

Session 7: Workshop 1

Title: Partnerships and the IT Brain Drain: the Case of India

Presenter: Prof Ashok Parthasarathi, Centre for Studies in Science Policy, Jawaharlal Nehru University, India

Chair: Dr Subramanian Venkateswaran, Director, Birla Institute for Technology & Science, India

Rapporteur: Nick Mulhern, ACU

Presentation:

Context: historical & statistical

There has been a national historic commitment to human resource development in science and technology in India since independence. Currently there are some 240 universities (*cf* 22 in 1947) and the annual 'output' of trained professionals/graduates in science-related subjects now runs at 0.5 million while in engineering the figure is more like 180,000.

The foundations of India's emergence as a major IT player in the 1990's were laid in the previous decade in terms of human capital, R&D capacity and industrial capabilities. Nevertheless, there has been a remarkable development in software output, with a growth from Rs2 billion (US\$50 million) to Rs240 billion (US\$5.7 billion) by 1999. Software now constitutes some 10.5% of India's exports & is projected to become 35% by 2008. Similarly there has been a dramatic increase in the annual entry into the profession of software personnel, rising from 20,000 in 1990 to 100,000 in 2000 and giving a total of software professionals at all levels of some 350,000 as of March 2000.

Software Industry Growth - factors

a) India

Factors include: the growing world demand for software, India's comparative advantage in highly technically skilled, English speaking personnel (in part based on the Indian traditional strength in mathematical education), the time-difference between India & the U.S. – important commercially in enabling work to be completed in India during the U.S.'s night - and India's huge comparative wage advantage *vis-a-vis* OECD countries. (In terms of salaries, China is India's nearest competitor, though it has the advantage of being able to set fairly arbitrary wage rates.)

b) Policy

Policy initiatives by the Indian government to promote the software industry have also been significant (i.e. India's economic infrastructure is not as restricted or as unimaginative as sometimes portrayed in the West). Measures have included: the liberalisation of economic policies, the exemption of the IT industry from corporate tax,

and a series of recent national task forces which have examined – and recommended developments which have been quickly implemented – various aspects of the software industry.

Other influential factors include: the integration of different government agencies with an IT interest into a single Ministry of Information Technology; the passing of an IT Act in mid-2000 covering issues affecting the IT industry such as e-commerce, intellectual property, etc; and Departments of IT set up by several states (in addition to central government initiatives).

c) Institutions

Institutional initiatives have also been significant: software technology parks (1 in 1991, now 18) have been established near academic institutions in order to promote partnerships. One software technology park was established, moreover, in Silicon Valley to facilitate the export of software by Indian SME's and to tap U.S. financial institutions.

IT Education/Training

Traditionally, most software professionals, like all science and technology professionals, have been graduates from publicly funded universities, Indian Institutes of Technology, or regional and state engineering colleges. In recent years, the Indian government has supported the expansion of existing public institutions and established several (7) new Indian Institutes of Information Technology. Private software training institutions have also been encouraged and these have proved particularly important for middle and lower technical level IT workers. The Ministry of IT has developed an accreditation scheme to ensure that quality levels are maintained and some 1,600 private institutions had been recognised by March 2000.

IT Software Trade

Three main modes of trade in IT software exist:

1. on-site services (e.g. software engineers are sent from India to develop & implement software abroad). Such personnel are sometimes exploited as 'software coolies' in low wage menial work.
2. off-shore services (the work - e.g. software development - is done in India as required, say, by U.S. customers and sent back to them by disc/satellite link, etc)
3. offshore products/packages (development and supply of systems from India; dependent on well developed technical expertise and overseas marketing).

Of these three, the on-site service sector has traditionally been the most significant by a large margin, thus confining India to the low value end of the software export chain.

Internet

Inevitably the Internet is a very significant and developing area of India's IT world. There were some 1 million users in 2000, but the projected growth is to a phenomenal 23 million by 2003 and this will have an explosive effect on education, learning and all

forms of IT used in the next 5 years. (Approximately 38% of Indian Internet users are school/college students.)

Academic-Industry Partnerships

Traditionally there have been few academic-industry partnerships. However, this has changed in the light of the economic liberalisation policies from 1991 onwards and the progressive devaluation of the rupee (which has made it much more expensive for Indian industry to secure foreign technical and knowledge inputs). The Indian Government's pressure on academic institutions to gain more funding from industry has also been a factor in the rise in academic/industry partnerships. Although there has been no formal study of the extent and nature of such partnerships specifically in the IT sector, this industry is probably one of the most significant for such links. As an example, there has been a considerable increase in recent years in income from sponsored research projects/consultancy assignments undertaken by IIT Delhi.

IT Profession & the Brain Drain

IT professionals in India work in five types of institution: government departments, government scientific agencies (e.g. CSIR institutes), state owned companies, private companies and academic institutions. Conditions and salary scales inevitably vary considerably. Until 18 months ago, base salaries of software professionals in the private sector (which are the highest) were from 75% to 100% higher than in other sectors. Such pay levels, in addition to the opportunities to visit the U.S. regularly on company work, meant that there was not a major incentive for such personnel to migrate. In contrast, those with lower pay scales than the private sector – notably government laboratories, IIT's and universities – were losing IT professionals, both as faculty and students. Major government agencies have been able to respond by outsourcing (sub-contracting) such work to IT companies while retaining a core of IT professionals in-house to plan, co-ordinate and run their IT-related programmes; but clearly universities & IIT's do not have this option.

India/U.S. Immigration: IT Personnel

A (partial) measure of the flow of Indian software professionals to the U.S. specifically is the number of H1-B1 visas issued by the U.S. Government: the figure tripled from 10,400 in 1995/96 to 30,200 in 1999/00. The U.S. Bureau of Labour Statistics has assessed that U.S. companies need to fill some 270,000 IT jobs; the shortfall will therefore increase rapidly over the next five years. There is in effect a 'mad scramble' for Indian IT brains by American IT companies. Consequently in 2000 even the top Indian IT companies were unable to compete with U.S. 'raiders' to retain their existing IT personnel. Moreover, according to a Nasscom-McKinsey study, the human resource needs of the Indian IT industry are so great that even if the current manpower pool were increased twenty times in the next five years, there would still be jobs to be absorbed locally. In practice, therefore, there is a major shortage of a very acute kind.

Factors/Measures Counteracting the Brain Drain

In recent years there has been a large influx of significant international (and domestic) IT companies investing in laboratories and centres in the IIT's (Delhi, Mumbai,

Chennai). The development of these laboratories could be a factor in future in reducing incentives for faculty and students to migrate, as world-class facilities become established locally. Another development is the promotion of IIT-alumni funded laboratories: for instance, the IIT Mumbai Heritage Fund – the IIT's alumni in Silicon Valley – has raised US\$22 million for launching world-class IT centres and programmes at IIT Mumbai. This could also help in some measure to reduce the IT brain drain.

Nevertheless, the problems of the brain drain from conventional universities which, unlike the IIT's, cannot mobilise such overseas funds, remains. It is in this area that government funding should thus be directed.

The Effects of the Recession: Return Migration (U.S. to India)

A postscript: the last nine months or so has seen a growing recession in the U.S. leading to an accelerated *return* flow of IT professionals to India. The length/severity of this downturn obviously cannot be predicted, but its effects could be significant (particularly given the importance of India's software industry). According to ITAA (Information Technology Association of America), the demand for new recruits from the IT industry has already fallen by 44% from 1.6 million in 2000 to 0.9 million this year and a return of some 50,000 Indian IT professionals in 2001 has been predicted.

The U.S. recession has led to some shift of IT/software professionals to Europe, but many of these are direct (i.e. new) recruits from India. (Given the obvious language and cultural problems Europe is unlikely to represent a major alternative opportunity for those seeking work outside India.) There is, however, a major positive development of the U.S. recession in the expected increase in the outsourcing of software to Indian companies - due to lower labour costs in India. In such a situation both the employment of software professionals and foreign exchange earnings would increase. (Some Indian companies have already responded by approaching U.S. firms to recruit staff for work within India, so anticipating the return flow of IT professionals.) The potential strength in domestic demand could partly redress the balance, though the shock of the effects of the recession remain real. It seems evident that a different pattern of IT migration will develop in the next five years.

Discussion

Professor Parthasarathi's presentation generated so lively a debate that this session over-ran its allotted time by some margin. Discussion ranged over the extent to which the brain drain (variously referred to by discussants as "brain train" and "brain gain") is a negative or positive phenomenon, or mixture of both; over its impact on, and importance to, both developing and developed countries; over the breadth of its relevance in the context of the globalised economy (to students and their choice of subject, to faculty recruitment in the wake of polarised salary structures, to university funding, to the relationship between higher education and industry, to patenting and licensing opportunities etc. etc.); and, specifically, over the university's role in responding to it.

The topic proved, in fact, to be so stimulating as to suggest that it would be well worth further development at a future ACU conference, seminar or workshop.