

Science and Technology in economic planning: The missing link

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Recently a Presidential Economic Commission was appointed to plan the future economic development of Sri Lanka. Unfortunately, this commission does not have a single scientist or a technologist in its composition amply illustrating that our leaders have not yet realised the importance of science and technology for the development of the country. We never had a leader of such calibre as Jawaharlal Nehru with a futuristic vision to develop the country. The planning commissions in Sri Lanka typically comprise economists, who think that industry is only garment industry and totally ignorant of the prospects of mineral based chemical industries or using education as a natural resource for development. Nor are they aware of how India has succeeded in achieving an impressive economic growth using its highly trained scientific human resources in outsourcing, Information technology, Bioinformatics and the Drug industry. Economists and politicians have done our planning since independence. What good has this achieved other than double digit inflation rates and an increasing foreign debt? What is needed is a paradigm shift in planning with the participation of technocrats combined with the political commitment at the highest levels.

A survey of the countries with impressive economic growth in recent times shows that, without exception these countries have used science and technology as the engine of economic growth. South Korea, which experienced a phenomenal economic growth in the last two decades, increased the percentage GDP spent on science and technology from 0.2% to around 2.8% over the last three decades. Scandinavian countries spend nearly 4% while India is planning to increase its current 0.8% to around 1% this year. Prime minister Manmohan Singh has gone on record stating that this should be increased to 2% to remain economically competitive with the western world. Sri Lanka meanwhile is spending even less than Bangladesh for science and technology with a meagre 0.16% last year, down from the 0.30% we spent in 1966! This clearly shows that our political leaders have not realised the importance of science and technology as the major tool of economic development. Numerous administrative establishments have appeared with some relationship to science such

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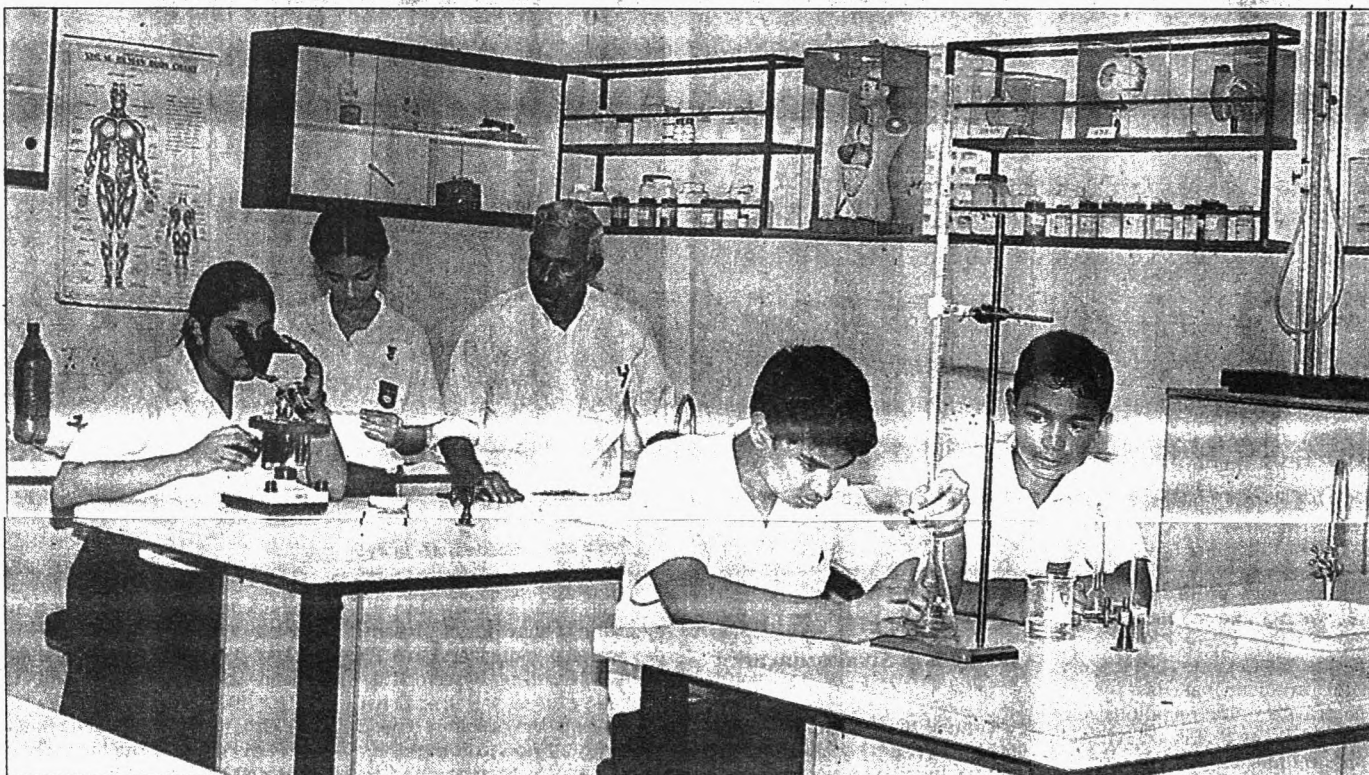
through against overwhelming opposition from the academic community.

Science and Technology policies-Lessons from India

Indian science and technology policy received the priority it deserves very early largely due to the efforts of Sri Jawaharlal Nehru, the first Prime minister of independent India. He had the vision to realise the value of science and technology to achieve economic prosperity. Prime minister Nehru started many research laboratories and gave their control to top scientists. A particularly successful example is that of Dr. Homi Bhabha who started and headed the Indian Atomic Energy Commission. Nehru started the prestigious Indian Institutes of Technology in the mid-1950's against much criticism and these have more than achieved their intended goals by producing world-class scientists and technologists who are now carrying India into the developed

countries such as the Indian Space Research Organization and the Indian Atomic Energy Commission come directly under the Prime Minister and hence are free to carry out their jobs without any political interference. The situation is quite the opposite in Sri Lanka. Here heads of research institutes are appointed on political merit rather than scientific merit and the politicians decide whom should be recruited and who should be promoted. In our own University system too, all appointments except the academic ones are currently made from the political lists supplied by the politicians.

Another major factor for the advancement of science in India is that technocrats run ministries connected to science and technology. The secretary to the ministry of science and technology is always a well-respected scientist. Its current secretary, Dr. Ramasami is a scientist of international repute and served earlier as the head of the Central Leather research Institute in Chennai. Mrs. Indira Gandhi during her tenure appointed several technocrats as secretaries to key ministries such as Agriculture, Milk Production, Telecommunications and Defence. She received the wrath of the Indian civil service for these appointments but what these appointments did to the country is phenomenal. India achieved the status of the largest milk producer in the world owing to the effort of a professional, Dr. Verghese Kurian who was appointed to the ministry dealing with milk production. Similarly Dr. Swaminathan, who was appointed as the Secretary to the ministry of Agriculture is considered as the father of the Green revolution largely responsible for India's self sufficiency in food. Similarly the Telecom revolution brought about by Dr. Sam Pitroda and developments in rocket technology by Dr. Abdul Kalam are clear examples where Indian scientists at key administrative positions have played pivotal roles making India an economic tiger in Asia.



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as the creation of a National Science and Technology Commission through the Science and Technology Act No. 11 of 1994, creation of a separate ministry of Science and Technology and the creation of National Research Council (NRC). Most of these are top heavy administrative structures and with the exception of the NRC have not done anything tangible to improve the quality of science and technology in Sri Lanka.

The Science and Technology Act of 1994 specifically states, inter alia, in section 2(a) that one of its objectives is, "to promote the use of science and technology as an integral part of the effort to achieve rapid economic development and improved quality of life and to alleviate poverty, and to involve scientists and technologists in the formulation of policy and in decision making".

It is pertinent to explore how far this objective has been achieved. It is this writer's opinion that with most of what is achieved is limited to annual "talkshops" where nothing tangible in terms of changes to scientific policies for national development have taken place. There is no place for innovation, international patenting, creating centres of scientific excellence, improving education system to meet the challenges of the new millennium etc.

Education and Innovation

We have an archaic education system which has not created the necessary conditions to promote innovativeness, motivation to succeed and impart practical experience through "doing things". It simply bogs down our students in a competitive rat race where the fittest survive. Since we abolished the practical examinations from our GCE (A.L.) science subjects, students who could not carry out simple practical manipulations enter our universities and continue to practice rote learning with no creative spirit. Our universities too have not promoted innovativeness, creativity and critical thinking largely due to the suppressive influence of highly politicised student unions. Our undergraduates are even prevented from asking questions in class thanks to the political tuggery and brainwashing by these so called student unions controlled by sinister political forces. The teacher centred education does not promote innovativeness nor new discoveries. We do not encourage those with the ability to "work with their hands" to blossom. Our school education system results in the early bifurcation into different streams such as Arts, Commerce, Science etc. instead of giving a broad education first with the ability to problem solving with diversification restricted to a later stage. Practical work and working

with hands is almost non-existent in our schools and Sri Lanka is perhaps the only country in the world where students enter the universities to follow science based courses without facing any practical examinations.

The bifurcation even in the science stream to physical sciences and biological sciences is highly undesirable and practised only in Sri Lanka. Even in neighbouring India, there is no such bifurcation. Science is getting highly interdisciplinary and the traditional borders between physics, chemistry and biology are fast disappearing. A knowledge of mathematics is essential for all biological stream disciplines such as Medicine, Dentistry and Veterinary science. Similarly, a knowledge of biology is essential for a good physical science student to pursue studies in challenging frontier areas such as Molecular biology. All science faculties in the university system have recommended to the University Grants Commission, at least on two occasions, that all A.L. science students should offer Physics, Chemistry, Biology and Mathematics as subjects. However, these proposals have fallen on deaf ears and the wishes of an individual or two has determined the entire fate of the educational reforms. Thus, one individual decided that the four subjects at the A.L. should be reduced from four to three and this got carried

country status. While our politicians, for securing votes at elections, even abolished the English stream for sciences in schools in the 1960's, India retained English as the medium of instruction in most schools and the universities. The IT boom in India, which has brought in prosperity to a significant population in India, is primarily due to the abundance of universities both private and public and the excellent level of English of its graduates.

Unlike in Sri Lanka, in India, there is a well-reputed scientist with a distinguished research record as the Prime Minister's science advisor. What is more remarkable is that the current science advisor to the Prime minister, Dr. Chidambaram has served even the previous Bharatiya Janata party government as its science advisor. Scientific merit is the sole criterion for such appointments and that is why science is thriving in India. This position is considered on par with that of a cabinet minister, with all attendant rights and privileges, and shows the importance the Indian government has placed on science. In sharp contrast, in Sri Lanka, presidential science advisors are appointed solely on political hegemony. These advisors have no track record of a research career and they are most likely kicked out when heads roll within the same political party. Some agen-

Scientific research and Tertiary education

There are many lessons we can learn if we compare a graduate from a good Indian University as against one from Sri Lanka. While the two cultures are very similar, the Indian students are highly articulate, often questioning their teachers in the classroom which is non-existent in Sri Lanka. Our students are prevented from asking questions in class by their own student leaders. This comes from my own personal experience of teaching chemistry over the past 37 years at the University of Peradeniya. The private sector feels that our graduates are worthless compared to those who graduate from private universities here and those who graduate from foreign universities. Even in the selection of graduates to the private sector, an interesting observation was made recently by the human resources manager of a leading multinational company. According to him, the private sector does not want to hire those graduates from universities where ragging is prevalent and violence is rampant between student groups. Some universities such as Katubedda are lucky to have completely eradicated ragging and their graduates are recruited without second thoughts compared to those from some other universities including my own university here at Peradeniya, where the majority of students either actively or passively condone ragging as a necessity of University life.

Continued on page IV