

Newspaper Clips

February 2-3, 2014

February 2

Times Of India ND

02/02/2014 P-22

JEE-Advanced on May 25

Kanpur: The Joint Entrance Exam (JEE)-Advanced will be held on May 25 and its result would be declared a month later.

IIT-Delhi would conduct the test along with six other IITs under the directives of the Joint Admission Board for admissions to the undergraduate programmes.

Students qualifying the JEE Advanced will get a chance to take admission to 16 IITs and ISM Dhanbad. The test would be conducted for only top 1.5 lakh candidates. Based on their scores in paper-1 of JEE (Main)-2014, they will be eligible to appear in JEE (Advanced)-2014. TNN

37L migrated for education within India in a decade

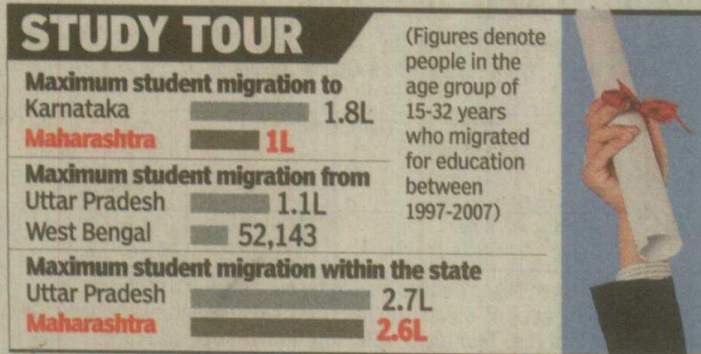
Maximum Movement Directed At Karnataka, Maharashtra

Hemali Chhapia | TNN

Mumbai: When we speak of migration, it's mostly about people looking for jobs. Fact is, millions migrate in search of a better education.

Even within education, our attention tends to be focused on Indians going abroad for studies. We don't look as closely at the multitudes who move within the country — from one state to another, or within the same state. In the last 10 years alone, 37 lakh youth have migrated within India for a degree/diploma.

Men outnumber women when it comes to this kind of mobility — 26 lakh compared to 11 lakh. Of them, 6.2 lakh (or 17%) moved to a new state, 16.8 lakh to another district within their home state. Karnataka received the largest number, 2 lakh, while UP sent out the largest number, 1 lakh. A January 2014 research paper, 'Internal Migration for Education and Employment among Youth in India', commissioned by UN-HABITAT's Global Urban Youth Re-



search Network, begins a conversation on whether or not Indian states must worry about internal brain drain.

"Migration is an old story. But the most important phenomenon we are seeing today is people moving for education," said author S Chandrasekhar, professor at the Indira Gandhi Institute of Development Research. "With uneven distribution of educational facilities, there are clearly going to be winner states and loser states. My paper maps the trends in migration, but also leaves you with a question, should we worry about brain drain at the sub-national level?" The study looks at

students who moved purely for reasons of education. "For example, if a family moved to Delhi because the bread earner got a new job and the child joined a Delhi college, he or she is not included in this survey," said Chandrasekhar.

Historically, marriage has been the biggest driver of migration — 77.5 million out of 110 million in the age group of 15-32; that's 70%. Nearly 10% have shifted in search of jobs and over 3.5% on account of education. "The share of educational migration has increased. As far as I can see, for education, more migration happens from AP to Karnataka, UP to Delhi, and UP to

Maharashtra," said Anil Kumar, professor at the Tata Institute of Social Sciences.

Chandrasekhar said most people in the 1980s moved not for education, but for career opportunities. "Then there wasn't a Noida then, nor were there large private universities. The new IITs and IIMs were not yet up. Only recently have so many new AICTE approved technical colleges come up," he said. Expansion of higher education has only fuelled migration.

"The most important states from the perspective of migration for education are Delhi, Maharashtra, Karnataka, UP, Bihar, Andhra, Kerala, Bengal and Rajasthan. Of these states, Delhi, Maharashtra, Karnataka are the key destinations (attracting migrants) whereas Bihar, UP, Kerala, Andhra, Bengal and Rajasthan are the key source states of migrants," the paper noted. "In the next five years, we will see the Haryana effect where new universities are coming up; that will give migration a new meaning," said Chandrasekhar.

Another name emerges for MS CEO – he's also Indian

Google's Pichai In Race With Insider Nadella?

Sujit John & Shilpa Phadnis | TNN

SUNDAR VERSUS SATYA

It looks to be Indian vs Indian for the top spot at Microsoft. A day after international media reported that the \$78-billion software giant was most likely to name 46-year-old Hyderabad-born Satya Nadella as its CEO, SiliconAngle, a popular California online tech publication, said Microsoft is actively in talks with 41-year-old Chennai-born Sundar Pichai, the boss of Google Chrome, Android (the world's

▶ **33% tech firms... P 19**

biggest smartphone operating system) and apps like Gmail.

SiliconAngle's editor John Furrier tweeted that talks with Pichai "are so tight under

- Born as Pichai Sundarajan in Chennai in 1972. Schooled there
- Has a B.Tech from IIT-Kharagpur, an MS from Stanford University and an MBA from Wharton
- Worked in Applied Materials and McKinsey & Co.
- Joined Google in 2004 to oversee Google Chrome, Chrome OS, Google Drive
- Went on to supervise key products Gmail and Google Maps

Class act: "Pichai was the



brightest of his batch and stood first in the department and went on to get the silver medal," says IIT professor Sanat Kumar Roy

Top draw: In 2011, Pichai's product innovation skills caught Twitter's attention. But Google reportedly paid \$50 million to keep him back

Android champ: In charge of Android, the most popular mobile OS and Google's big bet

wraps" that it could explain why Pichai's name had so far not surfaced for the CEO's job. Furrier retweeted that a second source had confirmed that

Pichai "is the dark horse coming out front runner". Most Silicon Valley tech writers and pundits, however, believe Nadella is still leading the race.

▶ Continued from P 1

Reputed tech writer Kara Swisher, who was the first to put out Nadella's name on Friday, tweeted that her sources were clear Pichai-born Pichai Sundarajan was not in the running for the Microsoft CEO's job.

The race cannot get bigger than this for India's technology talent: a storied global tech giant looking at two Indian-origin executives to lead the company at a time when it is losing mindshare to rivals Apple and Google and needs urgently to reinvent itself.

Nadella, as The Times of India reported in its front-page lead on Saturday, is a 22-year Microsoft insider who now heads the company's \$20-billion cloud and enterprise group. Pichai got a B.Tech from IIT-Kharagpur before going to the US for an MS from Stanford University and an MBA from Wharton School.

Under Pichai, Chrome has had an extraordinary run. In May 2012, Chrome became the most-used browser in the world, surpassing Microsoft's Internet Explorer, which had been the leading browser ever since it ousted Netscape from that position in the late 1990s.

Pichai's big advantage is the huge successes he's had in the consumer space of internet and mobile devices — where Microsoft has lagged behind and needs to play serious catch-up with the likes of Google.

Nadella's experience is mostly in enterprise, but his big plus is the 22 years and the variety of roles he's had in Microsoft, a sprawling giant of 100,000 people (to be 132,000 once Nokia's mobile phone business is merged) that doesn't accept outsiders in top jobs easily.

Nicholas Carlson of Business Insider, a business news site, wrote an article in September last year about Google's culture, where he said: "Pichai made his career at Google convincing computer manufacturers to install the Google Toolbar,

BIG BETTOR vs STABLE HAND

“Sundar (Pichai) has a talent for creating products that are technically excellent yet easy to use—and he loves a big bet. Take Chrome, for example. Today Chrome has hundreds of millions of happy users and is growing fast...”

Larry Page | GOOGLE CEO

“Microsoft chews up and spits out new hires in senior roles...He (Satya Nadella) knows where the bodies are buried.”

Charles Fitzgerald | A FORMER STRATEGIST AT MICROSOFT

which put a Google search window on the desktop of hundreds of millions of computers worldwide. Pichai is a dealmaker, a consensus builder. Perhaps his ascension is a sign of the kinder, gentler, more cooperative Google to come.”

But Pichai and Nadella are just two among thousands of Indians who are making a difference to the global tech industry.

Pichai's big advantage is the successes he's had in the consumer space of internet and mobile devices — where Microsoft has lagged behind and needs to play serious catch-up



There's a saying that in Microsoft, Google and just about every other tech company in the US, if you throw a stone, there's a very good chance you'll hit an Indian.

Vinod Khosla co-founded Sun Microsystems and remains one of the biggest investors in the US. Romesh Wadhvani founded several successful tech ventures, and now runs the Symphony Technology Group, a private equity firm. Gururaj Deshpande founded Sycamore Networks and the Deshpande Center for Technological Innovation at MIT; Pradeep Sindhu, Juniper Networks; Bharat Desai, Syntel; and Padasree Warrior is the chief technology & strategy officer at Cisco.

Meanwhile, Nikesh Arora is senior VP and chief business officer at Google and Vivek Gundotra, who's called Google's Social Czar, is the man behind Google+.

Many of these names are from the IITs, as indeed are thousands of others in senior positions at US tech companies. It is estimated that around 60,000 IIT alumni currently live in the US. The Birla Institute of Technology and Science (BITS), Pilani is another institution that has played a significant role in US tech. Sanjay Mehrotra, who co-founded SanDisk, and Preetish Nijhawan, who co-founded Akamai, are both BITS alumni.

A study by the US-based Ewing Marion Kauffman Foundation found that Indians account for 33.2% of immigrant-founded engineering and technology firms started between 2006 and 2012. That number was up from 26% in 2005. "Significantly, Indians have founded more such companies than immigrants from the next top seven immigrant-founder-sending countries combined," the report said.

Kanwal Rekhi, Indian-American entrepreneur and investor, said, "Indians have definitely arrived in the technology field. There is no issue with respect to technical capabilities and leadership qualities anymore. At the time I was being considered as CEO at Novell in 1992, there were many doubts about Indians as potential CEOs. Whether Wall Street will accept them was a big concern. We already have an Indian CEO, Shantanu Narayen, at Adobe, a top tier software company. Satya's elevation to CEO of Microsoft will be a feather in the community's cap."

Chennai's Sundar Pichai is dark horse

While Satya Nadella remains the front runner, Pichai is also in the race for Microsoft's CEO gig

Ishan Srivastava & Hemali Chappia | TNN

Chennai/Mumbai: About six months ago, a reporter from the Wall Street Journal called Sanat Kumar Roy, a professor of metallurgical and materials engineering, who had taught Sundar Pichai at IIT Kharagpur. The lady was curious about Pichai's academic standing.

Roy, who received the call a bit after midnight, hung up after saying he didn't recall teaching anyone named Pichai. "The next morning I looked up the admission register and found Sundarajan's name. I was told he had become Pichai. Sundarajan was the brightest of his batch and stood first in the department and went on to get the institute silver medal; he had scored the highest marks and was interested in electrical materials from the very beginning," said Roy.

Pichai, 41, like many Indians in America, obviously has shortened his name and expanded the initial. Before and after the name change what has remained constant is his brilliant technical ability and living life on the fast track.

Married with a son and a daughter, he studied at Padma Seshadri Bala Bhavan (PSBB), one of Chennai's most competitive schools and the alma mater of many prominent ITians from the city. The environment at home may have provided the necessary grounding for the academic rigour at PSBB. His father was an electrical engineer and both father and son shared great interest in the subject.

At IIT-Kharagpur, he stayed at a hostel

named Nehru Hall and was among the highest scoring in the metallurgical department from the first year itself. His name is listed on a board of toppers at the institute against the year 1993 when he passed out.

Prashant Tripathy, director and CFO of Max life insurance who stayed in the same hostel wing as Pichai, said, "I found him sharp and articulate. When discussions took place within our group, he usually took centre stage."

Pichai and Tripathy belong to a close group of 14 friends, all of them from the same wing, who have kept in touch all through these years. "He was very friendly and helpful. Not at all the 'nerdy guy' that one might assume. We used to watch movies till late night at times." Tripathy recalled his passion for cricket and the discussions on the sport which extended late into nights. "These were times when internet wasn't there and most of our time was spent talking to friends. He also used to read a lot," he said.

Pichai worked with two prominent professors for his B.Tech thesis - Prof D N Bose, nephew of the legendary freedom fighter Subhash Chandra Bose and the man who founded a material sciences lab in the institute, and Prof Indranil Manna, who is now director of IIT-Kanpur. Prof Manna recalled Pichai as a bright but quiet student. "He was very focussed and always thought before he spoke," he said.

One of the setbacks in Pichai's life was losing his friend and IIT batchmate Swaminathan, who went to Johns Hopkins for a PhD programme, in a car crash.

BATTLE FOR THE TOP JOB



SUNDAR PICHAI, 41, sr VP, Chrome & Apps and Android, Google

STRENGTHS

- ▶ Dealt with consumer facing businesses as head of Chrome and Android divisions at Google, knows the mind of the market
- ▶ Leadership experience in both desktop and mobile with Chrome and Android. Fits Microsoft, which is strong in desktop but struggling in mobile
- ▶ Deep into products, processes at Google. MS, which is in transformation, may gain from his insights into people practices
- ▶ Was sought after by other companies. Twitter is rumoured to have offered him executive position which Google thwarted with a \$50m counter

CONCERNS

- ▶ Unfamiliar with Microsoft culture which is not like Google's. May face resistance in bringing changes
- ▶ Not very experienced on Enterprise side, which is still a major growth area and revenue earner for Microsoft

“Market's looking for a CEO who can balance the role of leading enterprise transformation while keeping consumer momentum with Xbox and reboot mobile. Pichai is the total package”
Dave Vellante, ANALYST



SATYA NADELLA, 46, executive VP, Cloud and Enterprise, Microsoft

STRENGTHS

- ▶ Heads Cloud and Enterprise, among most profitable, fastest growing divisions at MS
- ▶ Has worked across mega divisions like Office, Bing in executive roles and made big contributions. Understanding of division dynamics is unrivalled
- ▶ MS is a huge company and its internal culture is complex. His position as an insider and 22-year-veteran is a big positive
- ▶ Will enjoy support within company, both from leadership and employees, for changes he might bring in compared to an outsider

CONCERNS

- ▶ Investors may be less enthused by insider's appointment, it will be seen as an incremental change rather than revolutionary
- ▶ Lesser experience than Pichai in mobile segment where Microsoft lags competitors but where it certainly needs to win

“In many organisations, a division the size of [the one Nadella runs] would be its own company...he's got charisma, employees like him, and he's got acumen to lead”
Norman Young, SENIOR ANALYST

IIT-B to set up entrepreneurship centre

TNN | Feb 2, 2014, 12:55 AM IST

MUMBAI: IIT-B will establish an [entrepreneurship centre](#) on its campus, with funding received from [Syntel](#) Co-founders Bharat Desai, a 1975-batch alumnus, and Neerja Sethi, under the aegis of The DS Foundation (Desai Sethi Family Foundation).

The centre, which will be named 'Desai Sethi Centre for Entrepreneurship', will encourage entrepreneurship and technology innovation through new programmes for education and research, multi-disciplinary courses, research laboratories and partnerships. Students will receive instructions and mentorship from IIT-B faculty and guest faculty from leading international institutions. Devang Khakhar, IIT-B director, said, "The centre will enable IIT-B to become the hub of entrepreneurship in the region, similar to the role played by Stanford University in the Silicon Valley."

The centre will focus on emerging technology areas like nanotech and biotech. Prototyping facilities will enable students to convert innovative ideas into proofs of concept. Its activities will cover the entrepreneurship value chain to include mentoring, micro-grants and networking with established entrepreneurs and industry leaders. It will be managed by a board comprising faculty members, student representatives, industry professionals and two international entrepreneurship experts.

"Entrepreneurship and innovation are critical for economic empowerment," said Desai. "This centre offers a new channel to convert breakthrough ideas into viable business ventures." The centre establishment was announced on Saturday during the inaugural session of the Entrepreneurship Summit, whose theme is 'Dream, Discover, Disrupt'.

The e-Summit session included an address by Alexander Blass, CEO of Innovative Institution of America, and an Oxford and Wharton alumnus. Speaking to aspiring entrepreneurs, Blass said, "Being sensitive to what people (customers) value is important than market research. Customer may not always be able to articulate needs, it is your responsibility as innovators/ entrepreneurs to understand requirements. But avoid know-it-all attitude."

IIT Bombay to set up research park

Seeks Rs 100-cr fund from MHRD

Aditi Divekar & M Saraswathy | Mumbai February 02, 2014 Last Updated at 10:55 IST



Indian Institute of Technology (IIT), Bombay to set up a research park in its Powai campus for the purpose of Research and Development (R&D), which will act as an incubator for companies. This will be launched in 2014 and the institute has sought Rs 100 crore of initial funds from the Ministry of Human Resource Development (MHRD).

"We have received in-principle approval from MHRD for this purpose. The outer limit for the project is Rs 400 crore, and in the initial phase we will need Rs 100 crore," said Professor Devang V Khakhar, Director, IIT Bombay.

Khakhar explained that they are building a 2000 square feet building where companies will set up their R&D units. These companies, whose founders need not necessarily be from an IIT, will also get an opportunity to interact with the IIT faculty. This research park will also provide space for incubators, where start-ups can be nurtured.

"While there are several incubation and research centres in other institutes, the speciality of this research park will be that they will be provided all the technology-related support that is vital for the upcoming companies," added Khakhar.

Bamboo frames for multi-storey housing in India?

Engineers from Trinity College Dublin and the Indian Institute of Technology (IIT) Delhi have joined forces to develop bamboo frames for multi-story housing in India. The research aims to establish whether a bamboo composite could work in high rise housing in earthquake zones in India. During the five-week project, the team worked with Professor Roger West and Professor Ravindra Dhir from Trinity's Department of Civil Engineering. Using static and cyclic loading, the durability of the frames was measured to establish their collapse strength and stiffness. Bamboo is well known for its tensile strength and flexibility. A special composite of bamboo and epoxy could provide an answer to the chronic shortage of low cost renewable medium density housing. It may also satisfy the need for ductility and durability for its use as the primary structural material in earthquake zones for housing of up to four storeys. The project forms part of an ongoing research collaboration between Professor Suresh Bhalla of IIT Delhi and Trinity College on testing bamboo columns. Trinity signed an MoU with IIT Delhi in 2011.

JICA's ₹1,336 cr loan for building IIT Hyd campus

The Japan International Cooperation Agency (JICA) has signed an agreement with the government of India to provide 23,035 million Japanese yen (₹1,336 crore approximately) of Japanese Official Development Assistance (ODA) loan for building of part of the campus of newly established Indian Institute of Technology (IIT) Hyderabad. The agreement was signed in New Delhi by Shinya Ejima, chief representative, JICA India Office, and Rajesh Khullar, joint secretary (Bilateral Cooperation), ministry of finance, government of India. The loan is at concessional rate of 1.40% and carries a repayment period of 30 years with a grace period of 10 years. The project is to be executed by IIT Hyderabad and the expected date of completion is 2018.

आईआईटी बॉम्बे में बनेगा एंटरप्रिन्योरशिप सेंटर

विज्ञान के उभरते हुए क्षेत्रों जैसे नैनोटेक्नोलॉजी और बायोटेक्नोलॉजी को बढ़ावा देने के लिए आईआईटी बॉम्बे एक एंटरप्रिन्योरशिप सेंटर की स्थापना करेगा। इस सेंटर का नाम देसाई सेठी सेंटर फार एंटरप्रिन्योरशिप होगा। यह सेंटर एजुकेशन, रिसर्च, मल्टी डिस्प्लिनरी कोर्सेज, रिसर्च लैब्स व पार्टनरशिप्स के लिए नए प्रोग्राम्स के माध्यम से एंटरप्रिन्योरशिप व टेक्नोलॉजी इनोवेशन को मजबूत बनाएगा। इसके तहत छात्रों को आईआईटी बॉम्बे की फैकल्टी और गेस्ट फैकल्टी के जरिए मार्गदर्शन मिलेगा। नया एंटरप्रिन्योरशिप सेंटर उभरती हुई टेक्नोलॉजी जैसे नैनोटेक और बायोटेक पर फोकस करेगा। प्रोटोटाइपिंग एक्टिविटीज छात्रों को अपने आइडिया को साकार करने में मदद करेंगी। इस केंद्र का प्रबंधन एडवाइजरी बोर्ड के माध्यम से होगा, जिसमें फैकल्टी मेंबर, छात्र प्रतिनिधि, इंडस्ट्री प्रोफेशनल और अंतरराष्ट्रीय विशेषज्ञ शामिल होंगे।

THE SEATTLE DIARY

Microsoft, Nadella talks enter last lap; Google's Pichai emerges dark horse

RACE FOR CEO Two Indians in fray, software giant likely to announce Ballmer's successor this week

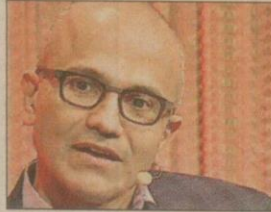
HT Correspondent

■ letters@hindustantimes.com

WASHINGTON: With Satya Nadella said to be in contract negotiations to head global IT giant Microsoft, a new report suggests another India-born could be in the running too — Google's Sundar Pichai.

Microsoft is expected to announce its new CEO this week, five months after Steve Ballmer said was retiring, giving the company a year to look for a successor.

Multiple reports in US media over the last few days indicated Nadella, a 46-year-old from Hyderabad and a senior Microsoft executive, was close to clinching the coveted position.



■ Nadella: nearly there?

The company has neither confirmed nor denied those reports.

It also did not comment on a report that Pichai, senior Google vice-president in charge of Android, Chrome and Apps, has emerged a strong candidate from outside the company.

He was called the search team's "top choice", by *SiliconAngle*, a



■ Pichai: new entrant?

tech news site, which said, citing sources, negotiations with Pichai were in "full swing".

Forty one-year-old Pichai is a rising star at Google, a member of co-founder and CEO Larry Page's inner circle called the L Team. He received a major career bump in April 2013 when he was given charge to steer Android,

the world's leading operating software for smartphones.

There were reports subsequently that he could be leaving for a senior position at Twitter and that Google paid him an extra \$40 million to make him stay.

"Sundar has a talent for creating products that are technically excellent yet easy to use," Page wrote about Pichai at the time of the Android move.

Pichai was born and raised in Tamil Nadu, and moved to the US after passing out from IIT Kharagpur. He went to Stanford and Wharton business school. He joined Google in 2004.

Pichai soon became a member of the leadership team, joining a galaxy of others of Indian origin: Nikesh Arora, Amit

Singhal, Sridhar Ramaswamy and Vic Gundotra.

"And he loves a big bet," Page had written about him then.

Microsoft is indeed a big bet, as big as it gets.

Though the *SiliconAngle* story was picked up by many IT blogs and reports, there hasn't yet been a ny official corroboration.

In contrast, there were multiple reports on Nadella — in Bloomberg, New York Times and the Wall Street Journal — all based on information from separate, independent sources.

But *SiliconAngle* was standing by its report.

Microsoft dominates the Indian enterprise software market space with a 31.1% market-share, according to IDC.



COLLABORATIVE RESEARCH

Deakin University entered into an agreement with the Indian Institute of Technology Madras (IIT-M) for collaborative research and development projects. They have announced the signing of a Memorandum of Understanding (MoU) that is expected to result in the wider dissemination and practical utilisation of inventions generated by IIT Madras faculty, students, and staff. This engagement will encourage students to enrol themselves in intense research and PhD programmes that will address important engineering and technology problems. The MoU will not only be limited to collaborative research and development projects in the areas of materials and engineering but will also extend to joint PhD. Ten students would be enrolled in the joint supervision programme.

Super 30 whiz wants fair shot at IIT for poor

ACCLAIMED mathematician and Super 30 founder Anand Kumar has called for the IITs to broaden their admission criteria to give students from poor families, especially those in rural areas, a fair chance.

"As students from poor families in rural areas start off at a serious disadvantage, they need an additional chance. They don't lack talent, but they do lack opportunities," Kumar said, addressing an entrepreneur summit at IIT-Bombay on Saturday.

"Education means empowerment. It has to be non-discriminatory. It requires a level-playing field for all. Talent is no preserve of the privileged," he added.

Anand said the poor condition of government schools was for all to see. "Those who can afford it, send their wards to private schools. After Class VIII, or even before, parents spend a huge sum on coaching their wards. But spare a thought for the poor, who

Education means empowerment. It has to be non-discriminatory. It requires a level-playing field for all.



— Anand Kumar,
Super 30 founder

don't even have books or copies. If their parents manage it somehow, they don't know if they will get teachers to teach in the schools," he added.

He said considering the harsh ground realities, the JEE board should give its policy a re-look and not make 80 per cent percentile a deciding factor for eligibility.

"Today, there is greater dependence on coaching, contrary to what was expected, as students go for it at every level," he added.

Kumar was among a host of speakers who addressed the two-day summit, which ended on Sunday, organised by IIT-Bombay at Powai. Prominent among these are Freecharge founder and CEO Kunal Shah; Innovation Institute of America CEO Alexander Blass; Flipkart founder and CEO Sachin Bansal; actress and activist Celina Jaitley; and Jim Beach, the faculty head at the US School for Startups.

Mail Today Bureau

Integrating IT and BT

Information Technology and Biotechnology need to come together to streamline manufacturing processes of biotech products

G. Padmanaban

Beyond the rhyming of the terms IT (Information Technology) and BT (Biotechnology), there can indeed be a valuable integration between the two — which is yet to be optimally exploited in the country. Many government departments deal with these sectors together, but essentially without any connection. IT, at least to start with, grew with initiatives in the private sector, whereas the growth of BT has been mostly due to government support. There was hype around BT at one stage to the extent that parents were prepared to pay expensive fees to get their children admitted to BT courses, only to find that their employment opportunities, unlike in the IT sector, did not hold much promise. The backlash led to such courses losing their sheen. There were not many industries to absorb the candidates, who were also found to be unemployable in terms of knowledge and training. However, the sector seems to have now stabilised and is on the growth path. The BT industry is growing at around 20 per cent which is quite significant in the context of a general industrial deceleration. The present turnover is estimated at \$5 billion with a projection of \$100 billion by 2025. The IT industry is valued at \$100 billion with a projection of \$300 billion by 2025. However, the scope of the BT sector is very large and can even eclipse the IT sector in terms of employment opportunities and reach to the economy and social sectors. The sector permeates health and disease, food and agriculture, environment and industry. A more appropriate strategy would be to integrate IT and BT seamlessly, wherever applicable, and aim for the \$500 billion mark by 2025.

There is a fundamental difference between the two sectors in India. The IT/ITes (IT-enabled Services) industry has become a major growth engine for the country's economy. It is stated that it contributes to around 5.6 per cent of GDP and direct employment to 2.3 million people and much more indirectly. The projection is to provide jobs to 20 million people by 2020. The main verticals utilising IT are BFSI (banking, financial services and insurance), telecom, manufacturing, media, construction and utilities, airlines and transportation, health services, etc. The fulcrum is services, be it IT or ITes/BPO (Business Process Outsourcing based on Internet) or engineering services. India



SMART TECH: The integration of IT and BT will help India make a mark in the innovation space. — PHOTO: AP

is identified with software services and there is now an effort to generate products (software) and work out strategies for the global and internal markets. To remain competitive, strategies like cloud computing and Platform-BPO strategies are becoming the options. The weakest link is hardware, be it the IT or electronics sectors.

Academia-industry link

The limitations are raw material, technology and skilled human resource. Both raw material and technology need to be imported. Unlike the software industry, available human resource is not skilled enough to compete with the Asian giants in the field. Interestingly, BT is grounded in a hardware equivalent, be it vaccines or drugs, or diagnostics or monoclonal antibodies or agri-biotech or biomass-based products including the energy sector.

The establishment of the National Biotechnology Board in 1982 that led to the establishment of the Department of Biotechnology (DBT) in 1986 by the government of India is primarily responsible for the growth of life sciences and biotechnology in the country. The initial phase of building competence in academia is now leading to resurgence in the industry. The best thing that could have happened is the starting of the schemes such as the Small Business Innovative Research Initiative (SBIRI) and the Biotechnology Industry Partnership Pro-

gramme (BIPP) in the last seven or eight years.

More recently, all these initiatives, along with additional ones, have come under the Biotechnology Industry Research Assistance Council (BIRAC), a Section 25 company set up by the DBT. There are around 400 biotech companies in the country and the numbers are growing. BIRAC supports around 300 projects with loans and grants to around 180 companies. A positive development is the evolving strong academia-industry interaction and intellectual property rights (IPR) filing in these projects, that has already led to development of some innovative products. A few representative examples are JE/pneumococcal/rotaviral vaccines, follicle stimulating hormone for infertility treatment, a microPCR platform diagnostic kit for parasite/viral infections, integrated navigation and training platform for tumour ablation, and a software platform for using mobile phone to analyse blood glucose strips. The vaccine sector is growing very strongly with a potential for India to assume global leadership. As is the case with the drug sector, where generics (out of patent drugs) are our strength, the BT sector is dominated by Biosimilars (erythropoietin, growth factors, mono-

clonal antibodies, insulin, industrial enzymes, etc.) besides conventional and recombinant vaccines. The only product in agri-biotech is Bt cotton. Many indigenous molecular diagnostic kits have been developed. There is perceptible activity in terms of medical instrument development.

In innovation

The integration of IT and BT will help India make a mark in the innovation space. New drug discovery is one such major area which will help India move beyond Generics/Biosimilars. Bioinformatics is one such area, which can help in drug design. Unfortunately, most IT professionals have very little appreciation of biology. There are a large number of steps that need to be taken before the molecule designed on the computer can become a drug. This needs a full appreciation of the biological/clinical aspects involved. But, with the evolution of systems biology (mathematical biology) and synthetic biology, an entirely new horizon is being made available to discover new drugs or do pathway engineering to design new microbial/plant products. This is, perhaps, the approach that would be needed to study brain function or evaluate biodiversity potential in nature.

An analysis of complex variables is needed for successful stem cell therapy or to understand cancer prognosis or evaluate QTL (Quantitative Trait Loci) in crops that govern yield, pest and drought resistance, etc. While BT can develop simple diagnostic tools, automation and telemedicine will be needed for village communities to reap the benefits. If stethoscopes can become out-dated, the day is not far off when portable ECG and MRI machines can reach the bedside. IT and BT need to integrate to streamline the manufacturing process of biotech products. We need integrated manpower, since skilled human resource is scarce in the area. The need of the hour is the evolution of IT (Dry lab) and BT (Wet lab) integrated companies in the areas of health, agriculture and industrial products.

(G. Padmanaban is INSA senior scientist, Department of Biochemistry, Indian Institute of Science, Bangalore.)

New drug discovery can help India move beyond the production of generics and biosimilars into bioinformatics

आपदाओं से निपटने को नासा से विमान खरीदेगा भारत

पिछले साल अपने पूर्वी तटीय इलाके में पांच चक्रवात झेल चुका भारत अब इस तरह की आपदाओं की बेहतर भविष्यवाणी के लिए नासा से एक विमान खरीदेगा। यह विमान एक प्रयोगशाला से लैस होगा। पृथ्वी विज्ञान मंत्रालय के सचिव शैलेश नाइक ने रविवार को बताया कि हम मैक्डोनेल डगलस डीसी-8 विमान खरीद रहे हैं। हमें उम्मीद है कि इसकी आपूर्ति वर्ष 2015-16 में हो जाएगी।

कई मामलों में बेमिसाल

फायदे

- ऊंचाई पर हवाओं का रुख जानने और खुद विमान में ही विश्लेषण करने में है सक्षम।
- इस विमान से तटीय इलाकों में चक्रवात की स्थिति का समय रहते पता चल जाएगा।

सेंसरों की होगी परख

- उपग्रह में भेजे जाने वाले उपकरणों के प्रोटोटाइप की जांच की जा सकती है।
- खामी होने पर अंतरिक्ष में भेजने से पहले ही उनमें सुधार किए जा सकते हैं।
- वायुमंडल में कार्बन डाइऑक्साइड सहित अन्य गैसों का स्तर जानने में मददगार।

उपग्रहों की कसौटी भी जांचता

- अंतरिक्ष में मौजूद मौसम उपग्रह हर सेकेंड करोड़ों बिट सूचनाएं भेजते हैं।
- यह विमान उन सूचनाओं की पुष्टि करने के लिए उड़ान भरते हैं, ताकि डाटा की पुष्टि हो सके।
- आर्कटिक में ओजोन की परत में हुए छेद की उपग्रह से प्राप्त तस्वीर की तस्दीक इसी से हुई।



मैक्डोनेल डगलस डीसी-8 विमान। ● फाइल फोटो

मौजूदा हालात

- दुनियाभर में 22 मैक्डोनेल डगलस डीसी-8 विमानों का इस्तेमाल किया जा रहा है।

सरकार की पहल

- बंगाल की खाड़ी में मौसम का रुख का अध्ययन करने के लिए मैसाचुसेट्स इंस्टीट्यूट ऑफ टेक्नोलॉजी से किया समझौता।

बड़ा है तो बेहतर है

- 157 फीट है लंबाई, डैनों का विस्तार 148 फीट
- 1000 से 42 हजार फीट की ऊंचाई पर भर सकता है उड़ान
- 12 घंटे लगातार या 5400 नॉटिकल मील लगातार उड़ने की क्षमता
- 15 टन वजनी उपकरणों से लैस 45 प्रयोग कर सकता है

सुविधाएं लाजवाब

- संचार के लिए दो इरिडियम (सैटलाइट फोन) आधारित तंत्र लगे हुए हैं।
- एक का इस्तेमाल चालक दल करता है, दूसरा वैज्ञानिकों के लिए है।
- मौसम संबंधी आंकड़ों को अपलोड करने के लिए लगे हैं मल्टीचैनल सिस्टम।

स्रोत: एजेंसी

कारोबारी शिक्षा

शिक्षा पर मोदी के विचार को नहीं मिली तवज्जो

भाजपा की सरकार बनने पर हरेक राज्य में आईआईटी, आईआईएम और एम्स स्थापित करने का मामला

कल्पना पाठक

भारतीय जनता पार्टी (भाजपा) के प्रधानमंत्री पद के उम्मीदवार नरेंद्र मोदी ने कहा कि अगर भाजपा केंद्र में सरकार बनाने में सफल रहती है तो वह गुणवत्तापूर्ण शिक्षा सुनिश्चित करने के मकसद से देश के प्रत्येक राज्य में भारतीय प्रौद्योगिकी संस्थान (आईआईटी), भारतीय प्रबंध संस्थान (आईआईएम) और अखिल भारतीय आयुर्विज्ञान संस्थान (एम्स) की स्थापना करेगी। हालांकि उद्योग और अकादमिक जगत ने मोदी के इस विचार को बहुत अधिक भाव नहीं दिया।

मोदी की घोषणा का मतलब यह हुआ कि देश में 13 नए आईआईटी, 15 आईआईएम और 21 एम्स बनाए जाएंगे। उद्योग जगत के मुताबिक अगर मोदी अपने लक्ष्य को पूरा करना चाहते हैं तो उन्हें इससे पहले संकाय सदस्यों को बेहतर वेतन देने पर विचार करना चाहिए। इसके साथ ही मौजूदा संस्थानों की आधारीय संरचना को सुधारा जाना ज्यादा बेहतर होगा।

एक आईआईटी के निदेशक ने अपना नाम प्रकाशित नहीं किए जाने की शर्त पर बताया, 'राजनेताओं के लिए किसी नई योजना की घोषणा करना आसान है लेकिन कोई भी गुणवत्ता को लेकर चिंतित नहीं होता। पिछले पांच सालों में जिन संस्थानों की बुनियाद रखी गई वे पहले से ही संकाय सदस्यों और कोष की कमी से जूझ रहे हैं। 13 नए आईआईटी का मतलब होगा कि करीब 1,300 शिक्षित संकाय सदस्यों की जरूरत होगी। किसी सुदूर नगर में बने आईआईटी में कौन पढ़ने और पढ़ाने आएगा? कौन छात्रों को प्लेसमेंट देने आएगा?'

मसलन आईआईटी जोधपुर और आईआईटी मंडी के 90 संकाय सदस्यों में 48 और 49

तकनीकी और व्यावसायिक शिक्षा की स्थिति



आईआईटी रोपड़ में 38, आईआईटी पटना में 19, आईआईटी भुवनेश्वर में 17, आईआईटी गांधीनगर में 14 और आईआईटी इंदौर में 13 शिक्षकों का पद खाली हैं, यहां तक कि पुराने आईआईटी में भी 41 फीसदी से ज्यादा रिक्तियां हैं। केवल आईआईटी हैदराबाद ही निर्धारित 105 संकाय सदस्यों में से 102 पदों को भरने में कामयाब रही है

शिक्षकों के पद खाली थे जिसे अब भरा जा चुका है। जबकि आईआईटी रोपड़ में 38 पद अभी भी खाली हैं। आईआईटी पटना में 19 जबकि आईआईटी भुवनेश्वर में 17 पद रिक्त हैं। आईआईटी गांधीनगर को अभी भी 14 संकाय सदस्यों की आवश्यकता है जबकि आईआईटी इंदौर को 13 पदों को भरना है। केवल आईआईटी हैदराबाद ही निर्धारित 105 संकाय सदस्यों में से 102 पदों को भरने में कामयाब रही है।

यहां तक कि पुराने आईआईटी में भी 41 फीसदी से ज्यादा रिक्तियां हैं। कुल निर्धारित शिक्षकों की संख्या जहां 5,356 हैं तो नियमित पद पर काम करने वाले कर्मचारियों की संख्या महज 3,158 है। आईआईटी बनारस हिंदू विश्वविद्यालय में सबसे ज्यादा यानी 57 फीसदी रिक्तियां हैं जबकि आईआईटी दिल्ली इस

मामले में 50 फीसदी रिक्तियों के साथ दूसरे पायदार पर बना हुआ है। इसके बाद क्रमशः 48 फीसदी और 42 फीसदी रिक्तियों के साथ आईआईटी खड़गपुर और आईआईटी गुवाहाटी का नंबर आता है। बाकी बचे चार आईआईटी में शिक्षकों के लिए खाली पदों की संख्या 19 फीसदी से 38 फीसदी के बीच है।

प्रौद्योगिकी संस्थानों के मुताबिक अगले पांच वर्षों में उन्हें उनके डॉक्टरेट कार्यक्रमों से संकाय सदस्यों की कमी को पूरा करने में मदद मिलेगी जिसका फिलहाल उन्हें सामना करना पड़ रहा है। हालांकि पीएचडी कार्यक्रम धीरे धीरे जोर पकड़ रहा है लेकिन आईआईटी के मुताबिक युवाओं को अकादमिक और शोध की तरफ आकर्षित करना अभी भी एक बड़ी चुनौती है। आईआईटी हैदराबाद के निदेशक

यू बी देसाई ने कहा, 'शोध को लेकर अभी भी छात्रों के बीच वैसा उत्साह नहीं है इसलिए पूरे माहौल को बदलने जाने की जरूरत है। दूसरे शब्दों में पीएचडी छात्रों के लिए और अधिक रोजगार के अवसरों का सृजन किए जाने की आवश्यकता है।' एक अन्य आईआईटी के निदेशक ने कहा, 'अगर हम अपने संकाय सदस्यों को बेहतर वेतन की पेशकश करते हैं तो हम पीएचडी छात्रों को रोक पाएंगे।' इसके साथ ही प्लेसमेंट की समस्या भी है।

पिछले साल नए आईआईटी में प्लेसमेंट की स्थिति 79 फीसदी से 92 फीसदी के बीच रही जबकि पुराने आईआईटी को बेहतर प्लेसमेंट नहीं मिल पाया। वहां भी 90 से 95 फीसदी छात्रों का प्लेसमेंट हो पाया।

और अधिक संख्या में आईआईएम को स्थापित किए जाने

■ मोदी की घोषणा का मतलब यह हुआ कि देश में 13 नए आईआईटी, 15 आईआईएम और 21 एम्स बनाए जाएंगे

■ उद्योग जगत के मुताबिक अगर मोदी अपने लक्ष्य को पूरा करना चाहते हैं तो उन्हें इससे पहले संकाय सदस्यों को बेहतर वेतन देने पर विचार करना चाहिए

■ मौजूदा संस्थानों की आधारीय संरचना को सुधारा जाना ज्यादा बेहतर होगा

■ आईआईएम के निदेशकों का कहना है कि सरकार को निजी क्षेत्र को शिक्षा के क्षेत्र में प्रवेश करने की राह आसान करनी चाहिए

का मतलब उसकी ब्रांड छवि के साथ समझौता करना है। आईआईएम के एक निदेशक ने बताया, 'क्यों नहीं मौजूदा आईआईएम को विस्तार दिया जाना चाहिए? आईआईएम न केवल ब्रांड है बल्कि यह पिछले पांच दशक से मौजूद है और इनमें से कुछ तो अंतरराष्ट्रीय मान्यता मिली हुई है।'

सभी आईआईएम में संयुक्त तौर पर कुल 3,335 सीटें हैं। आईआईएम के निदेशकों का कहना है कि सरकार को निजी क्षेत्र को शिक्षा के क्षेत्र में प्रवेश करने की राह आसान करनी चाहिए। एक दूसरे आईआईएम के निदेशक ने कहा, 'कई कंपनियों के पास पैसा और इच्छाशक्ति है तो फिर उन्हें क्यों नहीं शामिल किया जाना चाहिए? और अधिक संख्या में आईआईएम स्थापित करने का कोई मतलब नहीं है।'