

6. NEED FOR RESEARCH AND DEVELOPMENT IN HIGHER EDUCATION: PRESENT CHALLENGES AND FUTURE PROSPECTS

*Dr. R. Murugesan**

Introduction

The role of a sound higher educational system acts as a backbone for the development of any nation. The main difference between the developed and developing countries, not only relies on the socio-economic variables, but also on the exposure to the innovations in science and technology.

Literacy Rate

It is heartening to note that, the literacy rate in India has grown in a remarkable manner. As per provisional population totals of Census 2011, literates constitute 74 per cent of the total population aged seven and above and illiterates form 26 per cent. Literacy rate has gone up from 64.83 per cent in 2001 to 74.04 per cent in 2011 showing an increase of 9.21 percentage points. The literacy rate for males and females works out to 82.14 per cent and 65.46 per cent respectively. A significant milestone reached in Census 2011 is that a decline of 3.12 Crores (31,196,847) among illiterates is noted.

India contribution to Engineering Degree holders

India accounts for nearly one-third of the World's engineering graduates, each year. We contribute to nearly 30% of the global supply of graduate engineers. Starting with about 2,63,000 students in all disciplines in just 750 colleges affiliated to 30 universities in 1950, today we

have made a remarkable progress. The Universities Grants Commission in its Annual Report - 2010, has stated that the number of Universities has gone up to 493 (42 Central, 130 Deemed and 316 State Universities and 5 Institution established under Special State Legislature Acts) and the number of Colleges to 31,324. This shows the giant stride taken by the Indian Higher Education System.

Extreme advancement in technologies, particularly in better communication, mobile phones, Internet, E-mails social networking, better approach for knowledge dissemination and procurement, knowledge intensive nature, innovative approaches at grassroots, huge economic potential for large population, excellence in engineering and technology have made India, a destination for global companies.

Importance of Human Capital in Development of the Country

According to a recent survey, it is estimated that during 2011-13, the number of Engineers will grow at a Compound Annual Growth Rate of 24%. Presently 16 million students opt for higher education in India and the number is expected to reach 40 million by 2020. This rate of growth has to be sustained and measures have to be initiated to increase the growth rate so that we can have an impressive global talent pool.

World Bank conducted a study in 192

**Vice-Chancellor, Anna University of Technology, Madurai.*

countries and revealed that, for the progress and economic development of a nation, Infrastructure contributes to about 16%, the natural resources account only for about 20% and the human and social capital counts for at least 64%. In this area of human social capital, we can command the entire world under our control. With over 1 billion in population, we have a strong youthful work force. India is a young nation now because 54% of the population is under 25 years. It is because of this pool of skilled workers, India has made a magnificent stride in the knowledge based industries sector. With a significant mass of skilled English-speaking knowledge workers, we are marching towards a knowledge based economy whereas China and other Asian countries rely on manufacturing industries segment.

Precisely the Government has already targeted to step up the spending in the four major sectors namely, health, education, skill development and infrastructure in the forthcoming 12th Five Year Plan. It has envisioned to achieve 100% adult literacy, universalizing secondary education and increasing in gross enrollment ratio in higher education to 20% by March 2017.

The UGC also has stated that its main focus is to escalate the Gross Enrolment Ratio (GER) and open new universities and has proposed to set up 1,543 public institutions. The National Knowledge Commission has recommended that India should have 50 national universities and 1500 universities by 2015 to have a sustainable development and growth.

Need of Investment in Basic & Applied Research

All the developed countries know that basic and applied scientific research is an essential investment in the long-term welfare. They have assigned the topmost priority to the Universities to stimulate and nurture scientific and technical talent among the students. Eventually their economies boom as they gain knowledge supremacy over other countries. Accelerated

growth rate and increase in productivity is achieved only by supporting scientific education in Universities.

Need for Stress on Research & Development

Today, India is moving ahead possessing a new generation of technically trained scientific manpower. But the amount of time and energy spent on the research and development is very low when compared with other developing and developed countries. The R&D always has a close association with the scientific and technological development. According to statistics, the top eight countries that spend a considerable amount on R&D in terms of percentage of GDP were Israel (4.53%), Sweden (3.73%), Finland (3.45%) Japan (3.39%), South Korea (3.23%), Switzerland (2.9%), Iceland (2.78%) and United States (2.62%). It is pity to note that despite possessing a large pool of engineers, India invests only 0.8% of its GDP into the research and development. For us, to become a global superpower, this involvement must be increased, substantially.

If India has to continue at a growth rate of 8% every year, we need to see larger investment into research and development (R&D) and investment into supporting innovation. China did not have a structured R&D policy till 2006 but presently they have improved a lot and spend about 1.5% of their GDP in R&D and have planned to reach 2.5% in next five years.

Involvement of MNCs in Research & Development

The Indian government spent around 284 billion rupees (US\$ 5.8 billion) on research and development which is 17% more than previous allotment according to the budget for 2009–2010. But owing to the increase in demand pertaining to this decade of innovation, in the current budget 2010-2011, (a phenomenal increase of 175 per cent in the last budget) is offered to the payments made to National Laboratories, Universities and Institutes of technology for

Scientific Research. Also, the Government of India has approved in March 2010, the creation of National Knowledge Network that (NKN) will link 1500 Institutes of Higher Learning and Research through an optical fiber backbone leading to a new era of collaborative research.

Global multinational companies have already understood the potentials of the India's human capital. In a recent study it is highlighted that, R&D centers of these MNC companies setup in India have helped the parent organizations save a cumulative of USD 40 billion for the last 3 years. If we analyze the performance of these global majors, it is evident, how the scientific pool of Indian manpower has been a backbone in their success.

Texas Instruments was the first global company to set up a research and development centre in India, way-back in 1983. The globally acclaimed search engine and email service provider Yahoo does more than 25 per cent of its all development tasks in India. Siemens has setup its R&D centre in India to design and develop products for medical diagnostics tools. It is known that, Microsoft employs more than 1,500 people at its Indian R&D center which started off with 20 people about a decade ago. Key Microsoft projects such as its search engine Bing and the Windows 7 operating system were done in India.

World's largest ERP solutions provider SAP Labs India, has setup the company's largest R&D center outside Germany, employing over 4,200 people. It does two-fifths of SAP's global enterprise resource planning development. Half of the global development of SAP's customer relationship management software such as CRM 7.0 was done in India.

Bangalore was Google's first R&D center outside the United States. Google Map Maker, a global product conceived and developed by the Indian engineering team, allows users to add or edit features, such as roads, businesses, parks, schools, apartment buildings and localities. News Archive Search helps users

search historical archives for events, people or ideas and get a sense of how they have been described over time. The product was developed in India and deployed on a global scale.

Intel's Digital Enterprise Group's efforts have resulted in the company's first six-core processor, the Intel Xeon Processor 7400 series, currently the highest-performing server chip that Intel offers. Its Corporate Technology Group developed the world's first programmable processor delivering teraflops performance from its Bangalore center.

Hewlett Packard engineers in Bangalore contributed to the HP Dynamic Smart Cooling technology that cools systems in data centers on a customized basis and saves energy. The system was tested at HP's Palo Alto headquarters and deployed first in Bangalore. It is now deployed globally. Above all, the networking and communications giant Cisco has filed more than 600 patents from India.

No More Brain Drain, Hereafter

India is presently booming in terms of business and economic development. This trend is so huge that we are presently experiencing a phenomenon of reversal of brain drain. The very own Indians who have already left India to seek greener pastures in the Western Countries are returning back.

In a recent study by Universities like Duke, California Berkeley and Harvard this has been highlighted and the study showed some important results after analyzing the return of Indian and Chinese nationals back to their parent countries. According to the report, the most significant factors drawing both Indians and Chinese entrepreneurs back home were economic opportunities, access to local markets, and family ties. More than 60% of Indian and 90% of Chinese returnees said the availability of economic opportunities in their countries was a major factor in their return.

Surprisingly, 72% of Indian and 81% of

Chinese returnees said that the opportunities to start their own businesses were better or much better in their home countries. The speed of professional growth was also better back home for the majority of Indians (at 54%) and Chinese (at 68 percent). And the most important of all, the quality of life was better or at least equal to what they'd enjoyed in the United States for 56% of Indian and 59% of Chinese returnees. This clearly shows that at India is very comfortably placed in the global development scenario and is strong enough to pull back all the valuable human capital which we have lost earlier due to brain drain. These human resources shall be effectively tapped to initiate new research platforms.

Quality, Quantity and Innovation were required to meet the challenges of the changing nature of the today's World. To achieve this, a proper training of mind and soul to master science and technology is required.

Our Universities must Collaborate with Foreign Universities

Time has come now for the Indian Universities to realign their priorities. For example, if we take up the Universities in United States of America, they have created over 3600 new innovations since 1980 and averaging to over one per day between 1998 and 2005. More than 628 companies have been started with inspirations derived from these innovations. Over 200 U.S universities are actively involved in the research activities along with the industries and contribute to over \$21 billion each year to the economy.

The Universities in India should each take up a target area in research, the area where it wants to show the World, its expertise. Centre of Excellences shall be setup to train the students in all leading areas of science and

technology. A national policy may also be evolved to promote research activities. Faculties shall be trained with all modern research tools using cutting edge technologies. Universities should take up an immediate agenda to foster patentable research activities and train the students at par with global competency levels. They shall be encouraged to invent new phenomena rather than going by the age-old ways.

The change of curriculum according to the industry needs, has to effected to accelerate the research in the industries. The scientists, academicians, industry professionals and the research scholars should work under one roof for the development of research and technology by exchanging their views and experiences. The requirement of the industry should reflect in the syllabus, so that when a student completes his course he can smoothly blend with the operations of the industry. The research scholars have now developed a so called "Publish or Perish" attitude. Just for the sake of count, they have started putting up journals that does not have any research value. The research scholars has to be motivated to publish papers in high impact factor renowned journals, which will push the research to the top-gear and result in meaningful achievements.

Our Universities have to benchmark against the best global Universities, to consistently deliver world-class excellence. This can only be achieved by embedding persistence, perseverance, advanced studies, innovation and creativity into our system so as to achieve commendable standards in research and development, thereby enabling us to steer India towards a promising future.

