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Nanotechnology will throw open a global opportunity of $1 trillion by 2015

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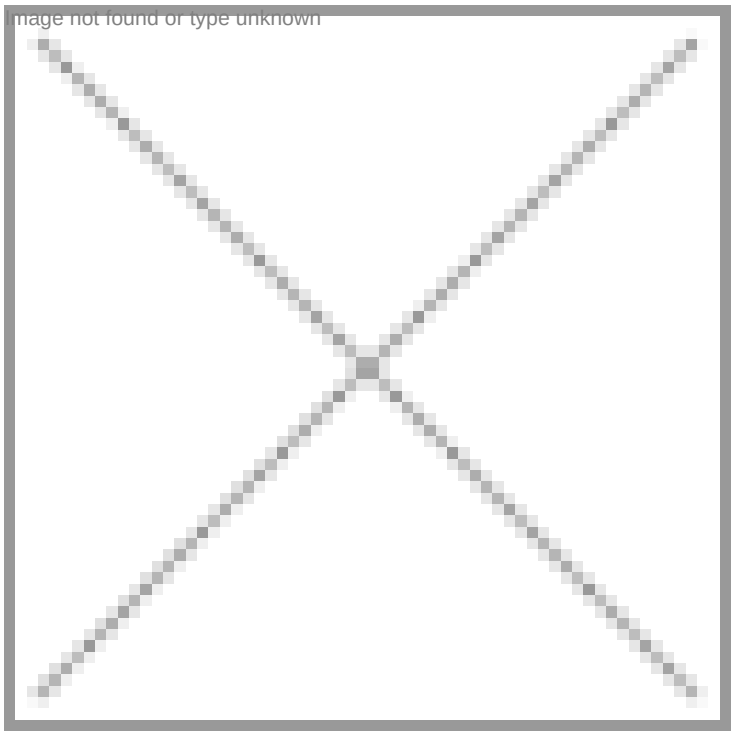

Indian Institute of Nanoscience and Technology to come up in Bangalore

Nanotechnology will throw open a global opportunity of $1 trillion by 2015

The first edition of Bangalore Nano organized by the Department of IT, BT and Science & Technology, Government of Karnataka, Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR) and MM Activ, provided a platform for all stakeholders in the field of nanotechnology to congregate and discuss and share their ideas and to envision a roadmap for India in nanotechnology. Experts equivocally said that nanotechnology cuts across all industries like automotive, IT, food, health, steel, textiles, energy, paints, cosmetics and defense and it would provide a global opportunity of $1 trillion by the year 2015.

Prof. CNR Rao, chairman, Science Advisory Council to the Prime Minister and president, JNCASR, said, "India has made a beginning in nanotechnology and Bangalore Nano is the first large scale nanotechnology event in India. The applications of nanotechnology extends from sensors, displays, transistors, data storage, storage of hydrogen for fuel cells, photovoltaic cells for harnessing solar energy, water purification to steel and rocket propellants. Ideally, India should get into the manufacturing of sensors in a big way as it is a knowledge based industry."

Prof. Rao added, "Indian researchers can make any nanomaterials at any form required but the biggest challenge lies in assembling of these nanomaterials. We are still looking at technologies to assemble these nanomaterials to make final commercial products. There is a huge demand for nanomaterials globally. India should be ideally catering to this global demand in the years to come."

Rameshwar Thakur, governor of Karnataka, inaugurating Bangalore Nano 2007. MN Vidyashankar, secretary, Department of IT, BT & Science & Technology, Government of Karnataka, (second from right) Prof. CNR Rao, chairman, science advisory council to the prime minister and president, JNCASR, and (extreme right) Jagdish Patankar of MM Activ, look on.

MN Vidyashankar, secretary, Department of IT, BT & Science & Technology, Government of Karnataka, informed, "The Karnataka government has identified a 14-acre plot to set up Indian Institute of Nanoscience and Technology in Bangalore. The institute has already received a funding of Rs 100 crore from the Central government."

Dr Patrice Millet, program officer, European Commission, which participated in the event as a country partner, said, "Public funding in Europe has become the largest investor in the world into nanoscience and nanotechnology. International co-operation is increasing in this field for the development of nanotechnology worldwide. The funding from the European Commission is also going to increase for the research and development in the field of nanosciences and nanotechnology."

Dr Faruq Marikar, MD, Nanobiz, USA said, "As India is gaining entry into the global top tier in numerous industry sectors, Innovation should come in naturally. Indians have proven that they can innovate in disciplined ways, here, there and everywhere. The necessary and sufficient conditions for innovation are trained scientists and engineers, tools and equipment and creative talent. A lot of learning is necessary to get there; and help is available if you ask for it, and pay for it."

Dr Pradip, Tata R&D Design Centre, Pune, felt, "Process engineering and scale up issues are critical in nanotechnology. To meet application needs of the common man, an innovative use of existing technology and new business models are needed."

Speaking on venture capital in materials science and nanotechnology, Prof. Anthony K Cheetham, Department of Materials Science and Metallurgy, University of Cambridge, said, "It is easy to spot the commercial potential of a research finding in nanotechnology, but the time to market is very long. It is illustrated by lack of commercial success of many start-ups in the nanotechnology area."

Illustrating on various applications of nanotechnology, Prof. Cheetham said, "Nanomaterials can be made into nanoparticles, nanotubes, nanowires, nanorods and nanosheets. Nanotubes can substitute steel as they are 10 times stronger than steel and six times lighter. Nanocrystals of aluminum could be used for rocket propellants."

He added, "Earlier emphasis of venture capitals was on investments in the nanomaterials and nanotechnology area. In last 2-3 years, emphasis shifted towards cleantech area, with applications in solar energy, water treatment, energy storage, fuel cells and emission controls. There are also some unanswered questions concerning toxicology issues as well as societal concerns."

Bhuvaneashwar Subramanian, senior research analyst-technical insights (healthcare), Frost and Sullivan, opined, "It would take a fair while before nanobiotechnology gets widely accepted amongst the masses and probably a bit longer before nanobiotechnology based products flood the market. With increasing research across several labs in the world, the future of nanobiotechnology lies across the areas of diagnostics, prosthetics and therapeutics. One can expect to see a buzz of activity in these areas owing to the increasing need in society for alternative solutions that would enable people live comfortable. The future thus for nanobiotechnology is to spearhead the concept of convenience healthcare through increased applications in non invasive healing and thereby augment the existing methodologies of treatment and offering patients the freedom to choose the most convenient option."

The challenges for commercialization of nanobiotechnology in India do not belong to India alone but are commonly faced global challenges and they include: competition from developed technologies, lack of adequate infrastructure, toxicity issues

of nanomaterials and lack of process standardization, he pointed out.

Dr G Sundararajan, director, ARCI, Hyderabad, noted, "The three challenges we face in commercialization of Nanomaterial technologies are bridging research and industry gap, skilled human resource and health, safety and regulation issues."

Funding

A consensus evolved that the economic results of nanotechnology look more certain compared to Information Technology and thus there is no dearth of funding by private and government. The US federal funding for nanotechnology is $800 million per annum. The Japanese government also funds the same amount. Europe has a funding of $1.2 billion per annum. In China funds of $150 million are available from both private and government per annum while India has an outlay of $100 million per annum.

The funding toward nanotechnology applications is largely from DST, DSIR and DBT. The total funding by these funding agencies amounted to $20 million until 2003-04 out of an annual R&D expenditure of $3.03 billion. The government has allocated Rs 1,000 crore ($250 million) through the NSTI for nanotechnology research from 2007. During the last five years the total investment in nanotechnology has been $50 million While the funding for nanobiotechnology in India is not very high compared to funding in countries such as the US, the funding efforts need to be appreciated. The proposed increase in funding is a good start and is bound to increase over a period with more innovations being developed with the course of time in the Indian terra firma.

Namratha Jagtap