All eyes on IIT-Delhi’s Open House
I²Tech 2011 to showcase high-impact research projects

Neha Alawadhi

NEW DELHI: A low-cost Braille display for the visually-challenged, a page-turning machine for the physically-challenged, a body posture correction alarm and a voice-based complaint management system for municipal complaints are among the projects that will be showcased at Indian Institute of Technology-Delhi’s Open House event -- I²Tech 2011 -- here this Saturday.

The Open House will include display and showcasing of laboratories and research projects by students, staff and faculty along with industry interface with experts from major industries. The Open House also coincides with the Institute’s ongoing Golden Jubilee celebrations.

High-impact research

“We are expecting over 1,000 people from industries, including 12 firms, to formally interact with our students during the Open House,” said IIT-D Director Prof. Surendra Prasad on Wednesday.

Highlighting IIT’s key achievements and progress during 2010-11, Prof. Prasad said the Institute was “promoting high-impact research”. Several departments at IIT-D are involved in research-based projects including smart materials like bio-textiles (Textile Department). The research focuses on creating artificial tissue cells like blood vessels and bladder tissue that can prove useful in medical treatment.

Naval and Army officers are also engaged in research to develop useful models for strategic use. The Centre for Applied Electronics is working on creating a self-sustained remote acoustic surveillance platform. The system is designed to detect low-power waves and also act as a communication system using digital signal processing hardware. Another research project involving ultra-wide band communication would find widespread use in ground penetration radars, anti-vehicle collision systems in cars and in medical research.

Speaking further about the Institute’s achievements last year, Prof. Prasad said IIT-Delhi was in the process of setting up a centre for nano-fabrication and nano-devices within the campus. The centre, being set up at a cost of nearly Rs.50 crore, would focus on non-silicon devices, unlike similar centres at IIT-Bombay and Indian Institute of Science, Bangalore, that focus on silicon-based devices.

IIT-Delhi has also taken up industry-based initiatives with companies like PepsiCo, Shell and Indus Towers. The Institute also approved 44 works last year for patents, according to Prof. Prasad.

Contributions

The I²Tech on Saturday would include IIT’s useful technological contributions including “Ferrite Phase Shifter” that are widely used in Defence radar operations, the “Fru wash” technology that prevents deterioration of unrefrigerated fresh vegetable and fruits by forming an organic coat over them and “axle counter for automatic signalling in railways” that is being used widely by Indian Railways.
Hi-tech innovations to be showcased at IIT-Delhi’s Open House this weekend

THE seventh Open House of the Indian Institute of Technology-Delhi (IIT-D) will be organised on Saturday. It will feature research undertaken by members of the IIT community over the past year.

Since 2011 is also IIT-D’s golden jubilee year, this edition of Open House will feature some of the major technological contributions made by the institute in recent years. Around 400 projects by 1,000 IIT students will be on display at the Open House, titled ‘Tech 2011’.

Among the technologies that will be on display on Saturday are the Social News Reader, which will expose online readers to news read by different social groups by identifying different clusters in the user’s online social network; the Bagbrella, which is essentially a hands-free umbrella in a bag; and a Body Posture Correction Alarm, which alerts the user when his/her posture is wrong.

As most of the older technologies have become meaningless, the Open House will feature more recent innovations. Some of the technologies on display on Saturday will be the Ferrite Phase Shifters, used in radars to allow for a sweeping beam without actually moving the instrument; the Fru Wash Technology, which provides an oil coating to fruits and vegetables, extending their shelf life; and the Axle Counter for Automatic Signalling in Railways, which has replaced manual systems at railway stations.

Prasad took some time off to talk about the institute. While he admitted to IIT-D having on board only 460 faculty members against a total of 578 posts, Prasad pointed out that the Institute has been consistently taking in new staff — 60 had joined over the last three years while only 18 had retired. The Director also said the Institute has also been hiring more women faculty members.

Prasad said that infrastructure at the institute is catching up with the requirements of the Other Backward Classes (OBC) expansion.

“Just before the Other Backward Classes reservations were implemented, we had started building a girls’ hostel. So, we have not faced any problems on that front. Hostels for accommodating over 1,000 boys will soon be ready, along with 100 houses for the faculty. We will also move into the new academic complex soon,” the Director said.
IIT-D to showcase its innovations over 50 years for golden jubilee

New Delhi: IIT Delhi will showcase its best innovations carried out over the last 50 years to mark its golden jubilee celebrations on Saturday. Schoolchildren, students from other universities and general public can visit the IIT-D campus to be a part of this open house called I2Tech and interact with the students and faculty there. So from path-breaking research initiatives to technology innovations like — a page turning machine, an alarm to correct your body posture, Bagbrella that is a bag with a detachable umbrella — there will be options galore for the visitors.

Around 400 projects by 1,000 IIT students will be displayed this year. "Last year 2,000 school students and other visitors had come to IIT Delhi. I expect that public participation will be more this year. There may also be 1,000 people from the industry present to interact with the students during the open house," said IIT-D director, Surendra Prasad. He added, "Besides new initiatives, we will also exhibit our history over last 50 years in the golden jubilee year of IIT Delhi." IIT-D carried out Rs 150 crore worth sponsored research activities and technological developments in 2010-11. In the same year, 43 patents from the institute were approved as compared to just 31 in the previous year. "This time our alumni also contributed approximately Rs 30 crore for setting up of a Central Research Facility, School of Biological Sciences," Prasad added.

The projects displayed across departments on Saturday will be the work of faculty as well as students of IIT-D. Look out for useful initiatives like the externally-heated clothing which can provide gradual heat in a controlled manner for a long period of time in extreme cold climate. The page turning machine will be ideal for those who have lost both their limbs. It is a simple machine which uses friction to lift the page. IITians have also developed a low-cost refreshable Braille display and also designed a special spondylitis pillow.

Financial Chronicle ND 21/04/2011 p-10

Innovations by IITians

Around 400 projects by 1,000 IIT students will be on display, especially school children and industry people, during 'I2Tech' which coincides with the institute's golden jubilee celebrations.
FROM IIT CAMPUS

No internet from midnight, institute wants students to rest

Mallica Joshi
■ mallica.joshi@hindustantimes.com

NEW DELHI: Staying connected is going to be a problem for students at Indian Institute of Technology Delhi (IIT-D) from the coming academic session.

The institute has decided to prohibit use of internet in the hostel between midnight and 6am. Presently, students get free internet access all day long in the hostel. The step was taken, authorities said, to ensure that students get enough sleep and are not stressed out.

“We want to ensure that the students’ performance does not suffer. Many students used to stay up playing games and downloading movies at night and would not go to class in the morning,” said Shashi Mathur, dean, students, IIT-D.

Internet facility, however, will be available in research rooms, labs and libraries all night long.

“Anyone who wants to study at night can access the internet at these places,” Mathur added.

But the decision has not gone down well with the students.

“The administration expects us to trek to labs and libraries in the dead of the night. Who would want to do that, especially in the winter?” said Abhishek Bhargava, third-year student of mechanical engineering.

Calling it a regressive move, Mitak Shah, a second-year student of civil engineering said, “We are adults and can manage our time. Some students want to study at night and internet in the hostel is an aid. This is not a fair decision.”

In 2008, the institute had put restriction on the amount of data students can download using the hostel bandwidth. This restriction is still in place.

Officials said if students use the allocated data limit to download games or movies, their studies get affected, as they can’t download any study material. But once the new restrictions are put in place, the cap on data will be lifted.

“Genuine students were suffering because of the cap. Also, it was creating other problems like slow internet speed,” Mathur added.

In the past, IIT-Delhi and IIT-Madras restricted the use of internet in hostels at night. IIT-Madras was the first one to put a restriction. Students weren’t allowed to use internet in the hostel from 1am to 5am.

The two institutes also took the decision for the same reason — students playing games all night and missing classes.

Students will, however, be allowed to use their personal internet. “If students have their own means to go online, we will not prohibit it,” said Mathur.

Students to display their inventions

HT correspondent
■ htcorrespondent@hindustantimes.com

NEW DELHI: Ceiling fan cleaners, cloth drying machines and an alarm to correct body posture — Dolities will be able to see all these innovations and many others at f2Tech 2011 at Indian Institute of Technology, Delhi (IIT-D) on Saturday.

Research work and students’ projects will be on display at the event, which opens on Tuesday.

“The event attracts many school students, with more than 3,000 students coming to see the innovations last year. The projects on display are from varied fields,” said Surendra Prasad, director, IIT-D.

Around 400 projects by 1,000 IIT-D students — many of which may make life easier — will be on display in the seventh edition of the event. Some of which are:

CEILING FAN CLEANER: This device will clean fan blades from both sides. It can be used while standing on the floor and the length of the stick of the fan cleaner can be adjusted according to the user’s height.

CLOTH-DRYING MACHINE: Students have designed a machine that will do away with the need to spread clothes in the sun. The machine aims to move air between clothes to dry them.
आईआईटी दिल्ली में रात 12 से सुबह 6 बजे तक इंटरनेट पर रक्षा
हरि भूमि न्यूज

वही दिल्ली। शिक्षा की गुणवत्ता को बढ़ाने और छात्रों को तनावमुक्त माहौल प्रदान करने के उद्देश्य से भारतीय प्रौद्योगिकी संस्थान (आईआईटी) ने अपने महोत्सव में मध्यप्रदेश के बाद संस्थान के हॉटेल में इंटरनेट के उपयोग पर रोक लगाने का निर्णय किया है।

आईआईटी दिल्ली के निदेशक उपरेंद्र प्रसाद ने कहा कि संस्थान के हॉटेल में छात्रों के रात्रि में अधिक देर तक इंटरनेट का उपयोग करने और इससे छात्रों के तनावमुक्त होने को बाधा सामने आई है। उन्होंने कहा कि संस्थान में छात्रों को तनाव मुक्त बनाने और उनकी कात्यायन के लिए एक पूर्वकालिक कार्यक्रम शुरु किया गया है और कई अंशकालिक कार्यक्रम भी इस कार्य में लगाए गए हैं।

प्रसाद ने कहा कि हॉटेल में मध्यप्रदेश 12 वर्ष से ज्या छह बजे तक इंटरनेट के उपयोग पर रोक लगाने का कारण है। हम सिर्फ छात्रों को तनाव मुक्त माहौल में पढ़ाई ही रखने का समय रखते हैं। आईआईटी में छात्रों के अत्यधिक कारण के बाद में प्रसाद ने कहा कि आईआईटी दिल्ली में ऐसा पढ़ाई समाप्त नहीं आया है लेकिन आईआईटी प्रवेश परीक्षा दिन करने के बाद यहां नए माहौल में सुझाए जा रहे हैं। उन्होंने कहा कि आईआईटी मुंबई और आईआईटी नागपुर के भी हमें यह मध्यप्रदेश के बाद छात्रों के इंटरनेट के इस्तेमाल पर रोक लगाने हैं।
लड़की बन कर गर्लफ्रेंड के होस्टल में घुसा III स्ट्राइक

17 Mar 2011, 17:18 hrs IST, टाइम्स रजलेंडर

गोरखपुर।। एसएएएम इंजीनियरिंग कॉलेज की बीटेक फाइंसल द्वारा एक छात्र ने फिल्मी स्टार्लैंड में अपने बॉयफ्रेंड को पूरी रात होस्टल के अपने कमरे में रखा। लड़का आईआईटी दिल्ली का छात्र है। लड़की को तो कॉलेज से निलंबित है। दिल्ली विश्वविद्यालय ने आईआईटी दिल्ली से भी कहा है कि लड़की के खिलाफ कार्रवाई की जाए।

भिलाई जानकारी के मुताबिक लड़की एसएएएम कॉलेज के सराहनीय महिला होस्टल में अपने रूम भेंट के साथ रहती थी। इसी महिले की रूम भेंट को लड़की की रूम भेंट होस्टल में नहीं थी। महिला का फाइंसल उठाते हुए लड़की अपने बॉयफ्रेंड को कमरे में ले आई। उसका बॉयफ्रेंड लड़की के काम से रात में उसके कमरे में आया। अगली सुबह वह उसी वेश में वहां से निकल गया।

होस्टल की कुछ लड़कियों ने इससे विफलता बताने से की। बात प्रिंसिपल तक पहुंची जिसके बाद इस मामले की जांच के लिए एक कमिटी गठित की गई। अन्य सूत्रों के मुताबिक लड़की ने खुद को लूट लिया कि वह अपने बॉयफ्रेंड को कमरे में लाई। लड़की ने अपने बॉयफ्रेंड का जान-पता भी बता दिया।

बताया जाता है कि दोनों अजात के हैं और लड़की समय से एक-दूसरे को जानते हैं। दोनों पहले में काफी अच्छे हैं और लड़की भी कॉम्प्यूटर सेक्यूरिटी के दौरान एक कंपनी द्वारा चुप्पी जा चुकी है।

इस घटना के बाद जिला प्रशासन ने गल्स होस्टल की सुरक्षा कम कर दी है।
No money for salaries, IIT-M showers gold coins

Several faculty members have spurned the offer, dubbing the coins weighing between 2 and 8 gm a "waste of money by a public institution" like the IIT.

The weight of the coin — 2g, 4g, 6g or 8g — offered to the staff member will depend on the years he/she has spent at the IIT. "The different weight denominations offered almost encourage people to melt the coins for cash," one of the professors, who rejected the offer, said, speaking under the condition of anonymity.

Documents accessed by HT show the largesse comes close on the heels of desperate pleas from the IIT to the HRD ministry for funds — claiming it was struggling to pay salaries, scholarships and pension.

IIT Dean (administration) Pramod Sriram told HT he was "100% sure the money used for the coins did not come from any HRD ministry funds." Sriram said he was unsure how the coins were financed, but said non-HRD ministry funds could technically not be used for payment of salaries.

Faculty members argued the technicality cited by Sriram hid the fact the IIT is forced to penny-pinch over funds.

"We are in the negative as far as non-fiscal funds are concerned to the extent of Rs 50 crore, and we still have salary/scholarship/new stipend to pay to the tune of Rs 200 crore," IIT Madras director Subra Suresh said.

Sriram countered that the IIT has been using non-HRD ministry funds to finance these schemes. Owing to the scheme of funding via non-HRD ministry channels, "technicalities" crept in, he said.

"We had no other option but to do this," Sriram said.

The irony, faculty members argued, is heightened by the fact that the controversy has erupted at a time when the IITs are playing with the government for financial autonomy. "Should the IIT build its corpus using funds it generates to achieve financial autonomy, or should it fritter these away on gold coins?" a faculty member asked.

Assam Tribune Guwahati 19.04.11 p-11

OIL initiative for underprivileged students to crack IIT test

STAFF REPORTER

GUWAHATI, April 18 — Seeking to brighten the prospects of a group of underprivileged students of Assam and Arunachal Pradesh, the Oil India Limited is launching the Utkarsh Superb 30 programme for the second consecutive year. The initiative will train 30 meritorious students to succeed in the highly competitive IIT entrance examination to be held next year.

The students selected after careful screening will be provided with a ten-month residential programme inclusive of food, accommodation and coaching with the sole objective of equipping them to crack the IIT and other engineering entrance tests.

To enable the students to be well prepared, the best locally available faculty will be engaged along with all necessary course materials. It will also be monitored by Shri Abhay Singh, a 1977 batch IPS officer from Bihar, who helped develop the Superb 30 when it was first launched in Patna.

According to Krishamurty Singh, the Centre for Social Responsibility and Leadership (CSR&L), the executing agency for the Superb 30 initiative, the selection of students has started and a written test will be conducted on May 15 in various locations including Guwahati, Jorhat, Dibrugarh, Tinsukia, Tezpur, Bongaigaon, Silchar, Itanagar and Pasighat.

Students whose annual family income is not more than Rs 1.50 lakh are qualified to take the written test. Interested students should contact www.csr.in where they can register for free.

They will fill in the form online to generate their admit cards. The admit card along with a photo identity card will have to be produced at the test centre.

Singh said that the OIL initiative is not just to support a few meritorious students overcome financial constraints to take a tough test and succeed, but to send a message to other students in their localities to become inspired.

"This initiative is designed to change lives of not just the students but for those around them, as once they graduate from top engineering colleges they will be able to transform their family for the better," Singh noted.

He further informed that young students from Assam and the rest of the Northeast are yet to become really aware about the IIT entrance test and only a few of them appear in it. Last year there were about 4,500 candidates from the Northeast, whereas nearly 47,000 students took the test from a city like Kanpur alone.
Super 30 founder is Europe journal's global personality

Indo Asian News Service
Patna, April 20

Mr Anand Kumar, who founded
Super 30, Bihar’s free coaching centre
which helps economically backward
students crack the IIT-JEE, has been
selected by Europe’s magazine Focus
as one of the global personalities who
have the ability to shape exceptionally
talented people.

He is the only Indian named in the
list.

“This gives me a feel that honest and
sincere efforts get noticed, no matter
where they are being made. I will carry
on with my pursuit of educating poor
children,” Mr Kumar said.

Focus is published by Italy’s biggest
publishing house Arnoldo Mondadori
Editore. Apart from Mr Kumar, the
article also mentions Iwano Brugneti
(athlete).

Earlier, Time magazine had
described Super 30 as the ‘best of Asia.’

Discovery channel made an hour-
long documentary on Mr Kumar, while
a film made by a British producer won
the ‘Viewers’ Choice Award’ in the Los
Angeles Film Fest.

Mr Kumar, who could not go to the
Cambridge University for higher
studies because of extreme financial
constraint after the death of his father,
started the Ramanujam School of
Mathematics in 1992 and founded the
Super 30 in 2002.

Super 30 provides free food, stay and
rigorous coaching for nearly a year to
30 poor and talented students selected
through a two-tier examination
process. Most of the successful
candidates have come from the most
underprivileged sections of society.

In the past eight years, the initiative
has helped 212 students clear the IIT
entrance test. In the last three years, all
the 30 students of the institute made it
to the IITs each year, drawing
worldwide attention.

The students have to pass a
competitive test to get into Super 30
and then commit themselves to a year
of 16-hour study each day, Mr Kumar
said.

Japanese channel NHK and Al
Jazeera also made documentaries on
Super 30. In 2007, industrialist
Mukesh Ambani honoured Mr Kumar
with the ‘Real Hero Award.’ During his
visit last year, US President Barack
Obama’s envoy Rashad Hussain
described Super 30 as the “best in
India”.

Mr Anand Kumar
Auto-driver’s techie son heads for IIM-C

By Girishwar Jha in Patna

BRAVING all odds, the son of a poor auto-rickshaw driver from Patna has made it to the Indian Institute of Management, Calcutta (IIM-C).

Anupam Kumar, a resident of Bhatra Ghat locality in Patna, scored a 97.09 percentile in the Common Admission Test (CAT) to qualify for the prestigious institution.

Anupam says he owes his success to his family. “Whatever I have achieved today is because of my parents,” he said, adding, “God should give everybody parents like mine.”

He said his family had often found it difficult to make ends meet while he was pursuing his goal. Anupam’s father Shrikanta Jaiswal has been an auto-rickshaw driver for more than two and a half decades in Patna.

“Our family income was quite low but my father never lost hope. He has been working hard for many years for the family,” Anupam said. This was not the maiden success of Anupam, though. In 2005, he had cracked the joint entrance examination for the Indian Institute of Technology (IIT), a student of Super 39, a free coaching institute for underprivileged children run by a young mathematician Anand Kumar.

He subsequently completed his first year of the M Sc. Integrated course in Physics at IIT-Kharagpur but left it to join Indian School of Mines (ISM), Dhanbad. He has since been pursuing a five-year dual course there in mining engineering with MBA.

Anupam’s father Jaiswal has been toiling hard for years to fulfill the dreams of his children. He leaves every day at 8 am and returns home as late as 11 pm, so that he could earn sufficient money to help his three children pursue their dreams.

Hardly surprising then,

Had also cracked the IIT entrance

his eldest son Anupam’s success has brought cheers to his family. “God has answered our prayers,” Anupam’s mother Sudha Devi, a housewife, said, adding “When my son called up to say he has been selected for IIT, I joy knew no bounds.”

After doing his matriculation from a private school and intermediate from the Hindi medium Dua Gobind Singh College at Patna Sahib in first division, Anupam focused on making it to the Indian Institute of Technology (IIT).

But the road to success was not easy because of resource crunch.

Anupam said he started giving tuitions to children to supplement the income of his family. “I used to earn Rs 1,000-1,500 by giving tuition to the students of classes VI and VII. At times I had doubts whether I would be able to fulfill my dreams. I also thought of becoming a teacher at a coaching institute at one point of time,” the IIT protégé said. Anupam had disappointment in store when he failed to qualify in his first attempt at IIT-JEE in 2004. But he got admission in Super 39 as one of the 30 students and went on to crack the IIT-JEE the next year.

Recalling his student, Anand said he was pleased to know that he had made it to the IIM-C. “He was a very talented and hard working boy,” the founder of Super 39 said. “I am sure he will go far in his career.”

Anupam’s success has also inspired his younger brother Abhisek and sister Anamika to pursue careers in engineering. Notwithstanding Anupam’s success, his father Jaiswal does not intend to stop driving his auto-rickshaw on the roads of Patna. When Anupam informed his father about his latest success, Jaiswal told him “to keep focus on his studies. He would keep running the auto-rickshaw for another two years before thinking of retirement,” his father said.
Born this way: Tendency to be ‘yes man’ is in the genes

London: Some people are born ‘yes men’, thanks to their genes which make them more likely to follow other people’s directives.

Researchers found that coming to a decision often involves listening to two parts of the brain — one that relies on taking advice and the other on experience.

The brain weighs up the often opposing views and then arrives at a decision to take an action, the researchers found.

But Brown University researchers in Rhode Island discovered that some people have genes that skew the decision towards one part of the brain than other.

They discovered the DARPP-32 genetic variation meant that individuals are more likely to do what he or she is told, even when it is contradicted by experience, the journal Neuroscience reports. 

BENDING OVER BACKWARDS: Variations in the DARPP-32 gene mean that some of us are more likely to do what we are told, researchers say.
No more sci-fi: 
This computer has emotions

London: Imagine a computer that has emotions just like you. This could soon be a reality, as scientists are inching closer to new class of computers which they say can feel "sorry" for their mistakes.

Researchers at Tel Aviv University's Blavatnik School of Computer Science are developing programmes which will make computers realise their mistakes and them operate much faster and predict events before they happen.

The programmes, the researchers said, will ask computers to try and do something only for them to be deliberately thwarted. By understanding the difference between the desired outcome and the reality, the machines will learn a sense of "regret" and how to minimise it. Computers which experience this will be less likely to make the same mistake in the future and will run more efficiently, the researchers said.

It could also teach them to predict the future — by considering all possible outcomes, they work out which is the most likely to succeed before they even start. The researchers led by Yishay Mansour, however, admitted that it was not quite on a par with artificial intelligence depicted in science-fiction films.

It's a first step in creating computers which could one day have human emotions, they said. Mansour has developed an algorithm that adapts to the situation at hand, effectively "learn" while running.
PSLV puts three satellites in orbit

V Ayyappan | TNN

Sriharikota: After two failed GSLV lift-offs last year shook the new-found confidence of India's space establishment, Isro on Wednesday successfully launched its 17th polar satellite launch vehicle.

A precision launch of the PSLV-C16 was followed by the spacecraft placing three satellites — ResourceSat-2, an Indo-Russian YouthSat and Singapore's first satellite X Sat — on an 822-km sun synchronous orbit. The satellites were placed in orbit 18 minutes after blast-off from the Sriharikota spaceport.

Indian Space Research Organization chairman K Radhakrishnan called the launch a grand success though there was a minor difference in the orbit achieved. "We wanted to put the satellites into a 820-km orbit, but we got an 822-km orbit," he said. The mission cost Rs 250 crore.

The launch was keenly watched across the world as data from ResourceSat-2 will be used by 15 countries. The 1,206 kg satellite will collect data on natural resources, including ground water and mineral deposits on land and fish density in the sea. The satellite has three cameras that can cover widths of 740 km, 141km and 17 km at resolutions ranging from 22 metres to 5 metres.

"The satellite will replace ResourceSat-1 which is in orbit since 2003. ResourceSat-2 is a global mission and has many improvements. It can be used to monitor snow cover, glacier changes, urban landscape and others," said Radhakrishnan.

PSLV-C16 mission director P Kunhiraman said all the stages of the rocket performed well. "The solid stage propulsion and liquid stage propulsion worked well and we were able to achieve the orbit in 18 minutes after the launch. The solar panel of ResourceSat-2 has been deployed and the satellite was pushed to the second orbit soon. If all goes well with the satellite, the ground centre in Bangalore will start receiving images from May 18," he said.

The other payloads are 92-kg YouthSat, an Indo-Russian stellar and atmospheric satellite built with the participation of students from universities. The YouthSat mission intends to investigate the relationship between solar variability and upper layers of atmosphere.

The third one, X Sat, is Singapore's first satellite and weighs 106kg.
STARTING SMALL

The rise of student entrepreneurs

The number of student start-ups—companies founded by people in graduate and postgraduate schools across the country—has increased over the last couple of years, despite a lack of investor interest.

BY AMRITRAJ CHANDRA
achandra@idmtmi.com

There’s something about these companies.
One offers inventory management software for small- and medium-sized enterprises. Another sets up websites for NGOs (non-governmental organizations). The third builds robotic kits for educational purposes.
All are run by people who are still in their early or mid-twenties. And all are small. Some may grow. Others may not.
Welcome to India’s student start-ups—companies founded by people in graduate and postgraduate schools across the country. When the National Entrepreneurship Network conducted its First Dot National Competition for student start-ups earlier this year, it received 99 applications from 33 cities: 46 were from non-metropolitan cities. Interestingly, the founders of 34 were from non-metropolitan cities. And only four of the nine came from families that earned more than Rs 5 lakh a year.

Whether it is IT (information technology), clean-tech, education, media, or retail—the existing belief is these entrepreneurs are not rich, but they are putting in money of their own,” says Nita A. Pandit, co-founder and chief executive officer, National Entrepreneurship Network (NEN). NEN, through its eCell, builds a comprehensive set of programmes to create an entrepreneur ecosystem. Present in 540 campuses across the country today and offering courses, skill-building workshops and mentoring sessions.
There’s a pattern in the 99 applications received by NEN that is true of student start-ups in general. Most are low capital investment enterprises—such as IT services, mobile communication services and e-commerce are the biggest source for start-ups. There aren’t so many student start-ups in capital-intensive sectors such as infrastructure. Some service sectors, which have seen activity, are the health-care, education, financial services and entertainment sectors.

India is still in the dot-com era and it does make money when a student talks about a Web-based business,” says S. V. Ramesh, who oversees the entrepreneurship cell at Great Lakes Institute of Management. “The reality is that India is still 10 out of 1,000 venture firms.”

SEIs such as agriculture, biotechnology, nanotechnology and clean energy are seeing traction because of a policy push. Recently, the government’s department of science and technology, the Council of Scientific and Industrial Research (CSIR) and Indian Institutes of Information Technology (IIITs) have been giving serious attention to technology startups in these sectors.

And the Indian Institute of Management, Bangalore, currently hosts start-ups in the space of security solutions for public banking transactions; back-end regulatory processes for the stock exchange; a bio-informatics firm that helps scientific researchers quickly search databases; a venture to help computer illiterate users access Internet content using a television remote; and a firm that measures and optimizes carbon footprints for organizations.

Whichever be the areas they choose to operate in, there’s no denying the increase in number of student start-ups.
The number of entrepreneurs setting up shop each year has tripped compared with three years ago,” says Aarti Mathur, co-founder and director of Reach, Bangalore-based organization that promotes entrepreneurship. “Start-ups require smaller investments and a state that is involved with seed funds has taken a look at big investments for a recent, one has stepped in to fill the gap.”

The number of dollars received by venture and angel investors has ballooned to 10 in 2010 from 32 in 2008, according to venture capital-focused news website VC Circle. In 2010, 16 were funded.

The size of the deals has increased too. The size of 11 deals in 2010 got $6 million, while 47 deals in 2005, signalling that the market is growing.

By the time a great idea receives approval and the funds arrive, the people behind the idea move on. Those who remain in the student start-up arena, almost in the same way as researchers in a school, do so for what they see as a mission and not for monetary gain. Several student entrepreneurs have given up their jobs to work on their start-ups. The Council of Scientific and Industrial Research (CSIR) offers various fellowships to students who have completed their PhDs and are ready to start their own ventures. (Source: National Entrepreneurship Network)

The concept of “deferred placement” where students can pursue alternative careers before start-ups and in case of failure, come back to campus placements programme is also rolling out. “Once placements are complete, students are free to start their own businesses,” says Pandit.

What tends to happen with deferred placement is that there will be people who are not interested,” says Shri K. Ramaswamy, chief executive officer, National Institute of Management.

"But the trend is starting to change. There are a number of these students who are interested in entrepreneurship and are looking at this as an opportunity. The idea is to give entrepreneurs the freedom to work on their ideas and not just a job.”

The change in focus from employment to entrepreneurship is one of the key takeaways from the tournament.

Investors cite similar issues with incubators.

"I believe incubations are incrementing really fast on a captive play rather than research and development labs that also allow access to resources,” says Amrutram Ramesh, chairman of Venturas, a Chennai-based $300 million investment fund. “Some college-based incubators believe that the reason they are there is to provide a physical space and help save rental money, which is the most disgusting thing I have come across.”

Still, the lack of investor interest hasn’t stopped the start-ups from getting their feet off the ground. “Output is the only grade when it comes to entrepreneurship programmes,” says S. Pradeep, managing director, SRI Ventures. “We have worked upon launching a start-up to get the degree.”

From the 15 new ventures that IIT Madras launches every year on an average, 15 additional ventures will automatically emerge from the dual degree entrepreneurship programme, he said.

At the IIM in Bangalore, the Centre for Entrepreneurship and Innovation (CEI) offers various entrepreneurship programmes for postgraduate students and people with work experience. The courses incorporate the current business realities of globalization and outsourcing. It also encourages research and research projects on different aspects of entrepreneurship. CEI also provides direct support to prospective ventures by providing consulting services, helping in identifying problem resources, providing necessary industry interface and arranging the funds.

In most cases, students who pursue their start-ups do so without the need to work for five to seven years in a company. This exposes them to the necessary social network for starting a company, says Arjan Achuthan, who teaches entrepreneurship programmes at the Indian Institute of Management, Calcutta.

“Here, universities also provide seed funding. And students can hold up to 25% of the equity. Students can take part in competitions and get financial backing.”

In the last five years, several start-ups have sprung up, from a food-delivery service to a clothing brand.

"We are now in the 3rd year of our programme. And I can see a clear trend in students interested in entrepreneurship,” says Arnav Agarwal, vice president of Pratyksha, a company that provides services in the fields of social impact and social innovation.

This is the first in a series on student start-ups. The next part will look at the financing landscape for student start-ups.
Looking for ‘impact of scale’, an entrepreneur tries again

PRADEEP SINGH

Looking for ‘impact of scale’, an entrepreneur tries again

By Sridhar K. Chari

Pengala Learning Pvt. Ltd is a digital learning platform that hopes to solve one of the biggest challenges in the education business in India: how can a school or a test preparation institute scale up without adding teachers and bricks and mortar classrooms.

"The business case is pretty solid. We don’t build content. We don’t sell it. So, no sales and marketing costs. In between, we take a piece of the action. There is the guy with a high propensity to pay—the guy preparing for IIT JEE (the joint entrance examination for admission to the Indian Institutes of Technology) without a coaching centre nearby—that gets the cash flow positive thing going...", explains Singh.

Then there is the ascensional case. "After you feed people, what is next? To teach them. The scale is enormous. There is no way to do it with the bricks and mortar model. There is no easy answer. If the difficult answer works, there is enormous impact."

Deepak Sinha, director at Viedea Capital Advisors Pvt. Ltd, said that if Pengala could make its platform interactive and provide a genuine learning experience, there was no doubt that the market for it existed. "Test prep institutions are strong regionally, but no one has a national footprint. And if you are scaling with a bricks and mortar, franchisee type model, maintaining quality can be difficult," he said.

Those doubting the idea would do well to read up on Singh’s past, though there is no guarantee that a man’s history has any bearing on his future.

Even today, most students graduate from US business schools in debt. When Singh graduated from HBS in 1984, he had $60,000 in the bank. So, he went and bought a second-hand BMW, and he and his wife Ruby drove around the US for six weeks.

The money came from a resume printing service he ran, which brought in revenue of $125,000.

"Remember, this is 1984, with no ready-made laser printers around. The average HBS graduate is incredibly insecure about his resume—particularly type of paper, watermark, thickness, and so on. My first year I passed with honours; barely made (it through) the second year. This had turned out to be a full-time job."

He may have just been lucky, but Singh is a man who likes to look back on his life in terms of the "lotteries" he has won. The first, he says, was the "womb lottery".

"I was born of refugee parents, Sikhs from Lahore, open minded liberal. I went from barely making first grade in school to going through IIT-JEE preparations and making it to IIT, Delhi."

The second lottery was admission to HBS. "Incredibly unpredictable process," he says grinning. "They pretty much pile up the applications, and throw darts to choose!"

HBS had other pluses: summer internship at McKinsey and Co. (he was hired by Rajat Gupta). Then he went to work for Texas Instruments Inc.

And finally, when he was set to return to McKinsey, a friend told him about a small company in Seattle that few people had heard of that was making around $100 million.

It was called Microsoft. Singh’s hiring manager was Jeff Raikes, who runs the Gates Foundation today. The job came with some nice stock options. That was the third lottery.

Since then, the law of averages seems to have caught up with Singh. Sure, Aditi is still around, and will end the year with $80-85 million in revenue. And Singh says that when he walks in, sees some people laughing over a joke in a corner, others engaged in an intense debate in another, he thinks to himself. "Hey, I made this happen."

But he admits he’d like something more than to make a big impact.

Who knows? Maybe he’ll win the lottery again.
REGULATORY GUIDELINES

Govt yields a bit on new technical college norms

Demand for ₹90 lakh as security money now rolled back to the original ₹30 lakh, but with a rider

BY Prashant K. Nanda
prashantn@livemint.com

NEW DELHI

Caving in to pressure, the Human Resource Development (HRD) ministry has partially rolled back the changes in the guidelines governing setting up of new technical institutes.

Earlier the HRD ministry had revised the guidelines and made it mandatory for new institutes to pay ₹90 lakh as security money for a period of 10 years. Now, it has rolled this back to the original level of ₹30 lakh, but inserted a condition wherein this sum would have to be paid in cash to the All India Council for Technical Education (AICTE), the apex regulator of technical education in the country.

In turn, AICTE would invest the money in a fixed deposit and retain the interest earnings in a special account.

Private colleges and institutes were, however, disappointed with the changes and wanted the government to restore the original guidelines.

They believe the move is a dampener to setting up new institutes at a time when the cash-strapped government is unable to make similar investments. Earlier, institutes were required to only furnish a bank deposit receipt for eight years and were allowed to retain the interest earnings.

AICTE member secretary M.K. Hada confirmed the development.

According to a senior HRD ministry official, who requested not to be named, increasing the security money to nearly a crore rupees “sounds little unfair” as it will hinder new institutes coming up. “When the focus is on increasing access to education and making gross enrollment ratio in higher education to 30% from the current 13%, you should not discourage education entrepreneurs. But, we have to closely monitor the quality,” the ministry official said. Currently around two million students are pursuing technical education such as engineering, management, pharmacy, architecture among others. And overall, less than 15 million Indians are pursuing higher education, which is just 13% of those who are eligible or in the age group. HRD minister Kapil Sibal has reiterated on occasions that India would like to add 30 million more students in the higher education space and the country needs over 20,000 more colleges in a decade time.

Last year, govt approved at least 600 new institutes and if all of them submit a security money of ₹30 lakh each in cash, then AICTE will have a corpus of ₹180 crore on which it will earn an interest. Moreover, the council will keep the cash in a bank fixed deposit for 10 years, according to the new rules. H. Chaturvedi, director of Birla Institute of Technology at Greater Noida and alternate president of the Education Promotion Society of India, an industry lobby, said, “At an interest rate of 9-10%, AICTE is expected to earn above ₹1,000 crore from this process in a few years. They are a government body and should not become a fund accumulator.”

AICTE’s Hada said the regulator is not making money rather it will help students in case of an institute shuts down. He said AICTE has encountered few instances when colleges furnish some fake receipt or withdraw the money before the expiry of the stipulated period. This will guard against any such attempts.

Private sector owns over 75% of the over 10,000 technical colleges in the country and Chaturvedi argued “government should not make private education unviable that too when government cannot fulfil the demand for such colleges.”

Chaturvedi indicated that this was part of a trend as earlier AICTE had imposed a charge ₹5,000 for each of the 10,364 technical colleges following the introduction of e-governance, earning it ₹5.18 crore.
The globalisation of management

In today's age of globalisation, management education needs to align the syllabus, structure, pedagogy, contents, faculty and every other aspect to the needs of continuous changes in the business world.

Dilip Ranadive

Keeping the definitions of hard-core economists aside, the word globalisation can be understood as the large-scale integration of cross country economies at industrial and corporate levels and its impact on various business and social aspects. In fact, the advent of globalisation in our country has been at such a scale over the decade or so that it has influenced almost every aspect of the business life, may it be the flow of information, capital, and technologies or most importantly people. From the look of the things as of this day this is just becoming order of the day and is here to stay.

In this situation, the field of management education has an almost obligatory responsibility to align the syllabus, structure, pedagogy, contents, faculty and every other aspect to the needs of this particular change in business world. The art and science of management was supposed to have been developed and perfected in US. While this system has its proven advantages, it is beyond argument that it is basically uni-cultural and therefore, it will have to be modified to include and accommodate the needs created by the multi-cultural dimensions of the businesses and issues generated there from.

The managers who are to manage things in such multi-cultural environments need to have this dimension to their knowledge, which equips them with skills and expertise to deal with such dynamic situations and produce results. Globalisation brings in executives who have different cultural upbringing to work closely and even creates their interdependency for the purpose of organisational interest. It is necessary that the management education provides a base to students to come to terms with these differences and also equips them to reach solutions.

The system of management education has experienced a multi-dimensional impact due to globalisation. Distance learning has emerged as the major driving force in the globalised economy as well as society and it has created both challenges and opportunities. The tools of learning are becoming technologically advanced techniques like e-learning, distance learning, video lecturing and overseas internships are rapidly becoming common. Management education will soon have to transform in to a more competitive and deregulated system which is tailor-made to meet the dynamically changing needs of globalised free market and will prepare students to take up the challenges of 21st century job market in the emerging cross cultural, cross-economic scenario.

The changed business world is bound to demand more of practical, solution oriented minds sets than the conventional, theory strong ones. The trend of placement processes shows a growing preference to test students majorly for their attitudes, analytical minds and problem solving ability. Some recruiters are using advanced psychometric tools to assess the emotional quotient of students and use it as an important component for judging them for profiles which would lead to leadership roles in a short period.

Whereas the university syllabus leaves much scope for improvement, the autonomous courses in management have been quick to adopt programmes which offer much better scope for practical learning and develop solution orientation, such as those based on case study methodology.

The educational system will have to create a deep rooted understanding of changing definitions of the words job and "career" amongst students. Gone are the days of life-long jobs at one place. There will have to be emphasis and ensure clear understanding in students’ minds that two words which matter most in today’s globalised corporate world are results and performance. Skills cannot be taught but they have to be acquired and once the management educational system will have to have enough space for students to make meaningful efforts in that direction. The system will have to strike a balance between the conventional academics and specialized, tailored courses for skill and knowledge development. There is also a strong need for corporates to align with management institutions to assist them in tailoring the learning programmes to their specific needs. Also, corporates can be effective partners of management institutions and contribute to groom talent, which has specific business models need. In fact, just like their CSR initiatives, corporates can seriously think of CSR (Corporate Educational Responsibility) initiatives aimed at management education and can even ensure that some of the HR managers have this as a part of KRA.

(The writer is director Corporate Relations MIT Group of Institutions)
'B-Schools must be knowledge hubs'

Top B-schools in the country are making best efforts to produce quality managers for the industry but are facing a few challenges. Prof (Col) A Balasubramanian, president of Sri Balaji Society, Executive Director BIMM, and Dean BITM, BIB, BIMHRD, tells us what needs to be done to enable B-schools generate opportunities for management students.

On the question of B-school autonomy, on the lines of IIMs, what do you feel is required to be done?

The autonomy essentialiy is related to the survival, functional efficiency and competitiveness to grow as a distinct institute or brand. Every student joining a business school expects a job. This expectation will have to be met by the B-schools. Therefore, the admission process becomes very critical. A growing up graduate student is conscious of what he is doing, takes a decision to join a particular course with the approval of the elders in the family including the parents and demands a Return on Investment. This being so, if the institute does not have the authority to scrutinise the suitability of various parameters and grant admission in their own institute, how do you expect them to deliver the result? In other words, giving admission based on a certain qualification and a certain cut off point of an entrance exam in a routine manner in a crowded atmosphere will defeat the very purpose of scientific admissions. Having admitted a student, the institute should take the responsibility to impart the best knowledge, skills and stitudes just like a finishing school. To produce the ideal graduate, we need the best faculty for which one should have the right to fix the right fee. All those rights already exist and are protected by various judicious pronouncements by the Supreme Court of India.

But, how about those "facing capitation fee and exploiting the students?"

The law of the land will take care of it. The problem here is, the Central Government has grabbed the subject education from the concurrent list and expects a few gentlemen to control the whole technical education. How can a person who does not know the requirements of the industry be at the helm of a regulatory body, which produces students for that sector?

Industry interface in B-school education is still lacking. Your views on the same?

I think that the situation is changing. We organise national B-school meets in which students discuss various issues with students. Like that every institute is doing something depending upon the capabilities and requirements perceived by them.

Do you feel in the final exams more stress should be on projects and outdoor assignments rather than high theoretical in nature?

Theoretical inputs make the bedrock of any good education system, but since management is a practical course like medicine there is no short cut to practical assignments and projects.

Therefore, management theory is nothing but well tested management practices published in the form of books. Let us note that the most revered Ramayana, Mahabharata, Quran, Bible and Guru Granth Sahib all are in the form of books. Do we treat them as theory, case study or practice?

As compared to Ivy League Institutions do we have a lot of catching up to do?

The eco system in India and the US is different. The US is a highly industrialised country with processes and systems developed over a century or more. In India, real industrialisation has started only after Dr Manmohan Singh demolished the Pematic raj and ushered in globalisation. In India, before study management before entering the corporate world. In the West, management schools are filled with students with rich corporate experience. In any case our own IIMs are no less than the Ivy League.

Is there a need for a common syllabus and uniform practices for the entire country?

If we want to kill the initiatives, experiments and innovative practices introduced on a common standard and face the consequences of stalling the industrial and corporate growth of our nation, did the corporates, the real employers of our MBAs make such a suggestion? Are views of all the trade and industry bodies - the end users of MBAs - sought? Can the marketing strategies of different companies across the regions be the same? Can the price of two products Maruti and Mercedes be the same? It is one phenomenon, which is the value creator.
Pvt cos soon in internal security?

But Govt Wants 5-7% Of Profits Invested In R&D For Cutting-Edge Tech

NEW DELHI: The government on Wednesday said it was ready to accept participation of private players in internal security area but asked them to spend at least 5-7% of their profits in Research & Development to get cutting-edge technology.

Expressing the government’s readiness, Union home secretary G K Pillai said the home ministry has undertaken several ambitious projects like the Crime and Criminal Tracking Network and Systems (CCTNS), National Intelligence Grid (NATGRID) and visa tracking system where tremendous opportunities were waiting for the private sector.

“I would like to say that in the internal security scenario, there is a huge market which is available for you,” Pillai said at a seminar organized by Indian Chamber of Commerce.

The home secretary said another project which is in the pipeline is the “Safe City Project” through which the government wants to make the cities safe. The project is being started in 24 cities for the safety of citizens through dedicated security networks. The home ministry hopes to extend the project to all major cities in the country in a phased manner.

“If that happens then there is tremendous potential where both industries and government can collaborate,” he said.

Citing the example of the Bangalore traffic management scheme, Pillai said the government and private sector jointly worked out a new scheme which is being implemented in 197 traffic junctions in that city. “The results are already there. In the last two years, there is a 20% decline in fatalities in Bangalore and 2,000 lives have been saved,” he said.

Asking private companies to spend at least 5-7% of their profits in R&D to get new technology, Pillai said: “I feel that most companies are still not investing enough in R&D. They believe that it is not crucial enough. But if you really want to go up the value chain, you have to spend 5-7% of your profits in R&D. It is important, it is a long term investment, it is going to give you good dividend as you move forward.”
The market for robotics is thriving. Robotics is applied in various spheres like automobiles, electronics and medicine.

What do you do when your child loves robotics, but you simply cannot afford a kit that is exorbitantly priced? Years back, the Danish company Lego marketed a robotics kit—kids built the kids, they began to grow familiar with the principles of robotics. This familiarity would eventually help them create problem statements. But the downside of this wonder kit was the pricing—Rs 25,000 ($600) was too much for a parent to afford. That was when the Chennai-based Robotics Research Lab Academy (RRLA), an institute that specializes in teaching children robotics, stepped in. P Verjeshwar, Head, Projects, RRLA, says, “We focus on the robotics movement at the school level. We feel that if the kits were priced reasonably then we would be able to embrace a wider market. So we decided to work the kits and charge about a lesser programme. This would make the prospect more affordable.” The robotics movement at the school level has been hugely successful because of the interest evoked in and created by what is called Fun Robotics or Hobby Robotics. The RRLA, that has its presence in schools that Chennai and Visakhapatnam in Chennai, will soon reach five schools in the next academic year by teaching the principles of robotics, in tandem with the Maths and Science NCERT syllabus. Verjeshwar says, “We have structured programmes, depending on the age group. The level of complexity grows with the student; they are integral to the tech first of engineering colleges. Since they are a major draw, students rush to training centres to win competitions.” While the supply is scarce, the demand for hobby kits is outpacing the growth. Research is being done on new robots, but the major applications of robotics in various spheres like automobiles, electronics and medicine are more demanding. However, the demand for robotics is already meeting the supply. The reason is the growing interest in the field, Srinivas Rajan, Head of Production, Hyundai, says, “The company recruits people with background in electronics. Yes, robots are used in our welding shops, the painting processes, and assembly processes will be required. We, through our demand for a huge increase, are meeting the demand, but we are maintaining it at a much lower percentage of the cost!”

Age group. For instance, at the lower levels, they are given a breadboard that teaches them how to build circuits.”

Several other factors have been contributing to the growth of the robotics movement in South India. Advanced robotics is up for the taking at the post graduate level and for research endeavours. Robotics at the college level in Chennai is a rage too. “Almost every university in Chennai has robotics labs. But there is a need to merge the robotics systems to labs,” says Verjeshwar. Dr K Verjeshwar, Chief Manager, Bangalore Robotics, a Bengaluru-based institute says, “Robotics competitions are a big draw for processes with required. We through our demand for a huge increase, are meeting the demand, but we are maintaining it at a much lower percentage of the cost!”

The market for robotics is thriving. Robotics is applied in various spheres like automobiles, electronics and medicine.
A pedagogic approach

Management education has come of age. Today, the quality of faculty, teaching methodologies and international relations indicate the success and reputation of an institution. Prafulla Agnihotri, Director, IIM Trichy, elucidates

South India has an enormously rich history of education. While science and technology are the most prominent fields of higher education in the South, management has also been gaining popularity over the last ten to fifteen years. Testimony to this is the presence of reputed institutions such as the Indian Institute of Management (IIM) Bangalore, Indian School of Business - Hyderabad, Department of Management Studies at IIT Madras, Bharathidasan University, Trichy, and the newly opened IIM in Trichy.

SUPERIOR FACULTY
The success of a management institution adopted by professors across institutions. Case study is an ideal teaching methodology. This system of teaching should be supported by additional techniques such as projects, which will lead to experiential learning. It is important to offer practical insight into every problem and not just provide theoretical concepts.

ADAPTABILITY
It is important to equip the managers of tomorrow with necessary skills, as they will eventually be the driving force of the nation. The management education must adapt to this situation and must offer appropriate programmes to his students. They should also aim to seek alliances with B-schools abroad, for both students and faculty exchange programmes. Lastly, management institutions must understand that they should seek cooperation from the industry so that the best of theory and practice can be applied to the
management institution
depends a lot on the
strength of its faculty; their
qualification, research
background, and research-
guiding abilities are vital to
the growth of the
institutions. B-schools
across the country must
devise methods and
mechanisms to allow the
faculty to interact with
international institutions
of repute. This can be made
possible by encouraging
them to attend leading
international conferences
and/or publishing their
research papers in leading
international journals. It is
important that faculty
across B-schools are aware
of the latest trends and
developments across
organisations. This can be
done only if there is a
strong industry-academia
interaction. The output of
the academia is the input
for the industry.

TEACHING
METHODOLOGY
Management education is
surely undergoing a
pedagogic change. Several
innovative teaching
methodologies are being
practice can be offered to its
students.
The country needs a clear roadmap for transforming universities as forerunners in active applied research. We find out the research ambience in the field of technology in South India.

Stepping into the 6th year of Indian independence, the country that gave the world the university system is still grappling with systemic problems in its higher education system. For the most part, public universities and highly-regulated private universities are still floundering, making Indian academic research lag behind US and China. Despite this, there is notable progress shown by the five IITs, Indian Institute of Science, few National Institutes of Technology (NITs), central State universities and some promising private deemed universities. The recently formed Indian Institutes of Science Education and Research (IISERs) are yet to establish a significant presence in the research orbit, but definitely moving ahead. There is ample research done in basic research and relatively less in applied research.

The real strength of India comes from its soft infrastructure in the forms of its intellectual capital. Over 50% of engineering graduates from across the country are produced in South. South India is the Mecca for engineering education that saw the emergence of the Genome Valley (Hyderabad), Silicon Valley (Bangalore) and Auto Valley (Chennai). To support this “valley ecosystem”, many universities provide the system, highly talented graduates and also engage in active research in Biotechnology, Nanotechnology, Computer Science, Automobile Engineering, Material Sciences, etc. Pioneering research is done in Computational Sciences at IISC Bangalore and in Computer Engineering at IIT Madras (IITM), IITs in Bangalore and Hyderabad, and also in Amrita University, Coimbatore. Research in Automobile Engineering, Engineering Design and Material Science is done extensively in IITs. IIT-M and to some extent, in the field of Automotive Electronics at IIT University Velodyne. Biotechnology and Nanotechnology related research is extensively done at IISc, SASTRA University, TANZ, Amrita University and IITM. In addition, other State universities like CUSAT (Kochi), College of Engineering (Chennai), NITs (Trichy, Warangai,}

The real strength of India comes from its soft infrastructure in the forms of its intellectual capital. Over 50% of
engineering graduates from across the country are produced in the South

from premier institutions like the Jawaharlal Nehru Centre for Advanced Science Research, an interdisciplinary approach can be positioned as a strategy to encourage universities to conduct high quality research. Instead of looking for the Zone for Research & Innovation (ZURI), a separate class of "Universities for R&D" can identify 100 universities.

The writer is the dean of a leading university in Tamil Nadu.