 1894 and 1976, the growth rate has remained greater than 1%. Consequently, the trend has been an increase in Japan's population. For example, in 1920 the population was 56 million, in 1950 it was 83 million, and in 2000 it was 128 million (see Figure 2). However, since 1977 the year-to-year growth has steadily declined from 0.95% to as low as 0.15% in 1999, which is below replacement rate (National Institute of Population and Social Security Research 2003: 4). Declining population is partly reflected by

8 The estimated shares are 2.8% for India, 19.3% for China, 3.9% for Japan, and 41.5% for the US. The corresponding shares for 2001 were less than 1%, less than 1%, 11.7%, and 50.5% (Ogawa 2007: 5). Japan's share of employees in the information services industry was 570,000 in 2005 compared to India's 130,000 and China's 90,000 (Ogawa 2007: 6).

a significant decline in the number of new high school graduates, by nearly a third – from 1,760,000 in 1990 to roughly 1,200,000 (Yuki 2006: 4). Population projections to 2050 further show that the growth rate will be negative from 2007 onward with a projected population of roughly 101 million. This emerging development raises a fundamental question of how Japan will respond to a shrinking labor supply.

Figure 2: Japan's Population and Growth Rate Trends



Source: Adapted from National Institute of Population and Social Security Research 2003: 1

Notes: Natural logs of both absolute population and net population increase have been used to sharpen the larger demographic picture.

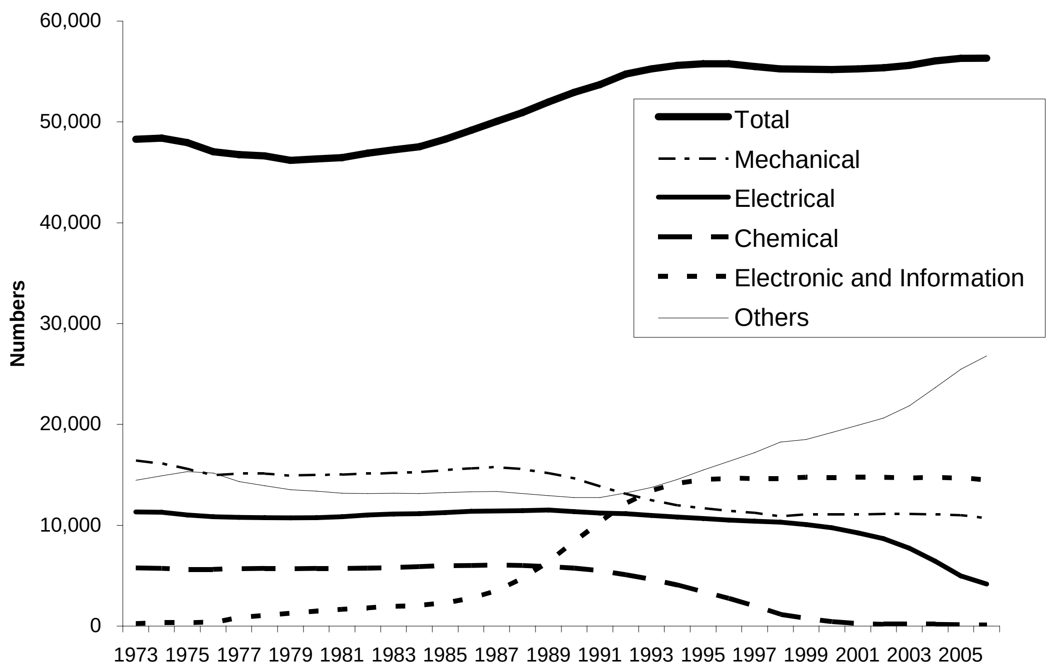
There are many interrelated explanations for the slowdown in population. Some are common to affluent societies and others specific to Japan. For example, Japan follows the other OECD norms of declining fertility as women enter the workforce and individual liberties are extended to women, which offer the options to not marry, defer marriage, divorce, and not have children. The burden of child rearing falls squarely on women as men spend long hours at the office, which acts as a disincentive for tying the knot. There is also social stigma of single women raising children. However, Japan unlike western OECD nations has not incorporated women to the same degree in permanent labor markets. There is still a large share of women in the part-time, contingent workforce. For example, between 1980 and 2003, the share of female part-time workers to share of total female workers increased from 26% to 42% (OECD 2005: 171). The corresponding numbers for male workers were 6% and 14%. With a growing share of elderly population and limited state support for them, the responsibility of elderly care often fall on women. All of these have effectively reduced the fertility rate in Japan.

Intuitively with declining fertility rates we can anticipate labor-market imbalances over the medium- to long-term. It is not all together clear which specific sectors are likely to demand more workers and subsequently confront shortages. However, with an ageing population there is bound to be an increase in the need for health care and elderly care workers. Similarly, manufacturing sectors that are integrated with the new economy and technologically dynamic will need highly educated professionals. As the high technology service economy, including finance drives the national economy the need for technical professionals is expected to increase. This is evident from the fact that even small and medium firms are demanding highly skilled workers as opposed to the traditional high school graduates, who are finding it increasingly difficult to find employment after graduation (Yuki 2006: 5). Hence, the intuitive (often Japanese) argument that higher youth unemployment negates labor shortage is not valid as the expectations of employers have shifted in favor higher skills and training that go beyond high school education.

Japanese data on students by fields of study at various levels illustrate the looming shortages ahead. The data at the undergraduate level reveal the relative stability in enrollment ratio in the humanities since 1990, a gradual decline in the social sciences since 1995, and a steeper decline in science and engineering since 1970 (Ministry of Education, Culture, Sports, Science and Technology (MEXT) 2006). At the junior college level the pattern is not dissimilar, with humanities enrollment share declining from 26.4% in 1990 to 13.1% in 2005. The corresponding figures for social sciences and engineering for 1960 and 2005 are: 19.8% and 12.3% and 11.3% and 4.6%. At the master's level, science and engineering numbers increased between 1960 and 1990 but have been declining ever since. Between 2000 and 2005, the average enrollment in science and engineering at the master's level was 63,284, about 48% of total, having dropped from 56% in 1990 (MEXT 2006). At the doctorate level, total enrollment has increased until 1990. In the first half of this decade enrollment ratios fell with social sciences steady at 10%, sciences at 9%, and engineering at 19% (MEXT 2006).

Since the early 1970s, total enrollments in various engineering fields have increased marginally in Japanese technical colleges (Figure 3). From 1973 to 2006, the numbers increased from about 48,000 to about 56,000, an increase of 17% over the two decades (Ministry of Education, Culture, Sports, Science and Technology, various years). Mechanical, electrical, and chemical engineering has consistently declined since the late 1980s and early 1990s, reflecting declining sectors, while electronic and information-related subjects grew sharply since the mid-1980s but stabilized quickly by the early 1990s. There was a sharp increase in engineering under "others", which covered several fields such as architecture, design engineering, and systems-related engineering and also various types of information and communications technology engineering such as electrical electronical, electrical electronical system engineering, visual information, and management information. However, overall enrollment in technical colleges remained stable.

Figure 3: Trends in Technical Student Enrollments in Japan in Technical Colleges



Source: Ministry of Education, Culture, Sports, Science and Technology, Gakkou Kihon Chousa Houkoku (Statistics on School and Education in Japan), various years.
Notes: Mechanical =Mechanical Engineering and Mechanical Electric Engineering
Chemical = Chemical Engineering and Industrial Chemistry
Electronic and Information = Electronic, Electronic Control, Control Information, Electronic Information, Information Electronic, Information, and Information Communication
Others = Substance Engineering, Architecture, Design Engineering, Interdisciplinary, System-related, etc.

One IT service area where Japan is expected to experience acute shortages is in embedded software. This segment is rapidly expanding globally and in Japan. It demands software to "control equipment with complex functions" such as "automobiles, mobile phones, information appliances, and other modern mechanical products" (JISA 2006: 29). This segment is represented by industries that account for roughly 10% of Japan's GDP of ¥500 trillion ($4.3 trillion) such as industrial machinery, consumer electronics, and telecommunications (46% of embedded market) and it demands highly skilled technical professionals (JISA 2006: 29-30, Kojima and Kojima 2007).[9] The 2005 Embedded Software Industry Survey Report pointed out that there were about 70,000 unfilled engineering positions, suggesting both shortages and weakness in human resource development for this segment (in JISA 2006: 30). This is further revealed by Japanese firms having the highest level of outsourcing (not to be confused with offshoring) (82%) among the triad, with the US (47%) and EU (35%) (Kojima 2006: 14-15). As product cycles become shorter the pressure to develop high quality software quickly means greater reliance on larger number of top-notch professionals, which Japan does not seem to generate.

It is evident that the interaction between demographic challenges, education enrollment patterns, and emergent needs in contemporary Japan are suggestive of constraints in the supply of technical talent. Enrollment in general is slowing down at all levels but absolutely declining in science and engineering at the undergraduate level and in junior colleges. This presents a dilemma for employers in the high technology sector, where skills are in demand and where internal labor markets are becoming difficult to sustain due to rapid technological obsolescence. At the postgraduate levels, science and engineering enrollments are only gradually improving. This may be a response to tight labor markets for ordinary graduates. On the whole both master's and PhD level enrollments in science and engineering have been holding steady since 2000. However, the dynamic embedded software segment, where such postgraduates are likely to be employed appears to have hit a structural impediment.

[9] In 2003 embedded systems (the units that contained embedded software) had a turnover of ¥51 trillion ($425 billion) (Kojima 2006: 5). This figure is consistent with 10% of $4.3 trillion above.

FOREIGN TALENT IN JAPAN

The challenge for Japan is how it will meet the growing need for high technology professionals, especially in IT services. There are several possibilities, none of which in the Japanese context are attractive, institutionally, politically or socially. One long-term option would be to induct more women and younger part-time workers in these labor markets. However, in the immediate term institutionally the challenges are daunting. Traditionally gendered division of labor is still pervasive in Japan with manufacturing largely male-dominated in Japan. Technical fields such as engineering have been largely shunned by Japanese women. Social policies in favor of married women have been also unfavorable for them to return to work after marriage. Part-time workers, while many of them would like to work full time, their education, training, and skill levels are inadequate for highly demanding technical work.[10] Automation, which raises productivity, could potentially release workers over the medium term. But most manufacturing operations in Japan are already heavily automated, though there are service sector areas such as banking, retail, etc. in which greater automation could be introduced to increase efficiency. However, the Japanese penchant for "face to face" interaction and service expectation at a personal level limit the extent of automation.

The third possibility is to increase tertiary education enrollment to new levels so that structurally the Japanese economy can concentrate on high-wage, high-value jobs but this option is limited by lower fertility rates and the unattractiveness of technically challenging fields of study. Lastly, increasing but managed inflows of foreign talent, though fraught with political, economic, cultural, and social difficulties, is likely to reduce the pressure on labor shortages in the immediate as well as in the long-term. Obviously, this option needs to be exercised in conjunction and in some combination with other options mentioned above.

Attracting foreign talent is important for Japan for a number of reasons. First, among all the options mentioned above, this is perhaps the easiest one to handle in the immediate to medium-term. But more importantly, there is no quick-fix to the domestic availability of

[10] The new social group NEETs that is Not in Education, Employment, and Training is a new development in the wider economic and social structure in Japan. A large part of the young generation is growing up as "freeta" or freeters (unemployed, part time freelance workers (arbeiter in German or arubaito, which is part-time job in Japanese) (Wikipedia 2007, http://en.wikipedia.org/wiki/Freeters.

tertiary educated, technical talent hence securing talent from overseas is promising, especially from large Asian countries such as China, India, and others. Second, as the global economy experiences accelerated expansion in the high technology sectors, including ICT, the demand for such professionals is expected to grow. This suggests that Japan will have to compete with other countries to secure such workers and hence must become institutionally receptive to the presence of foreign talent. As of now the presence of foreigners in Japan is quite low by OECD standards, although the share of foreigners has increased over time. For example, in 1975, foreigners in Japan numbered 669,000; in 2001 it was 1,383,000 or 0.57% of total population and 1.09% respectively. The US with a population of nearly 300 million in 2004 had 12.8% foreign-born population or 37.6 million people (OECD 2006: 262). Third, the presence of foreign technical talent is politically less charged than admitting foreigners in general. But before outlining some policy measures the question is what is the current pattern of talent flows to Japan and whether such flows are durable. In other words, how attractive is it for foreign talent to work in Japan.

In the discussion below, two forms of flows are addressed: the flows of professionals and the flows of students. They both have different implications in terms of future availability of talent in sending and receiving countries (see D'Costa 2008). Briefly, flows of professionals are largely temporary but a significant share could become permanent. Consequently, sending countries are also expected to witness varied impacts, gain talent after their return, or face brain drain. Similarly, foreign students in Japan can benefit sending countries with their training. More importantly, Japan would gain from student flows by meeting student shortages in universities, complementing Japanese learning experience, expanding overseas, and in the long haul secure readymade talent for the Japanese economy by retaining such students. The inflows of technical professionals first, followed by flows of students, mainly in sciences and engineering are examined below.

Foreign Professionals in Japan

The government of Japan reports the entry of foreigners in various ways.[11] Its alien registration system, based on visa classification, is indicative of the types of professionals entering the country and who either intend to or actually stay for more than 90 days (see Table 1). Between 1990 and 2005 the number of such entrants nearly doubled from 1,075,317 to 2,011,555 (Table 1, see also Kobayashi 2001: 121).[12] The disaggregated Asian data shows that North and South Korea held the number 1 spot, followed by China. The Koreas are treated together as there are many (northern) Koreans (of undivided Korea) living in Japan but who have refused to naturalize. However, the noteworthy trend is the steep decline in the share of Koreans of total registered foreigners in Japan and the gradual increase in the presence of Chinese. In 1984, the share of Koreans and Chinese were 82% and 8% respectively. The corresponding figures for 2005 were 30% and 26%. Another development has been the sharp increase of Brazilian (and Peruvians) of Japanese ancestry since 1990, the year when various immigration reforms were enacted. Brazil now holds the third position for foreign registrations. This is clearly a sigh of labor shortage and an attempt to maintain a "racially" more homogeneous Japanese population. The anomaly as far as Asian countries are concerned is India. From the 9th position in 1984, India's ranking has hovered between 10 and 13 since then. However, the flow of Indians to Japan has also increased over time.

For the purposes of identifying technical talent or highly educated professionals "four" categories of foreign entrants by resident status–professor, researcher, engineer, and intra-company transferee – have been used. These groups of professionals can be roughly equated to technical talent appropriate for the high technology industry. Technical talent as defined here is a subset of total talent, which includes many other categories of professionals such as journalists, entrepreneurs, lawyers, medical staff, etc. (see notes under Table 2). These four categories represented 50% of total talent (defined as the total of professionals, engineers,

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[11] The data is collected by a number of Japanese government ministries. Hence, the data are not always consistent. Moreover, there are a variety of definitions under which the entry of foreigners is recorded. For example, by visa category such as professors, engineers, etc. and whether they have registered as aliens that is staying in Japan for more than 90 days and so on.

[12] There are of course other categories, which fall under the definition of "Professionals" such as journalists, investors, lawyers, medical professionals, and humanities and international business personnel (Japan Immigration Association, various years). These professionals largely fall under the OECD definition of human resources in science and technology (HRST) but with our focus on the software and IT industry, we omit these categories.

and intra-company transferees). What is incontrovertible is the importance of Asian talent in the Japanese economy, representing nearly 75% of total foreign technical talent in recent years. Asians also represent a slightly higher share of technical talent relative to total Asian professionals, 57% compared to 51% for foreigners as a whole (Japan Immigration Association, various issues).

Relatively, most Asian countries are senders of unskilled or semi-skilled people, whereas North American and West European countries tend to send fewer people but a higher concentration of professionals. For example, in 2005, Canada, the UK, France, the US, and Germany had shares of professionals to total national populations in Japan ranging from 29% for Germany to 40% for Canada. The most likely reasons for their presence are multinational companies hailing from these countries and better professional educational system to handle global business. Interestingly India too had a high share of 31% compared to China's 8.5%, suggesting professional attractiveness of Japan due to globalizing India's IT industry and difficulties for non-professional Indians to reside in Japan. All the other Asian countries had less than 3% share of professionals and Brazil and Peru even less, smaller than one-tenth of one percent. It is clear from this that although China and other developing countries from Asia and Latin America send many people to Japan most of them are in the non-professional categories. Rich countries, and paradoxically India, send mostly professionals as an integral part of their engagement with Japan.

Nevertheless since 1990, China has emerged as the largest country in sending various kinds of technical talent, followed by Korea and India (Japan Immigration Association, various issues). Of the four types of professionals considered to be technical talent for this paper, engineers comprise the main category, with intra-company transfers being another important component. In 2004, China represented 55% of Asia's technical talent, 58% of Asia's professionals, and 38% of all foreign professionals registered as aliens in Japan (Table 2). However, since 1998 its share of professionals in Japan has been on the decline. This may be an outcome of increased opportunities elsewhere or in China itself, which has been growing rapidly in both manufacturing and high technology services in recent years. Korea is a distant second but represents 20% of Asia's share of talent in Japan.

Table 1: Foreigners Registered in Japan by Country by Descending Order

1984	**(persons)**	**1986**	**(persons)**	**1990**	**(persons)**	**1995**	**(persons)**	**2000**	**(persons)**	**2005**	**(persons)**
TOTAL	840,885	TOTAL	867,237	TOTAL	1,075,317	TOTAL	1,039,149	TOTAL	1,686,444	TOTAL	2,011,555
N&S Korea	687,135	N&S Korea	677,959	N&S Korea	687,940	N&S Korea	666,376	N&S Korea	635,269	N&S Korea	598,687
China	67,895	China	84,397	China	150,339	China	222,991	China	335,575	China	519,561
USA	27,882	USA	30,695	Brazil	56,429	Brazil	176,440	Brazil	254,394	Brazil	302,080
Philippines	9,618	Philippines	18,897	Philippines	49,092	Philippines	74,297	Philippines	144,871	Philippines	187,261
UK	6,354	UK	7,426	USA	38,364	USA	43,198	Peru	46,171	Peru	57,728
Viet Nam	3,911	Viet Nam	4,388	Peru	10,279	Peru	36,269	USA	44,856	USA	49,390
W. Germany	2,997	W. Germany	3,193	UK	10,206	Thai	16,035	Thai	29,289	Thai	37,703
Thai	2,536	Thai	2,981	Thai	6,724	UK	12,485	Indonesia	19,346	Viet Nam	28,932
India	2,434	Canada	2,685	Viet Nam	6,233	Viet Nam	9,099	Viet Nam	16,908	Indonesia	25,097
France	2,250	India	2,601	Canada	4,909	Iran	8,645	UK	16,525	UK	17,494
Canada	2,149	France	2,494	Malaysia	4,683	Canada	7,226	Canada	10,088	India	16,988
Brazil	1,953	Malaysia	2182	Australia	3,975	Indonesia	6,956	India	10,064		
Australia	1,686	Brazil	2,135	Indonesia	3,623	Australia	6,036				
Malaysia	1,649	Australia	2,058	India	3,107	India	5,508				
Indonesia	1,643	Indonesia	1,839	Iran	1,237	Malaysia	5,354				
Iran	543	Iran	852	Germany	3606	Germany	3963				
Peru	452	Peru	553	France	3166	France	3772				

Source: Japan Immigration Association, various years.

Table 2: Shares of Foreign Talent of Selected Asian Countries

	% Share of Four to Total Talent			**% Share of Asia's Four to World Four**								
	1998	**2001**	**2004**	**1998**	**2001**	**2004**	**1998**	**2001**	**2004**	**1998**	**2001**	**2004**
Asia	54.8	57.6	56.8	68.9	70.4	74.5						
	% Share of Technical Talent to Country Total Talent in Japan			**% Share of Country Technical Talent to Total Asian Technical Talent**			**% Share of Country Total Talent to World Total Talent**			**% Share of Country Talent to Total Asia Talent**		
China	54.0	53.5	53.8	68.1	54.3	54.6	43.2	36.3	38.3	69.1	58.5	57.6
India	73.2	79.2	82.5	6.3	8.7	11.2	2.9	4.0	5.1	4.7	6.3	7.7
Koreas	51.4	54.0	54.9	14.0	17.5	19.8	9.3	11.7	13.7	14.9	18.6	20.5
Philippines	71.1	70.5	71.8	4.0	4.0	4.5	1.9	2.1	2.4	3.1	3.3	3.6

Source: Japan Immigration Association, various years.

Notes: Four = Technical Talent = sum of professors, researchers, engineers, and intra-company transfers
Total Talent = sum of professionals, engineers, and intra-company transfers
Professionals = sum of professors, journalists, investor/business managers, lawyers, accountants, medical staff, researchers, humanitarian workers, and international business personnel
Total Talent > Technical Talent.

The small presence of Indian professionals does not commensurate with the talent the country generates, which is one of the highest in the world. India represents 11% of Asia but only 5% of all registered foreign professionals in Japan in 2004. Thus India's share of Asian technical talent is only one-fifth of China's.[13] However, India's share of Asian talent in Japan is on the rise: from 6.3% in 1998 to 11.2% in 2004. The reasons for India's low presence are not difficult to identify: Indian technical professionals prefer English-speaking receiving countries, which also draw them early on as students. There are other factors as well such as unfamiliar foods, few national culturally-based children's education, and the reluctance of the Japanese government to allow residency for elderly parents. The US is clearly a preferred destination for Indian technical talent and students, displacing the UK over the years (see D'Costa and Parayil 2007).

Notwithstanding the big gap between the Chinese and Indian flows, the former has declined and the latter has increased somewhat. For example, China's share of Asian technical talent fell from 68% in 1998 to 55% in 2004, while India's share increased from 6% to over 11% during the same period. The Philippines has a large Japan presence relative to other Asians. For example, in 2005, Philippines had over 9% of total foreign registrations in Japan compared to India's less than 1%. The government of Philippines has an explicit policy for exporting people (Tyner 2006). Its dire economic circumstances have made it a prime sender of people overseas. Many Filipinos work as entertainers in Japan and some are entering the elderly care professions as well. Although the Philippines is making a mark in the information technology services sector, its professional presence in Japan is small. It is less than 2% of total Philippine registrations in Japan compared to India's share of 32% in 2005 (Japan Immigration Association, various years).

The analysis of Japanese data on foreigners' registration by visa category suggests that Asian countries are important in sending people and professionals to Japan. Once dominant, Korea has been pushed out by rising China and other countries such as Brazil and smaller Asian countries. India, however, has been conspicuous by its relative absence. This pattern, however, does not hold when it comes to technical talent, narrowly defined. China remains the largest sender but proportionately its share of talent to total residents is quite low.

[13] It is also noteworthy that India sends more professionals to Japan (5%) than it exports software (2-3% of total exports). This may be due to greater "face to face" interactions necessary in the Japanese market.

Western countries and India tend to have smaller numbers but higher proportion of technical talent relative to their respective residents. This suggests that Japan is globalizing selectively when it comes to talent and foreign professionals themselves are choosing their country of work.[14] The fact that Japan is attracting foreign professionals at this time is a good pre-condition for future flows, on the condition that the barriers that currently exist such as Japanese language, business practices, and national receptivity toward foreigners in general are minimized.[15]

Foreign Students in Japan

The presence of foreign students in Japan though weak has been on the rise. It is reasonable to assume that as more students study in Japan the larger will be the number of students staying back to work in Japan. But the available data does not strongly support this assumption. The data on visa conversions from student status to worker status in Japan show that few students stay back. Just about 6,000 students converted their visa status for employment in fiscal year 2005-06. Of them, 96% were from Asia, of which three-quarters were from China (Japan Immigration Bureau, various years). India's share was less than 1% of total Asian visa conversions. Obviously, economic, social, and cultural factors impinge on the attractiveness of Japan as a place to live and pursue a professional career. In any case a viable long-term solution to Japan's impending shortages of technical talent will have to be addressed by increasing foreign student enrollments. However, if there are barriers to professional mobility then presumably the same kinds of constraints would dampen student enthusiasm to remain. However, one difference between mature professionals and students studying in Japan would be the latter's greater familiarity with the Japanese institutional environment, including language abilities. Here we briefly analyze foreign students in Japan at the undergraduate and graduate levels.

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[14] Currently, more high-skilled Japanese citizens go abroad than foreigners come to Japan. Intra-company transferees, assumed to be highly skilled professionals, ranged from 5,000 to 6,500 foreigners in the 1990s and between 10,000 to 11,000 in 2001 and 2004 (Japan Immigration Association, various issues). In contrast, nearly 53,000 Japanese nationals went abroad to take up various posts (Kobayashi 2001:121-122). Similarly, nearly 200,000 Japanese citizens went abroad for studies and technical training and over 100,000 for research in the late 1990s. Anecdotal evidence suggests the emigration of young Japanese women due to professional and lifestyle reasons and wedlock.

[15] The discussion of these issues is taken up in another paper.

Total foreign college students nearly tripled from 35,877 in 1990 to 100,804 in 2006 (Ministry of Education, Culture, Sports, Science and Technology, various years). Among foreign undergraduate students in Japan enrolled in regular course work in the humanities, social sciences, and engineering are popular fields but the sciences are not. For example, since 1985, the share of science enrollment to total enrollment has been less than 1%, whereas engineering share, albeit declining has been roughly 10% (MEXT, various years).[16] Foreign engineering students at the graduate level increased faster than in undergraduate education. After the social sciences, engineering is the most sought degree in Japan by foreigners. This is indicative of Japan's strengths in manufacturing technologies.

Most students these days come from China, 17,566 in 2006, followed by Korea 4,322. All other major countries, mostly Asian, had less than a thousand students, while the US and India had 286 and 268 students respectively (Table 3). Similarly, most undergraduates come from China and Korea, and followed by the US and Malaysia. Although the absolute numbers are quite small, Malaysia is noteworthy for its highest share of engineering enrollment. Japan is known for its engineering industries and the outward reach of Japanese multinationals in SE Asia, including Malaysia may be a factor for this development. Besides, there has been an official Malayan policy of "looking east." At the graduate level, the proportion of both science and engineering enrollments are higher than the undergraduate level, although only marginally for the sciences. For example, science enrollment hovered around 3%, whereas engineering was over 20%. Malaysia and Indonesia have more of their graduate students pursuing engineering. Given the small number of foreign students it can be inferred that there are shortcomings for foreigners pursuing science education in Japan although it is not clear as to what they might be.

If we define future technical talent broadly, that is, the social sciences, sciences, and engineering, then roughly 50% of foreign students fall under this definition (Table 3). The presence of Asia at the undergraduate level is noteworthy, of which China with more than 50% and the Koreas with 14% in recent years take up the bulk of undergraduate foreign students in Japan. However, the Koreas have witnessed declining shares since 2000, possibly due to increasing presence of other Asians in Japan. India remains an outlier with low number

[16] The total number of foreign engineering students in Japan has increased, with nearly 18,000 foreign students for 2006.

of students in Japan, not too dissimilar from the UK and the US. This is in contrast to the large number of Indian students in the US. From this we can infer that Japanese language, weak educational institutions, and limited professional advancement may be important barriers for Asian talent mobility. That said Asian countries continue to have a high share of students in what could in the future translate into technical talent for Japan.

Globally speaking Japan is not yet an attractive destination for most foreign students when compared to other major receiving countries. Almost 25% of foreign tertiary students pursuing studies abroad are in the US, compared to UK's 11%, Germany's 10%, France's 9%, Australia's 8%, and Japan's 4% (UNESCO 2005). Japan's lack of attractiveness is also evident from data on foreign students who change their visa or immigration status for employment purposes. Alternative destinations, cultural distance, especially language, and the perceived quality of tertiary technical education have been the principal reasons for foreign students shying away from Japan.[17] Japan has a long way to go before becoming a large receiving country of foreign talent. Given its demographic dilemma Japan will have to move quickly to attract talent or else face fierce competition ensuing from shortages of talent in all major IT producing countries, including China and India.

[17] A survey of Japanese Language Proficiency Test in 2004 showed that there were 90,356 Chinese applicants compared to India's 3,869 (JISA 2006: 39). Similarly, China had more than 111 times the teachers for Japanese language than India. Few Indians, compared to the Chinese, study Japanese language or business culture. For these reasons alone, Japanese clients have not been very enthusiastic about offshoring work to India (JISA 2006: 38-39).

Table 3: Foreign Students in Japan (1985-2006)

	1985			1995			2000			2006		
	Total	% to Total	% of Tech Talent	Total	%of Total	% of Tech Talent	Total	% to Total	% of Tech Talent	Total	% to Total	% of Tech Talent
Foreign Undergraduate Students in Japan (1985-2006)												
TOTAL	**14264**			**32565**			**36223**			**68889**		
China	4275	30	46.1	14939	45.9	54.4	18158	50.1	55.1	46196	67.1	64.2
N-S Korea	7351	51.5	51.6	12127	37.2	54	11990	33.1	51.1	13081	20.3	51.8
Malaysia	446	3.1	82.5	1574	48.3	78.6	1196	6.6	82.9	1335	1.9	87.8
Thailand	233	1.6	50.2	297	0.9	54.2	407	3.4	38.3	639	0.1	55.1
Indonesia	94	0.7	46.8	322	1	67.4	297	0.8	45.1	462	0.7	53.2
Vietnam	20	0.1	0.5	90	0.3	50	293	0.8	59.4	777	1.2	68.2
India	41	0.3	9.8	41	0.1	12.2	57	0.2	33.3	109	0.2	52.3
UK	83	0.6	43.4	203	0.6	10.3	273	0.7	16.1	291	0.5	20.3
US	733	5.1	8.9	846	2.6	5.7	807	2.2	5.2	1555	2.2	8.6
Foreign Graduate Students in Japan (1985-2006)												
TOTAL	**5477**		44.5	**18712**		48.6	**23729**		47.2	**31915**		50.4
China	2087	38.1	49.9	9596	51.3	48.7	12077	50.9	47.2	17566	55	52.1
N-S Korea	1644	30	39.6	4186	22.4	47.8	4626	38.3	43.9	4322	13.5	44.6
Malaysia	55	1	47.3	218	1.2	66.1	298	6.4	68.5	433	1.4	70.7
Thailand	260	4.7	52.3	480	2.6	53.1	714	3	51.8	866	2.7	46
Indonesia	128	2.3	42.2	636	3.4	60.2	888	3.7	58.2	908	2.8	58.4
Vietnam	11	0.2	45.5	104	0.6	56.7	290	1.2	55.2	778	2.4	63.4
India	58	1.1	46.6	140	0.7	62.9	136	0.6	52.2	268	0.8	52.2
UK	30	0.5	26.7	37	0.2	27	65	0.3	29.3	0	0	0
US	171	3.1	22.8	259	1.4	38.2	240	1	31.2	286	0.9	44.1

Source: Ministry of Education, Culture, Sports, Science and Technology, Government of Japan, various years.
Notes: % to Total = Country students/Total Students
% of Technical talent = Country students in social sciences, sciences, and engineering/Country Total Students

ADJUSTING TO GLOBALIZATION: SOME CONCLUDING REMARKS

The purpose of this paper was to relate Japan's specific demographic predicaments to its future competitiveness in the ICT industry. It was argued that the impending labor shortage, resulting from the demographic crisis, could not be tackled by internal sources of labor as the population is ageing rapidly and fertility rate has declined. Furthermore, reduced number of students and decreasing enrollment in Japanese science and engineering programs suggest that Japan must secure talent internationally. But this too is challenging for Japan because of the immigration implications it generates. However, allowing foreign professionals is a better medium-term solution to Japan's intractable labor market problems. For the long haul other strategies will have to be combined with an open-door policy toward international talent. This means that Japan must adjust to the new global realities of intense competition and cross-border flows of goods, services, technology, and capital. The flow of talent is a particularly important dimension to this set of flows, the absence of which could hurt the Japanese economy. But as the Japanese data revealed it is difficult practically to keep out highly skilled workers when there are shortages. In order to assess the feasibility of obtaining foreign technical talent this study analyzed the flows of professionals and students to Japan, with a particular focus on Asia, and the ICT industry.

Data on foreigners registered in Japan show that the presence of foreigners as a whole has nearly doubled since 1990 to about 2 million. The bulk of foreigners come from Asia with China and the Koreas being the top two sources of foreigners in Japan. In recent years Brazil and Peru have also increased their presence in Japan. But unlike China and other Asian countries, the Latin American countries do not send highly skilled people to Japan. They fill low-end industrial jobs in Japan, where there are shortages and high pressure to maintain cost competitiveness. Of these registrations, Asian countries, especially China, tend to have a high proportion of skilled professionals. In 2005, Asia's share of all professionals by visa category was 65%, while China's share of Asia was 59%. India was clearly an anomaly, given its size and its reputation in technical talent. It sends few professionals to Japan but the numbers have increased nearly tenfold since 1990, albeit from a low base. India shares OECD norms of an absolutely small number of professionals in Japan but a high proportion of technical talent, narrowly defined as professors, researchers, engineers, and intra-company transferees.

On the student front, although foreign student enrollments in Japan have increased nearly two and half times since 1990 the numbers is are still quite small—about 70,000 undergraduates and 32,000 graduates in 2006. Most students come from China followed by Korea. This was preceded by Korea's lead over China until the 1980s. These two countries in 2006 accounted for 77% of all foreign undergraduate students and 69% of all foreign graduates in Japan. The rest of the foreign student population hail from other Asian countries. Here too India's presence is negligible, which is not dissimilar from the pattern of students coming from the US and the UK to Japan. Humanities is the most popular field, followed by social sciences and engineering. The sciences reveal very low enrollments suggesting some educational-institutional impediments. Engineering is more popular in part because of Japan's reputation in manufacturing and increasing spread of Japanese multinationals in the Asian region.

Given this picture of increasing flows of talent and students, albeit small, from the world at large and the concentration of Chinese, Koreans, and smaller Asian countries in the vicinity, the question is not whether Japan needs foreign workers but whether it will be able to attract enough professionals and students. The magnitude of flows themselves suggest that Japan is not receptive to foreign presence although at the individual firm level businesses are selectively seeking out opportunities by recruiting foreign labor either in Japan or abroad. As long as other dominant economies such as the US or Western Europe continue to attract professionals and students and reform their immigration policies for making it more hospitable to foreigners, Japan will find the competition for talent rough.

While Indians will continue prefer the Anglo-phone countries especially the US, the Chinese will also continue to seek opportunities in the US. Their presence in Japan may be a second-best choice for many of them. There are advantages in working with Chinese professionals because of geographical proximity, some cultural affinities, and the larger student presence in Japan, who become familiar with Japan and later contribute to Japan's talent pool. The paradox is that both China and India are growing very rapidly and the demand for technical talent is growing rapidly at home and abroad. So unless Japanese companies and the government adopt more aggressive policies their ability to meet labor shortages in critical industries will fail. While the mobility of Chinese professionals and students has been well-established, Japan will have to go much further to attract Indian students and professionals. There have been several recent bilateral initiatives to strengthen India-Japan partnership. But considerable effort will be needed in revamping and reorganizing Japanese institutions of higher learning by internationalizing the curriculum. Furthermore, given Japanese business practices (a subject for another paper) it is quite challenging for foreigners in general to work with the Japanese. Hence, the adjustment process to globalization for Japan will remain protracted, incremental, somewhat painful, and mostly without enthusiasm.

Japan will have to contend with two paradoxes. The first is that the demographic crisis cannot be averted in the medium term and hence substantial policy intervention is not a matter of choice. The second is that maintaining the status quo either by design or default may somewhat shield Japan from the vagaries of the world economy but also subject it to a variety of internal economic and external competitive pressures. These are likely to arise from labor market imbalances, exacerbated by the growing needs of an ageing society. Whether Japan can live up to its historic reputation by keeping the barbarians out by becoming more like them remains to be seen. But in the meantime if one were to believe the former director of the Tokyo Immigration Bureau, Mr. Hidenori Sakanaka, the challenge is clear: Asia has high population growth, Japan has low population growth so Japan needs to manage the flows and let in qualified people. Otherwise, what might be a trickle now could turn out to be a flood once the labor shortage reaches crisis proportion (Personal Interview with Sakanaka, Tokyo, March 13, 2006). Given alternative opportunities in the global economy and the continued regional integration in Asia, the challenge for Japan, should it come to accept foreign talent in large numbers, would still be whether foreign talent will be available. The high rates of growth in both China and India and the continued demand for ICT professionals worldwide are likely to constrain foreign talent availability for Japan.

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