Science Technology and Innovation in Sri Lanka

The views presented here are the participants' and do not necessarily reflect the views and position of the United Nations or the United Nations Conference on Trade and Development.
Sri Lanka is a small island 65,600 sq km in area and a population of 19.6 million. Sri Lanka had a Gross Domestic Product of US $ 27.0 billion in 2006 and a GDP per capita of US $ 1355 (Central Bank of Ceylon, 2007) making it the second highest GDP among South Asian countries after the Maldives and higher than those of India and Pakistan which were around US $ 800 in 2006. Sri Lanka showed a negative GDP growth rate of – 1.4% in 2001 but has since then increased its growth rates to around 5.5 % in 2004 and 2005 and 7% in 2006. India showed a high growth rate of 9.2% in 2005 and 2006 and Pakistan 7.3% and 6.2% in those two years.

Sri Lanka is classified as lower middle income by the World Bank while Sri Lanka’s neighbours, India and Pakistan are classified low income.

Sri Lanka became in 1979 the first country in South Asia to open its economy although its capital account was not liberalised but has failed to attract high technology industries compared with other South Asian countries which opened up their economies much later (De Silva and Amaradasa, 2001). Initial investments in Sri Lanka’s free trade zones were mainly in the garment industry where the availability of textile quotas was an important attraction to the initial investors mainly from the Far East. The garment industry has consolidated itself and managed to survive after the Multi-fibre agreement and quotas ended in 2005 although production and exports have stagnated in the recent past.

Only 28% of Sri Lanka’s GDP is derived from Industry and this figure is similar to that of India and Pakistan. In Thailand and Malaysia, the percentages derived from industry are 46% and 52%.

High technology exports forms only 1% of Sri Lanka’s manufactured exports and these are low in India (5%) and Pakistan (2%) as well. These form a much higher proportion of manufactured exports in Thailand (27%), Malaysia (55%) and Singapore (57%). Textiles and Apparel constitute over 40% of the value of Sri Lanka’s industrial production, with food and beverages making up 23%. Chemicals and Petroleum contribute 21% boosted by high prices for petroleum and rubber based products. Pharmaceuticals, mainly tabletting, capsuling and packaging constitutes a quarter of these exports.

These figures suggest that Sri Lanka and its neighbours India and Pakistan have been less successful in their industrial development strategy and in the development of high technology industry than Thailand, Malaysia and Singapore but this is to be expected as these countries opened their economy and their capital account long before Sri Lanka. India and Pakistan are still in the process of opening up their economy. Sri Lanka appears to be not doing as well as its immediate neighbours, India and Pakistan.

Sri Lanka like many other developing countries aimed at replicating the industrial development success that was shown by the so-called Newly Industrialized Economies (ME), Korea and Chinese Taipei during the early 1980s but this model itself has itself been put into question after the Asian economic crisis of 1997. Furthermore, rapid globalization and the World Trade Organization has been changing the context of economic development and many of the features of the ME model like protection for import substitution industries, selective foreign direct investment, subsidies for export and limited intellectual property rights legislation are impracticable in today’s international economic environment.
The ability of a nation to profit from advances in science and its own scientific research output depends on its national innovation system. While it is easy to identify the essential characteristics of a national innovation system, innovation has multiple and synergistic effects in all realms of human life. It can provide higher standards of living through modern consumer products and services, better communications through advanced computer technologies and modern transportation methods, high quality education and employment in high technology industry through the expansion of research and the development of new knowledge and rapid national development through the promotion of small and medium enterprises.

The importance of a strong human resource base in science and technology cannot be over-emphasized making expenditure on tertiary education in science and engineering and the number of scientists and researchers as a percentage of population principal indicators of a nation's readiness to exploit science and technology for national development. Gross expenditure on research and development (GERD) and business (or private) expenditure on R & D (BERD) as a proportion of GDP are also considered to be important criteria in determining the strength of a country's innovation system. Among other factors are the proportion of high technology exports as a percentage of industrial exports, publications, patents granted and royalty and licence fee payments and receipts.

Sri Lanka has not done particularly well in these areas with overall expenditure on education which increased from 2.7% in 1980 to 3.2% of GDP in 1991 reducing further from 2.56% in 1997-2000 to 2.17% in 2001-2004, although this has increased to 2.74% during 2005-2006. The number of scientists and researchers has stagnated at around 190 per million of population although this is higher than that of India (157) and Pakistan (69). The figures for Singapore, Malaysia and Thailand are 7000, 430 and 330. Sri Lanka's GERD has been between 0.13 and 0.18% and its BERD negligible. Its high technology exports are a mere 1% of its manufactured exports and it has had very few US patents granted each year and royalty and licence fee received is nil.

Sri Lanka's National Innovation System is therefore weak and the government proposed to increase GERD to 1% over a period of five years from 2006 to improve the system. However GERD has actually reduced during the past year. The war in the North east of the country had escalated and military expenditure had increased to almost 4% this year.

Although Sri Lanka has been a success story in telecommunication developments with over 7 million mobile phones in the hands of its citizens, most of them are used only for talking and SMS. While there are one or two BOI manufacturers of hardware catering to the export market, there is very little research or manufacturing taking place for the local market. Mobile phones are almost totally imported but there are a few firms assembling computers for the local market. Although there have been a few fines involved in software development, Sri Lanka is far behind India in this field. The growth of the software industry in Sri Lanka is being impeded by the lack of human resources and some of the firms established in the country have moved to India. Sri Lanka with its low labour cost and comparatively good English knowledge has been able to attract some Business Process Outsourcing business but this too has not developed as much as was expected. The use of ICT in the entertainment and media industry is still at a rudimentary state in Sri Lanka.

Biotechnology in Sri Lanka is still at an early stage with the only industries in the area being those in traditional biotechnology like beer and cheese making. There is very little research being carried out in the field in Sri Lanka. There is similarly very little research and no
industry based on nanotechnology in Sri Lanka although the Ministry of Science and Technology has ambitious plans to establish an Institute of Nanotechnology.

Sri Lanka has not been very successful in attracting foreign direct investment, most of the investment except in the telecommunications area in the recent past being through privatization receipts. Sri Lanka had implemented a far reaching privatization program ever since the early nineties and has successfully privatized large parts of its state sector, including gas, telecommunications, airline, ceramic and cement industries and its tea and rubber plantations. Privatization has now been halted as part of government's policy after attempts to carry through plans to privatize its petroleum refiner, power sector and banks had repeatedly failed due to trade union pressure.

Sri Lanka is one of a few countries in the world which still provide education free of charge up to tertiary level. However the absence of private tertiary education institutions has placed limitations on the number of University places with only 5% being enrolled in tertiary education in Sri Lanka compared with 38% for Thailand. Even so, science and engineering have ceased to be popular among the youth with many opting to move into business and management studies.

The long-standing dominance by public sector technology institutes, and the limited development of innovative activity in private enterprises has been a common feature of South Asian economies which has severely limited the effectiveness and coherence of their research system.

Sri Lanka established a National Science and Technology Commission in 1998 and reorganized its scientific institution. The Commission is essentially a policy making body given the responsibility of make recommendations to Government on all aspects of scientific and technological development. However its location in the Ministry of Science and Technology and lack of influence in other ministries, especially the Ministry of Industry has lessened its effectiveness. The Ministry also has four important institutions implementing policies in science and technology, the Industrial Technology Institute, the National Engineering Research Development Corporation, the National Science Foundation and the Arthur Clarke Institute for Modern Technologies. There is also an Inventors Commission and an Industrial Development Board based in other Ministries but there are no institutions in Sri Lanka, dedicated to the promotion of the commercialisation of research or innovation. In Sri Lanka, there have been very few attempts made to set up business incubators and none has so far spun off into independent enterprises.

Intellectual Property Rights (IPR) legislation in many developing countries has been claimed to be a disincentive to innovative research. However Sri Lanka's IPR legislation (Code of Intellectual Property, 1979; Intellectual Property Act, 2003) has satisfied the requirements of TRIPS although complaints have been made regarding the effectiveness of enforcement.

The Sri Lankan government is implementing a crash program aimed at establishing 300 Science and Technology "Vidatha" centres in the villages. These centres are manned by science graduates who are expected to provide a conduit to entrepreneurs in the village through which marketable new low level technologies emanating from local research could be accessed and commercialized. The centres are also expected to help entrepreneurs find solutions to scientific and technical problems they face in setting up small enterprises.
Regional cooperation in South Asia has not been very strong. The South Asian Association of Regional Cooperation (SAARC) was formed in 1985 not as an economic bloc unlike ASEAN. There has been hardly any intra-SAARC trade with total SAARC exports amounting to only 4% of world exports. Economics have estimated that Sri Lanka lost $266m (36% of import bill) by not importing from SAARC. No long-term scientific R & D programmes with real partnerships have evolved between SAARC countries so far.

The major stumbling block for the development of scientific and technological capabilities in Sri Lanka is the low state support for R & D, lack of highly trained professionals in R & D organizations, underdevelopment of higher education and the science base in universities and the preference for foreign technology rather than the development of local technology by the industrial sector. The science base in the universities need to be expanded with more Ph.D and R & D programmes coupled with peer review and measures to ensure standards of excellence. Diffusion of R & D remains weak and left to natural play of different actors and attempts to forge linkages between the Universities, industry and government agencies have not been very successful.

Research and Development institutions have been unable to rise above low levels of R & D with short term goals as funding has been insufficient. Furthermore a lack of design and engineering facilities to upscale technology developed in their laboratories and mechanisms including venture capital to transfer to industry have led to gross underutilization of technology capacity of the institutions.

References:


