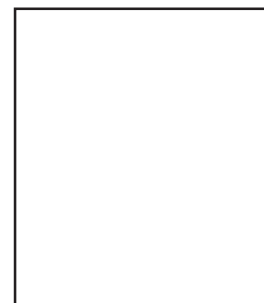


## *From Chairman's Desk*

The challenges of research lies in translating basic research into applied research and utilizing the outcome in innovative ways for product development or product improvement to ensure market sustenance. Protection of research outcome by way of Patent is the avenue leading to recoup investment on research as well as produce wealth for society and sustaining further research. Ultimately success of research depends upon its rate and extent of exploitation by the industry for production and its influence on GDP, which is vital for competitiveness, productivity and overall social gain.



The basic research discovering structure of DNA by Francis Crick and James Watson of Cambridge University in 1953 revealed that almost all aspects of life are engineered at molecular level. The ensuing applied research empowered scientists with tools for disease diagnosis, drug development, gene therapy and genetically modified organisms all of which are boon in our day to day life and have value added impact on society. Not only the quantum of research publications but also the quality of such publications in terms of reproducibility and patents obtained signifies research outcomes. Research outcomes are important index of growth and development which is estimated by gross domestic product (GDP) at purchasing power parity (PPP) per capita i.e. the value of all final goods and services produced within a nation in a given year divided by the average (or mid-year) population for the same year.

Such a compilation of these parameters by IMF for 2009 brings home that India stands far distant in the list at 128 and even small Asian countries like Malaysia, Singapore, Taiwan and South Korea are far ahead. A compilation of R&D expenditure in 2007, as a percentage of GDP (R&D intensity) in EU ranks **Sweden** (3.60% of GDP) and **Finland** (3.47%), **Austria** (2.56%), **Denmark** (2.55%), **Germany** (2.54%), **Cyprus** (0.45%), **Slovakia** (0.46%), **Bulgaria** (0.48%) and **Romania** (0.53%). The highest increases in R&D intensity between 2001 and 2007 were found in **Austria** (from 2.07% of GDP to 2.56%), **Estonia** (from 0.71% to 1.14%) and **Portugal** (from 0.80% to 1.18%). However, R&D spending as percentage of GDP in India is only 0.8% as compared to China's 1.23%. Moreover, out of this 0.8% expenditure in India, 80% is by public sector while the private sector share is only 20%. In China and the US, the public sector share is only 30% each while in Japan it is only 18%. The number of persons doing research and development in Scandinavian countries is 7,000 per million of population and 4,700 per million of population in the US. In India, there are 156 researchers per million of population or say research activity is meager. The manpower for research needs sound educational background and development of manpower needs modern infrastructure so that training is in tune with time. Dynamic syllabi and increased practical experience component are a must for human resource development.

Research documentation system must be developed at national level by an independent body having International collaboration, to generate database of people, research centres, funding etc. and their monitoring by way of publication of outcome of every project undertaken, in reputed Journals followed by patenting of inventions and innovations, as prime duty of such agency. This should cover both industrial and academic activities whether sponsored or otherwise like research requirements for post graduate and doctoral degrees of Universities, so that quality of degrees can be monitored.

***Prof. Suresh Nagpal***