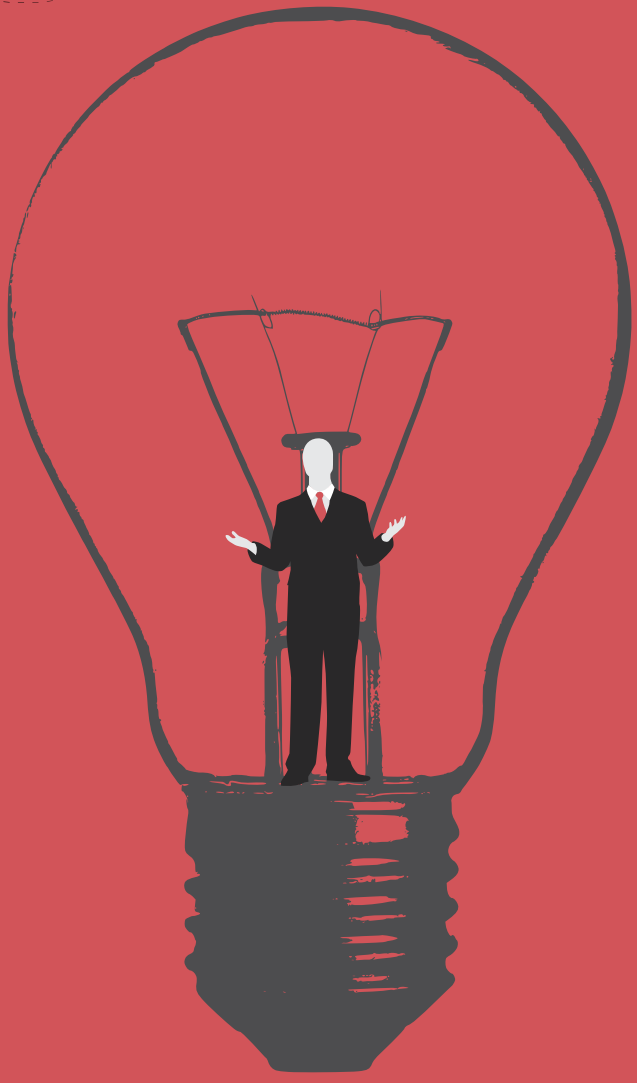
FUNDAMATICS

1Q2014



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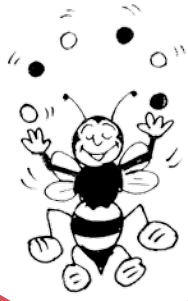
FUNDAMATICS

1Q2014

IIT Bombay Alumni Association

Quarterly magazine of
The IIT Bombay Alumni Association

Contents




Z Z Z

From the Beehive

Life at 2

It was exactly 2 years ago in December 2011 that *Fundamatics* was born. Miraculously, to say the least. This was a baby that would have been stillborn, attempted to be delivered barely a couple of months after conception. Anyway, after a series of flukes, fits and starts, we presented a 200-page issue to you. You all loved it and lapped it up and life at the beehive has never been the same since then. We moved from one issue to another in a never ending stream. We grew, we evolved, we transformed and moved in a direction you steered us into. Thanks to your continuous patronage, we grabbed 3 coveted national ICE awards after just 6 issues under our belt.

As you hold this 9th issue in your hands, one as fat as the inaugural issue, one that's touted as our bumper anniversary issue, it's but natural for all the bees to reminiscence and ponder over what got us here. Many of you have confessed to us privately that while you applauded our efforts publicly, you were internally skeptical about whether we would survive beyond a couple of issues. One of you was candid enough to mention that you felt that we were a comet that was shining now, but would disappear without a trace. Yet, you humoured us. Gave us articles, brought in subscribers, and solicited advertisements for us to egg us on. Spoke words of encouragement while crossing your fingers and privately praying that we would live up to your expectations and prove your skepticism wrong.

And then we saw the joy erupt on your faces when we eventually turned out winners. At the beehive, we are constantly in a soul searching mode. Our exploration into the deepest recesses of our mind tells us that the secret of our success is YOU. We started an alumni magazine in a fit of a mad moment and did not have the time to lock ourselves within the confines of guiding principles, model, statement of purpose, core philosophy and the like. We wanted to elicit your participation to help us evolve. After all, we are dealing with very eminent alumni who have a history of running mega and global corporations across the world. If the best minds on the planet contribute material for our magazine and go one step further to guide us, mould us, and encourage us, can we go wrong?

So far, every issue of *Fundamatics* has been centered around a theme and the theme this time is on Innovation & Entrepreneurship. We feel that *Fundamatics* is an innovative idea of the IITB alumni community. It is an enterprise that runs on the cooperative principle and despite heavy pressures, pitfalls and occasional setbacks, it is still profitable, notwithstanding its baby phase. How could we think of any other theme to celebrate our birthday?

As you scroll the pages, you will see that we have dispensed with our regular back-page, the thank you section, in this issue. That's

because we believe that all of you viz. our CARS (contributors, advertisers, readers, and subscribers) need to be thanked here, right at the top. Treat this as an editorial-thank you combo. And do read the most thought provoking content from our galaxy of extremely eminent souls that we have lined up here. In a rare and an exclusive interview, HRD Minister Pallam Raju bares his heart and mind to speak on wide ranging issues concerning IIT and IITBAA. Czar of manufacturingJamshyd Godrej, ISB Dean Ajit Rangnekar, Skill Development Diva Revathi Kasturi, Alumnus Hemant Kanakia, columnists Sudheendra Kulkarni, Beheruz Sethna, Ali Contractor—they're all there with full guns blazing. We have interesting anecdotal stories from entrepreneurs, poems, trivia, and some attempt (both successful and unsuccessful) at humour in order to bring about a balance. Do not miss the fascinating stories about IITB's participation in commemorating the memory of the historical Salt March at Dandi, buttressed by an informative column by Ali Baba.

Thanks again and keep us buzzing.

Jumblebee.

Engineering Entrepreneurship and Innovation

Readers might question the wisdom of our decision to dedicate the theme of the annual special issue of Fundamatics 2014 on the theme of Innovation and Entrepreneurship given the fact that there is a surfeit of writing on Innovation and Entrepreneurship available to readers today.

Our decision had less to do with the fact that IIT Bombay alumni have amongst its ranks many successful entrepreneurs and innovators and more to do with a sincere belief that a better understanding of the nature, process and practice of innovation and entrepreneurship is a key factor in economic development and that this is a crucial area that can fuel sustainable growth mechanisms in the foreseeable future for developing economies like India.

Today, the nation is undoubtedly in an era of dual realities, at one end there is rapidly progressing science and technology, growing economies, and changing lifestyles and at the other, accessing such basic amenities as food, health, education, and livelihood is still a challenge for millions.

A unique but undetected phenomenon in the past couple of decades among Indians has been a consistent unleashing of an entrepreneurial movement like never before. Be it serial entrepreneurship in the Silicon Valley or setting up plants and factories in India these are people who bucked the trend deciding to ignore the lure of cushy jobs with fat salaries and daring to dream of building something of their own. This is a gigantic socio-cultural change that bodes well for our country. In this issue we would like to look through time space and across disciplines to focus on India's innovation frontiers, and on unique insights on entrepreneurship that can both guide and inspire our readers.

Scattered across the pages of this issue are unique insights to pique your curiosity and encourage conversations and debate, and also inspiring life stories that enable us to investigate whether innovation and entrepreneurship manifest themselves differently across different sectors and disciplines. The larger aim is as always to inspire the next generation of entrepreneurs and innovators who would draw sustenance form these narratives and script transformative stories in their own lives.

Queenbee

Innovation and Entrepreneurship

AJIT RANGNEKAR

The IIT Bombay alumni network constitutes arguably the cream of talent in the country, which has a track record of producing some of the brightest and most successful entrepreneurs in our country. It is therefore fitting that Fundamatics is dedicating this special issue to the area of Entrepreneurship and Innovation.

The importance of entrepreneurship in our country today cannot be over-emphasised. We have a very large youth population waiting to be gainfully employed; large sections of the society still remain economically backward, while the overall environment being resource constrained is marred with social conflict and strife. Entrepreneurship and Innovation are the life-blood for successful business, which, as the late Professor Sumantra Ghoshal used to say, is a force for good. As alumni of a premier institution, with a successful track record notwithstanding, we have a responsibility to do more.

Understandably, the subject draws a significant proportion of our attention in the organisation I head. I have captured below some learnings based on our experience of working with Entrepreneurs. I will use an example where my colleagues from ISB worked on a project in the area of providing affordable housing to illustrate the points I am making.

1. The Idea is not important – Execution is: There is a tendency among many young entrepreneurs to get bogged down with getting a great idea, or in perfecting the idea that they already have. The idea almost never remains in its original form once you hit the market. In fact, it often changes quite dramatically. The trick is to hit the ground running early and iteratively improve your product. We first considered affordable housing as a concept of high rise low cost homes in a faraway location, to reduce costs. After doing market segmentation, and looking at who can afford to buy such homes, we changed the concept completely to focus on homes near unorganised industrial areas.

2. Look beyond internet start-ups: The most amount of entrepreneurial activity seems to be in this one space. But there are many more fields that have a crying need for innovation and entrepreneurship. Certainly use technology – but do so innovatively to address market needs. India has enormous unfulfilled demand in what may be called emerging middle class market, i.e. people just coming out of poverty. These people need fulfillment of basic needs (housing, health-care, etc) at a cost that is roughly 10% of international cost. If you can achieve that, the opportunities are immense.

3. Listen to the market: Another pit-fall we often notice is that entrepreneurs get too emotionally attached to their product. Yours may be the best product in the world – but if it doesn't serve your customer's needs, it is not of much use. So continuously adapt

your product strategy to market reality. We first thought that poor will be happy to live in flats, but most such people have a very strong emotional need to own land. We, therefore, changed our model to give people small single family homes with their own land.

4. Identify barriers and overcome them: The market pays you only to solve problems. The more insurmountable that the problem may seem, the greater the rewards for solving it. It was generally felt that land near urban areas would be too expensive, but land near unorganised manufacturing areas is not expensive. Mortgage finance is usually not available for such people, as the perceived cost of recovering money is thought to be high. We worked with their employers to arrange deduction of EMI at source to reduce cost of collection, and to give comfort to the lender that the borrower is employed.

5. Address risk perception of lenders: People who wish to buy small affordable homes at Rs 3 to 5 lakhs do not have the capital to buy the homes. Developers and lenders also see such projects as risky and unprofitable. We worked with both, potential developers and financiers, showing them detailed market segmentation, feedback from home buyers and their employers, and worked on marketing and sales strategies. Once the lenders were convinced of the profitability, they were willing to offer finance to the project at very competitive costs.

6. Scale up: In a country like India, to have an impact, one needs to achieve scale. We initially started with building about 300 homes. Once those were sold at an attractive profit, we codified that detailed knowledge into a manual which could be used to cookie cut other developments. Now over 1,000 such homes are being built, and thousands more can be built.

So, the lessons were – develop a concept quickly, take a beta version to market and test it out, adapt quickly, and leave your ego and love for the product aside. Think end to end (design, manufacturing, sales, maintenance, use, and most important, scale), not just about the product.

After several years of mentoring and working with our alumni start-ups alone, we at the ISB are taking steps to implement some of our learning to support the broader entrepreneurship community. We will set up a Design Thinking focused incubator that can help entrepreneurs translate their ideas around people's needs, and where all enablers such as technology, processes, organisation, etc. are aligned to meet people's needs most effectively. For any education institution, the greatest joy is to give flight to alumni dreams. ❖

Ajit Rangnekar
B. TECH. 1968, CHEMICAL ENGINEERING

Ajit Rangnekar is the Dean of the Indian School of Business (ISB). Prior to taking charge as the Dean, he was the Deputy Dean of the School from March 2003.Before joining the ISB, Rangnekar was the Country Head, first for Price Waterhouse Consulting and then for PwC Consulting, in Hong Kong and the Philippines. He was head of the Telecom and Entertainment Industry Consulting practice for PwC in East Asia (China to Indonesia). After obtaining his undergraduate degree from the IIT Bombay he went on to complete his post graduation from the Indian Institute of Management, Ahmedabad.

Changing the Status Quo:

On Innovation and Entrepreneurship in India

HEMANT KANAKIA

For years, commentators have been throwing up a lot of smoke about innovation and entrepreneurship in India, but I have yet to see any fire. In my defense, I would blame my training in IIT (in the early 70's) for turning me into a first-grade skeptic. I did, though, put that cynical attitude to constructive use after I moved to firangi land to get a PhD. It helped me become a researcher at Bell Labs and, ultimately, a successful entrepreneur.

In 2010, I returned to India and started investing in smart young people who wished to turn their innovations into successful businesses. It was a bit of a culture shock for me, particularly when it came to entrepreneurship. I'd returned to a different India than the one I left behind. In my batch of '75, I don't recall a single person that talked about becoming an entrepreneur. Of course, there were plenty of rebels in the batch. There were two who wanted to be Naxalites, one who became a leader of a major labor movement, and one who became a politician. But, mostly the batch was full of traditionalists who joined family firms, went to business schools or simply went abroad. The attitudes and actions of recent batches seem vastly different.

I am not nostalgic about those old days. But, I do find myself a bit suffocated by all this talk about innovation and entrepreneurship in India. Will all that smoke be a precursor to a giant fire, or, is it simply due to some wet, smoldering leaves? Are we going to create next-generation Indian equivalents of Mark Zuckerberg, Larry Page, and Sergey Brin? (If you do not know who these folks are, I would advise you to turn to a different article.) My answer to this last question is a nuanced yes.

It is important to separate innovation and entrepreneurship as two distinct words that denote two separate spheres of activity that are only partially linked. Some, but not all, innovations can be commercialized, and some, but not all, entrepreneurs focus on building innovation-based businesses. In this article I will focus on innovations that lead to commercialization and on entrepreneurs that build innovative businesses.

The word innovation has been so overburdened all over the world, and especially in India, by MBA types that it now requires a bit of clarification. Simply put, innovation is about changing the status quo. In my opinion, the more radical the change, the more interesting the innovation becomes. Innovations don't have to be technological; business models can also be innovative. For instance, Bill Gates innovated by starting the trend of shipping half-ready software and then forcing everyone to buy a new operating system every few years! People fell for this trick and made him ultra rich. We didn't mind the fact that this new OS did mostly the same thing as before but would now need a faster computer to do it. What an innovation! Several others, such as Amazon,

eBay, PayPal, and Walmart, have similarly built very big businesses by changing the existing business models in their sector.

Technological innovations generally make things faster, cheaper, or more efficient. Innovation is needed to put 1024 microprocessors on a single chip that would've once contained only one; it is needed to build super data centers that house not one or two but hundreds of thousands of servers, which all work in tandem to handle queries and transactions by Google or Amazon; it is needed to build autonomous vehicles that can cross a desert or prowl on the crowded roads of Palo Alto, California. Or, the innovation could be about building chips that fit inside a handheld device and perform medical diagnostics tests within seconds, at a fraction of the costs incurred in a clinic.

The first type of innovation—business model innovation—can emerge anywhere in the world. All it needs is the willingness to do something radically different. Many new business models have historically emerged from the USA, and they were often enabled by technology innovations that also emerged from the USA. But, there is no reason why this type of innovation-based business can't emerge from elsewhere. Skype is an example. Developers based in Estonia, Denmark, and Sweden were the ones that developed Skype. Skype uses peer-to-peer technology to offer free voice communications to people. The peer-to-peer data exchange technology was invented in the USA. But Skype was the first one to use it effectively to disrupt the traditional telephone network model of voice communication.

So far, breakthrough applications like Skype have not emerged from India, but there is no reason why entrepreneurs from India can't do something spectacular with business model innovations. Maybe the real block here is in the attitudes of individuals and in society's social set-up. Perhaps I'll have to write another article about that in the future.

The second type of innovation—technology innovation—is harder to visualize happening in India. Our engineering education is the main culprit for this state of affairs. Even at the finest institutions, like IIT, we have focused on teaching by rote and on evaluating students' performance with written examinations. There is not enough flexibility in the system to reward those who excel at building things over those who excel at taking written exams. Such an environment is not conducive

I am not nostalgic about those old days. But, I do find myself a bit suffocated by all this talk about innovation and entrepreneurship in India. Will all that smoke be a precursor to a giant fire, or, is it simply due to some wet, smoldering leaves?

to developing curiosity and experimentation among IITians.

A recent initiative taken by alumni from the batch of '75, supported by the current IIT-B administration, called the Tinkerers' Lab, is a tiny move in the right direction. Tinkerers' Lab is a place where students can meet in groups, outside of the regular curriculum. The workspace at Tinkerers' Lab is being equipped with tools and materials to allow students to break down and rebuild gadgets to learn how they work, or to build novel gadgets. To a large extent, our engineering education at IIT-B is being treated as a queue where once you enter you wait your turn to get out and start making big bucks by getting jobs with global consultancy firms, or joining MBA schools. Tinkerer's lab will hopefully encourage those who want to be different. Maybe these students prefer to become great

entrepreneurs rather than small, desk-bound cogs in big global firms.

Another big disappointment in this regard is the lack of interest displayed by industrial families like Birla, Ambani, and Tata in creating innovations-based industries. They have the resources to promote innovation in a big way. But, these family-based conglomerates seem to prefer to buy technology via joint ventures with foreign firms. Their focus remains on short-term profit. They maximize profits

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by understanding how to operate within the peculiar and often nonsensical constraints for Indian businesses that our bureaucracy creates. If one contrasts that attitude with Korean industry giants like Samsung and Hyundai, one is bound to feel depressed. In Silicon Valley, successful entrepreneurs from one generation routinely participate in the ventures of the next generation. They fund innovations by contributing capital to venture capital funds or by directly investing in start-ups. The companies they control also fund research both inside the company and in collaboration with universities. Many of these companies have created venture funds to nurture new innovative businesses (e.g. Google Ventures, Dell Ventures, and Intel Ventures). I don't understand why the founders of our modern industrial empires are so different. Alas! I don't think this attitude will change for a long time to come.

The Indian Angel Network, which I participate in, provides seed funds to start-ups. Last year, the network received about 4000 business proposals. That number is going to be handily surpassed this year. But, out of the proposals we received last year, I would say that only about 30-50 business plans are based on technology innovations. And, none as yet, have shown a wide-sweeping vision for changing the world. Based on that evidence, I have to surmise that we have a long road ahead before entrepreneurs like Bill Gates and Mark Zuckerberg emerge from India.

If this all sounds negative, rest assured that I am indeed fairly positive about India's potential for innovative entrepreneurship. But to fulfill that potential we need to change some of our attitudes and habits. The changes I propose are simple and practical and can be made without simultaneously demanding changes in government or bureaucracy.

First and foremost, we all, individually and collectively, need to develop a deep love—I think almost a reverence—for technology. Getting into IIT requires putting off everything inessential and suspending one's life until the JEE. But that kind of rigid focus on doing well in written examinations isn't something that makes for a good entrepreneur. Chasing grade point averages are good activities for some to pursue. I would say pursue them if you can, by all means, but while doing that don't forget to build some novel gadgets, write an awesome program, and participate in activities whereby you learn engineering by doing things and not just by reading about it. Become an active member of Tinkerers' Lab! I assure you that

the distinction one can thus achieve will land a better paying job offer after graduation from companies like Facebook or Google than a topper will secure. What's more, those jobs will be more fun than the certain drudgery awaiting you at global management consultancy or accounting firms. If you harbor any doubts about this advice, I would recommend you read biographies of Bill Gates and Mark Zuckerberg.

Second, I would advise you to clear the cobwebs from your mind. These cobwebs are terms, which were often generated by MBA-types and NGO-types, like "social impact innovation" and "bottom-of-the-pyramid business." If you want to be a great entrepreneur, stay focused on technology, and, in particular, on how one can use technology to radically alter the way people live. If you are successful in doing that, then you will have a social impact. The term "bottom-of-the-pyramid" is indeed catchy and worthy as a subject of several business school case studies. But, I see this exercise of isolating the poor as a different class of customers as being equivalent to calling untouchables by a better sounding name like harijan. Instead, your aim should be to build something useful and affordable for a large section of population, poor or not, and to use technology to make this business profitable and scalable.

Third, I would advise one to get out of India. I do not mean get out literally but figuratively. Given the technology deficit one currently observes in our research and academic institutes, the best bet for an entrepreneur is to turn to the world in order to stay abreast of development in a chosen field. Given the large Indian diaspora, an emerging entrepreneur should find it easy to arrange to spend 3-4 months in the USA observing, talking and absorbing emerging technologies. Build your founding team globally right from the beginning. Moreover, although India may become your initial market-entry point, try to build businesses that have universal appeal.

Fourth, keep the long-term focus. I have been amazed at times by stories about founders that start paying themselves exorbitant salaries or who buy a new car worth 20 lakhs for personal use out of funds collected before the company has become profitable. That is like eating your own child to satisfy an immediate hunger. Using company money for short-term gain implies that you have no faith in the business you founded. To shortchange the company of money in order to meet the personal needs of founders is to deprive the business of oxygen at a crucial stage of development, and that ultimately reduces the value of shares for everybody, including the founders.

Fifth, stop wasting time with trivialities. This is not the time to worry about the title you should carry or the corner office space you should have. It is time to aim for the moon, taking care of big priorities first and believing in yourself. That attitude is at the core being of a great innovator and entrepreneur. ❖

Hemant Kanakia
B TECH. ELECTRICAL ENGINEERING, 1975

Hemant Kanakia led an elite research team at AT&T and is a start up Guru. He set up Torrent Networking Technologies and later sold it to Ericsson. He went to start two more companies, Photuris, Inc. Gemplex Internet Inc. and sits on boards of PriceHawk, Photuris, Inc., Pipal, Inc., ViaGate technologies. He is a private investor in start-ups focusing on Internet Infrastructure companies.

AAP, BAAP & PAAP

GRUMBLEBEE

Grumblebee grumbles because that's his job. But of late, he's been grumbling more than ever. Reason: Grumblebee covers the bungling that takes place at the estate of MGPL-Madam G's Pvt. Ltd. But of late, the bungling level has reached such a feverish pitch, that Grumblebee has taken up a permanent station at Madam G's bungalow called 10, Warpath. Here, the "cabaret" comprising of blue-turbaned, head nodding, remote controlled COE (Chief of Estate), CFO P Chillum Humdrum, telephone operator Uphill Cymbal, chief gardener Shudder Jowar, TV repairman Menace Tawry, PRO Salmon Cursed-it, fixer Dig-my-grave Singh and other dramatis personae meet with unfailing regularity and outdo each other at bungling big time, so much so, that Jethtro Tull was flown in once to sing the MGPL anthem, "Let's bungle in the jungle".

Readers of past issues of Fundamatics may recollect the MGPL gaffes viz. JEE Huzoor, Coalgate, Echo Vadra-danti and the infamous "tearing up of nonsense". Madam G, in a bid to get featured in FUNDAMATICS had directed her cabaret to bungle in the ecology/environment space since she had correctly surmised that Team Fundamatics features pieces that touch upon ecology and environment. But now, Grumblebee discovered to his grumble, that MGPL is a unit out of control and bungles in all directions – environmental and otherwise. Read on to see what he has uncovered at the latest summit in 10, Warpath in a piece titled AAP, BAAP & PAAP.

Fundabees

How often have we said this? The mood at 10, Warpath was somber and grim. Madam G's countenance was icy as ever, but her eyes breathed brimstone and fire.

"Men!" she thundered. "After this, I will never address you as gentlemen."

"You know that I want you all to bungle big time and I reward you all every time you bungle," she continued. "But for God's sake, when did I ask you to bungle so big that our existence is threatened and that Marauder Moody takes over our estate? He has already taken over 4 of our regions, thanks to your bungling gone overboard."

"Ashok Payload!" she addressed the vanquished one from Rajasthan. "Thanks to you, Rajasthan is now a Ranisthan. Why did you crash so badly?"

"Madamji!" Payload replied. "I am payload, not a pilot. There was a pilot amongst us who could have helped me soar. But he maneuvered our aircraft into a tailspin that made me crash-land. His non cooperation is the last straw that broke the back of all camels in my desert land which finally deserted me."

"Excuses! Exsuses!" Madam G hissed under her breath. "Ajit Rogi! What have you to say for yourself?"

"Madam! You know I am a rogi on a wheelchair. True, I told people of Battisgarh that I would break the battisi of that Ravan Singh. But your son Rollback Aandhi visited here and people broke my battisi."

"Horrendous people! Have you all forgotten to take flak when it comes, but pass on credit to me when and if it comes? Not that any comes nowadays. OK! Let's see what Mad-row Rescinder has to explain about his sorry performance." Madam G continued with some F&B (not food & beverages: fire & brimstone)

"Ma'am!" Mad-row Rescinder was a cool dude who could say ma'am and not Madam. "Ma'am! I was about to vanquish Save-raj

Chouhan. Nobody would have saved him. But our very own Dig-my-grave Singh undid my efforts. He pressed CTRL-ALT-DEL while Saveraj clicked on save."

"Madam, Madam, Madam!" Dig-my-grave interjected. "10 years ago, I was the Raja here and they made me take sanyas. And they made this sanyaasin Amma Bore-thi, the Raja. So what is wrong if this Raja Rescinder also takes sanyaas? Raja bana sanyasi and sanyasin bani Raja."

"Enough all of you. Excuses! Excuses! Don't you know that excuses are the privilege only I and Rollback can avail of? Whatever happened to good old fashioned sycophancy you all were notorious for? Anyway, let me now turn to Sheila-in-Deepshit. Her trespass is unpardonable. So close to my own backyard." Madam G continued.

"Sheila! Delhi" Madam G said while turning towards Sheila.

"Pardon me Ma'am" Sheila quizzed.

"I said. Delhi".

"I didn't get it" Sheila replied in confusion.

"Precisely! That's what I meant. You didn't get Delhi. Why? What is the reason?" Madam G thundered in a rare display of sarcasm.

"Reason is AAP" Sheila replied in defiance.

"Are you blaming me?" Madam G thundered and her F&B level rose by a few notches.

"No, no... don't get me wrong. I am talking about the mango people who call themselves AAP. AAP got 28 seats, BAAP got 32, and we at PAAP got just 8."

"Where has our PAAP gone wrong? Can't we indulge in simple cardinal sins properly anymore?" Madam G wondered.

"Ma'am!" the lawyer's assistant Abhi-shook Sting-me chimed in. "Did you mean cardinal sins? I thought you meant carnal sins and that's why I indulged in some. In fact, if these undersized BAAP guys can expand from 32 to 36, I would... "

"Shut up Sting-me! Enough of your carnal misdeeds which did me in. By the way, who are these mango people and who let them into our estate?" Madam G wondered.

"Madam!" Dig-my-grave answered. "Ever since you told us that Fundamatics guys love the environment, I let the swamps and marsh grow unabated in our estate. But when the marsh started sprouting too many lotuses, I called some jhadoo-walas to come and clean up the lotuses. How would I know that these rascals would invade our estate in droves and clean us up while leaving the lotuses untouched?"

"And you know what ma'am?" Jonti Natak-rajan piped in. "Delhi has become totally unsafe for women like us. See what they did to Sheila and her jawani! God knows what they'll do to you and me after this. Not only that, this AAP outfit is headed by a guy called All-wind Jhaduwal. His cronies are plucking mangoes from our orchards and waving jhadoos and singing tera jhadoo chal gaya... I think they are breakaways from the pop band called ANNA."

"Not only that," Uphill Cymbal spoke up finally. "These AAP and BAAP guys are a funny lot. Till now, we would all fight to form the government. But these guys are now fighting to NOT form the government. How strange!"

Madam G's face turned quizzical at this revelation and then broke into a smile, followed by a raucous laughter. The entire cabaret looked at her in anticipation and begged to know the cause of her elation.

"This is good news gentlemen." She now acknowledged that they were gentlemen even as Abhi-shook Sting-me listened with suspicion. "The solution is simple. Next elections, we shall let Marauder Moody and All-wind Jhaduwal fight over NOT forming the government. Let them both win. That way, we may be able to keep our estate and bungle some more."

"But what if people ask us to support AAP, since Rollback has also praised them?" P Chillum Humdrum wanted to know.

"Answer is simple!" madam G replied. We will tell people, "Hum AAP ke hain kaun? And BAAP is kunwara. PAAP zindabad." ❖

Enterprising the Chaat

BUNKUMBEE

I am Bankim Biswas and what I write is a lot of bunkum and wish-wash. Entrepreneurship and Innovation! All bunkum and wishwash, invented by a set who love jargon more than they like jaggery. Let me explain. There's some background to this. Do you know Takat Singh Aslinglji Purohit? He was a cook in the H4 mess. He spent less time cooking food and more time cooking up plots and schemes to fight with G-Secs and Mess Secs in his capacity as the Gen Sec of the IIT Bombay Mazdoor Union. This was in the 70s and early 80s. In 2009, when a group of H4 alumni descended on H4 to pay back the mess workers with some gratitude and some cheques, Takat Singh was still trying to cook. He was a recipient of the alumni largesse and in an emotional moment, he invited all the assembled H4 alumni for a chaat party at his chaat stall just outside H5. Both his grown-up sons churned out bhel puri, paani puri, sev puri, papdi chaat and fruit juices at a quick speed. Takat Singh himself served alumni junta, helped by fellow mess workers who had been serving and waiting on tables for over 25 years now. Not only that, Takat Singh refused to accept payment for the delicious chaat which was modestly priced at Rs. 10 per plate as declared in the painted price list hanging on a pole of his stall.

While savouring bhel and chaat, alumni CXOs discussed the change in Takat Singh's demeanour. The change from a higher-pay-demanding-union-leader to a benevolent-chaat-stall-owner. "He's an entrepreneur now!" CXOs announced. "And he's not charging us because he's investing in relationship management." Fortunately, Takat Singh did not know English, leave alone jargon-ese, otherwise he would have protested. He was, what he would have been called in the 80s, a chaatwala. Masquerading him as an entrepreneur did not change the quality of his chaat, neither did it change his objective of trying to make ends meet. Back then, they all did it. Ghosalkar worked in the IIT press but rushed to assist his son at his bookbinding shop at Y-Point. Muley signed off from work early and cycled to hostels to type BTPs (B Tech projects) at Rs. 100 apiece. Godbole, whether in the estate office or in his later day posting at security office, spent evenings and weekends assisting his wife in her tailoring venture. All struggling middle class folks who were trying to make ends meet. Happy to be called bookbinder, typist and tailor respectively. Would have been aghast as being re-incarnated as entrepreneurs. Technically and dictionary-ly, they were and are entrepreneurs.

There was a venture capitalist amongst us. VC was devouring the chaat and looking at Takat Singh intently. A look that said that he wanted to advance a proposal to Takat Singh. Fortunately, there were some amongst us who were still engineers and spoke English. We had the presence of mind to whisk VC away from TS. Had we not done that, this is the likely conversation that would have taken place.

VC: Takat Singh! Brilliant chaat. Congrats on your new enterprise. You now need to expand your business and make it go global. Here's my visiting card. Call me and we'll discuss funding options for your venture.

TS: Sir, I don't know what you mean. I have only 2 sons and they're doing their best and helping my family make ends meet. How can I expand? Do I need funding? What are its

implications? Will you charge 4% per month and make me pawn my wife's jewellery? There is none left by the way.

VC: Come on TS. You are an entrepreneur now and must think like one. Think big. Hire a marketing consultant and we'll roll in big business. Don't worry! I'll recommend the consultants to you and advance the payments to get you going. But first, send me a PowerPoint presentation that describes your vision statement for your venture and please list out your short term and long term objectives.

TS: My short term objective is to stop talking to you and make sev puri for this gentleman who's been waiting for some time now. My long term objective is to go buy balloons and lollipops for my grandkids and pick up my wife from her workplace and bring her home this evening. What is a PowerPoint presentation? What is a marketing consultant? What good will they do to me and you? Did you find my bhel that bad that you are suggesting all this?

VC: Oh never mind! I'll find you a technical consultant who will make your PowerPoint presentation. I'll hire a strategy consultant who will list out your objectives. And the marketing consultant will…….

TS: But what is all this? What will all these people do? What will they say? How do I pay them? If you're advancing them, what's in it for you? Can you please pause for 2 minutes so that I can make one bhel for this other man who's come here, without any consultants telling him to come here?

VC: Ok TS! Here's the broad plan. Back of the envelope calculations from my side. Don't ask me what back of the envelope is, since I'm not too sure. Let's say that we call your venture TSC. Short for Takat Singh Chaat. Right now, you're operating at TSC@H5. You can look at expanding to TSC@H1, TSC@H2 and so on. Open up 15 TSCs.

TS: But how Sir? I have 2 sons, not 30. I can barely run this place. How do I run 14 more?

VC: Aha! That's where we come in. Your strategy consultant will tell you that you can outsource the assignment to others. To franchisees who will run individual TSCs and pay you the franchise fee.

TS: Aree baap re! When I served you in H4 25 years ago, you used to read up books on induction motors and differential equations and properties of argon, while eating my stale chapatti. Where did you learn to talk about

After adjusting my equity to incorporate all advances and funding, after paying strategy consultant, marketing consultant, FB consultant, relationship manager, franchise manager, outsourced personnel, pricing consultant, printing, stationary, overheads, travel expenses, merger-and-acquisition consultant, you will certainly do better than what you're doing today.

franchise and outsourcing and whatever? Tell me, do you seriously understand your own words? I can ask Shantaram Gawde to open up one chaat stall at H3. But he will call it SGC@H3. Why will he call it TSC@H3? And why will he pay me?

VC: TS. Samjha karo. I did not learn anything about properties of argon. So they taught me some jargon. Shantaram will pay you the franchise fee when our consultants explain the concept of brand merchandising to him.

TS: I still don't understand. Anyway, what

will the marketing consultant do? I still think that you do not like my bhel and that's why you're doing this to me.

VC: OK, let me explain. Marketing guy will tell you to revise your pricing upwards. You have to pay the consultant fees anyway. Introduce new items in your menu. Yes! Yes! I know you are short of hands and cannot introduce any new items. Don't worry! Make the same chaat. Just call it paapdi chaat at Rs 50, Delhi chaat at Rs. 60, Agra chaat at Rs. 70 and TSC special chaat at Rs. 80. Don't ask me why anyone will pay differentially for a chaat which is the same. And add mixture of potatoes, onions, peas and tomatoes. People are brand conscious nowadays. They will pay an extra Rs. 10 for a Delhi handle, 20 for Agra and what not. Pay for getting FB likes. Ashok Gehlot has supporters in Istanbul thanks to FB. Get liked in New Zealand and see what it does to your profile. Young consumers will declare, "I am chaating at TSC@H6". Hundreds will like this statement and someone will soon send out an invite. Soon, there will be a contest to see which TSC will get max attendance. You can also double the price one day and announce "happy hours" where you can buy one and get one free. Organize theme weeks. During Navaratri, announce a Gujju week and add sugar and jaggery to your chaat and serve to the garba and dandiya gang in all hostels. During a Bong week, add fish pieces to a bhel. During a Goan week, add feni into the paani puri and so on. Expand. Ideate. Innovate. Outsource. Focus. Strategize. Learn. Discuss. Focus on key deliverables. Climb the learning curve. Generate collaterals that extol the virtues of chaating. Create a website and induce maximum hits. And when the days get heady, sell your venture to the highest bidder. Hire a merger-and-acquisition expert to sell to TCS….

TS: Sir, most of the TCS employees have all eaten my chaat. Why should I sell when I'll do as well as you say I will? And why will TCS buy my modest stall?

VC: TS, you don't understand. Nowadays, people don't sell when they're in trouble. They sell when they're doing well. You cannot understand why you shut down Windows by clicking on the Start button. Same reason, you'll not understand why people sell when they do well. TCS will buy you out because they don't want infringement on their brand. TSC sounds similar to TCS. From your chaating clientele, they'll find potential employees, vendors, outsourced agents and consultants. They'll buy all TSC franchisees and pay a fat sum.

TS: Ok ok! So after all this, how much will I make?

VC: (pulling out his iPad) Hmmmm… after adjusting my equity to incorporate all advances and funding, after paying strategy consultant, marketing consultant, FB consultant, relationship manager, franchise manager, outsourced personnel, pricing consultant, printing, stationary, overheads, travel expenses, merger-and-acquisition consultant, you will certainly do better than what you're doing today. By the way, how much do you earn now?

TS: I can buy 2 balloons and 2 lollipops every week for my grandkids and on holidays, I also earn enough to buy cinema tickets for me and my wife.

VC: See, I told you. You can do better with my plan. You can now buy 4 balloons, 4 lollipops, 4 chocolates and you can watch 2 movies every month as an added bonus. And feel happy that you have provided income to so many consultants, who'll earn enough money to buy your chaat 10 times over. So shall we shake and sign the deal?

TS: Sir! Can we hire a history consultant who will tell us how to slip back into the eighties? ❖

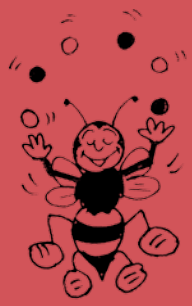
Bringing History Home

In 1959, Dr. Martin Luther King, Jr., the Nobel Peace Prize winner of U.S.A., came to India as a pilgrim. After a month's travel in the land of Gandhi, on the eve of his departure, he was asked a cynical question at a press conference in Delhi. He was asked: Where is Gandhi today? We see him nowhere. The answer he gave is as relevant today as it was then, as it brings home to us why Gandhi continues to be relevant today and in the centuries to come. Dr. King's reply was that Gandhi was inevitable. If humanity is to progress, Gandhi is inescapable. He lived, thought and acted, inspired by the vision of a humanity evolving towards a world of peace and harmony. We may ignore him only at our own risk.

But ignore him we do, just as we ignore our history and the many thousands of nameless, faceless people whose courage and sacrifice gained us our precious independence. A lot of us who grew up on the staple diet of NCERT history books at least know of the famous Salt Satyagraha by Gandhi and his famous Dandi March. But dig a little deeper and you would draw a blank. We know next to nothing about the 80 marchers who walked along with Gandhi and even less about the Salt Tax and why picking up a fistful of salt from the sea was so revolutionary.

Thanks to the 'National Salt Satyagraha Memorial at Dandi' , a project of the Ministry of Culture, which selected IIT Bombay for the design, co-ordination, and implementation of this project, some of that history is being brought alive to us at IIT Bombay. We share some of the highlights of that project through a visual essay on the two Dandi Marchers' workshops which just concluded in IIT Bombay campus and Ali Baba's column: 'A Fistful of Salt'. We hope that reading through it all will bring alive the mystique of the Mahatma a little bit closer to you.

Ezbee



National Salt Satyagraha Memorial at Dandi & Dandi Marchers' Sculptures Workshop at IIT Bombay

PROF. KIRTI TRIVEDI

Dandi Salt Satyagraha Memorial Project

For the first time in the history of contemporary art in India, a number of artists, supporters and volunteers from around the world are coming together to set up a monument of international importance. They will create a part of the memorial to be dedicated to the Salt Satyagrahis who marched with Mahatma Gandhi to defy British imperialism. The monument celebrates the historic March of 1930 that triggered a wider Civil Disobedience Movement, leading to India's freedom in 1947, which in turn inspired leaders such as Martin Luther King Jr in the US and Nelson Mandela in South Africa

This prestigious task of setting up the National Salt Satyagraha Memorial at Dandi (a project of the Ministry of Culture, Govt. of India) has been assigned to Indian Institute of Technology, Bombay (IIT Bombay), which is working in association with an international design team. The IIT Bombay team based in IDC has been co-ordinating the research, visualisation, and creation of the art components for the project, which includes a bronze statue of Mahatma Gandhi, 24 narrative stoneware murals for the pathway leading to the main statue, and a cluster of 80 life-size Dandi Marchers' sculptures.

The main memorial will include a statue of Gandhiji inside a pyramid of light, followed by life-size sculptures of the group of the 80 fellow marchers. Two stylised hands raised up in the sky, holding at the top a handful of simulated salt crystals, will form the canopy under which the main Gandhiji sculpture will be placed. With light levels going down towards evening, a pyramid of light will rise up in the sky illuminating a crystal sculpture at the apex, with a bank of LED search lights floor mounted around the rim of the base pedestal.

A pathway towards the main memorial will replicate the Dandi March route through 24 spaces representing the 24 halts. Each space will have a panel (mural) carrying a visual depiction of the main events which occurred during the day's journey to the halt through bas-relief sculptural narratives. The pathway is proposed to be created around the left bank of a small lake to be constructed in the space earmarked for the memorial complex. The individual spaces are designed to enable groups to gather around each narrative panel, where a guide could take them through the episodes.

IIT Bombay recently organised two workshops, in the months of November and December, where the life-size sculptures of all 80 marchers were created within the IIT Bombay campus. The sculptures were prepared by sculptors and students from across the globe under the guidance of the IIT Bombay team and a team of renowned sculptors invited as

Prof. Kirti Trivedi interacting with students and visitors

resource persons. The participants worked within an overall visual framework, and made use of the 2' high reference images created by sculptor Siddharth Sathe based on the guidelines given by the IIT Bombay team after doing thorough research over almost two years on the actual marchers who had participated in the Dandi March..

The Dandi Marchers' Sculptures Workshop I, held from November 7-24, 2013, brought together experienced sculptors from different parts of India. These 20 sculptors, working with resource persons under the guidance of renowned Indian sculptor Shri Sadashiv Sathe, produced life-size clay statues of 40 young Salt Satyagrahis who went on the 240-mile March from Sabarmati to Dandi in South Gujarat.

The second workshop, held from December 7-22, 2013, had participating sculptors from UK, USA, Tibet, Bulgaria, Japan, Austria, Burma, and Sri Lanka, along with 13 Indian sculptors to work on the statues of the remaining 40 Salt Satyagrahis.

During this ambitious project that has been researched, coordinated, and implemented by IIT Bombay, each sculptor was able to complete clay statues of two marchers. Further processing involves taking plaster casts of the 80 clay-models produced in the workshop and making fiberglass masters, which will be used to make the final sculptures in stoneware. The stoneware sculptures created from the clay statues made at the workshop will be installed on the pathway at the Dandi Salt Satyagraha Memorial at Dandi, Gujarat. A series of evening talks on Gandhian philosophy and methodology were also arranged throughout the two workshops. The collection of life-size clay statues, a rare and stunning sight, continues to attract visitors to the Powai campus of IIT Bombay.

Prof. Kirti Trivedi

Kirti Trivedi is a Professor at the Industrial Design Centre (IDC), IIT Bombay. After a first degree in Mechanical Engineering, he did post-graduate studies in Industrial Design from IIT Bombay and the Royal College of Art, London. In 1981, he worked as a UNESCO Fellow in Japan, under the guidance of Prof. Kohei Sugiura and was introduced by him to the intellectual depth and the richness of Asian Design. He helped set up the Centre for Asian Art & Design at the School of Art, Design and Media at NTU in Singapore, when working as a visiting professor there in 2011.

Besides teaching and design research, he has been active as a design consultant in the areas of product design, design management and product planning, graphic design, book design, exhibition and museum design, environmental graphics and signage design; with numerous publications and awards both nationally and internationally. He designed the permanent exhibition My Life is My Message at Sabarmati Ashram, Ahmedabad as well as Vinoba Darshan at Gopuri, Wardha. His current research is in Asian Design, Universal, Language-independent Learning, Self-evident Design, and in developing appropriate interaction design solutions for Indian needs based on emerging technology possibilities.

In 2000, he was one of the six international educationists who drafted the Manifesto for the Future of Design Education for ICOGRADA, and presented at Oullim 2000, in Seoul, South Korea.

Prashant Sharma

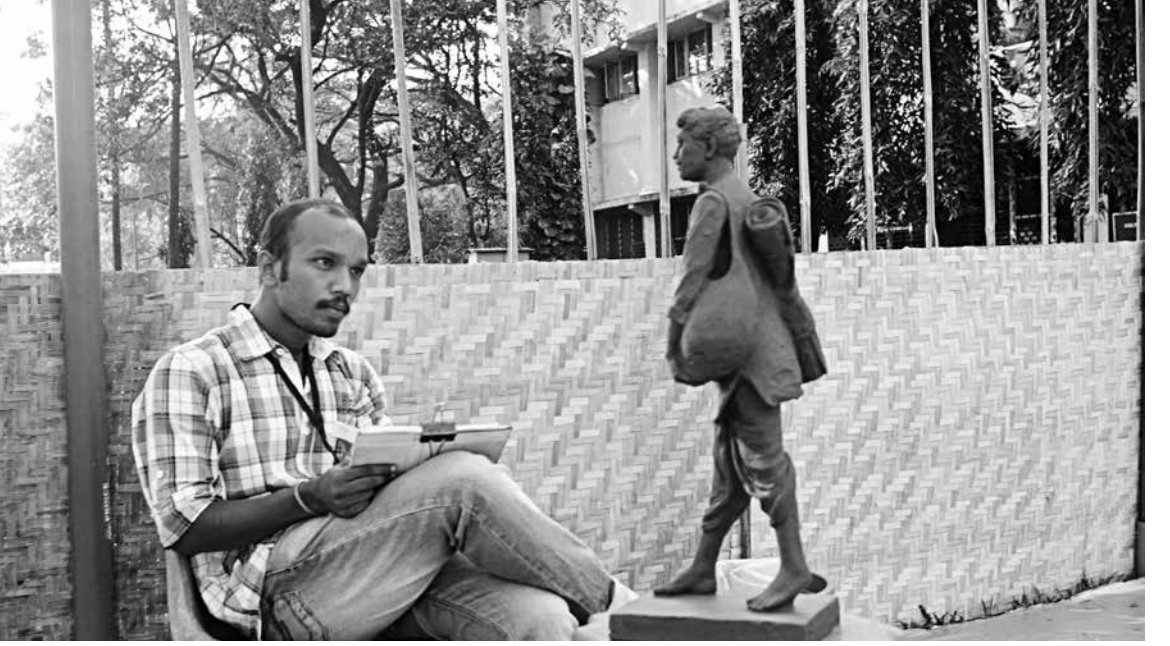
The images from the Workshop have been shot by Prashant Sharma, a photographer, an artist, and a communication designer. He holds a Masters Degree in Visual Communication from Indian Institute of Technology, (Bombay) and Bachelors Degree in Applied Art from College Of Arts, New Delhi. With a fresh feel to add to the world of photography and zeal to succeed, his photographs have found space in candid and contextual image making. Prashant has worked on MHRD projects for some period, when he travelled across India to explore Cultural Identities. Passionate about nurturing new talent, he believes in sharing knowledge and divides his time teaching students at various design colleges as a guest lecturer.

List of 80 Marchers who participated in the Dandi March, 1930

1. **Mohandas Karamchand Gandhi.** *Age 61. Gujarat.*
2. **Pyarelal Nayyar.** *Age 30. Punjab.*
3. **Chhaganlal Naththubhai Joshi.** *Age 35. Gujarat.*
4. **Pandit Narayan Moreshwar Khare.** *Age 42. Maharashtra.*
5. **Ganpatrav Godshe.** *Age 25. Maharashtra.*
6. **Prathviraj Lakshmidas Ashar.** *Age 19. Cutch.*
7. **Mahavir Giri.** *Age 20. Nepal.*
8. **Bal Dattatreya Kalelkar.** *Age 18. Maharashtra.*
9. **Jayanti Naththubhai Parekh.** *Age 19. Gujarat.*
10. **Rasik Desai.** *Age 19. Gujarat.*
11. **Vitthal Liladhar Thakkar.** *Age 16. Gujarat.*
12. **Harakhji Ramjibhai.** *Age 18. Gujarat.*
13. **Tansukh Pranshankar Bhatt.** *Age 20. Gujarat.*
14. **Kantilal Harilal Gandhi.** *Age 20. Gujarat.*
15. **Chhotubhai Khushalbhai Patel.** *Age 22. Gujarat.*
16. **Valjibhai Govindji Desai.** *Age 35. Gujarat.*
17. **Pannalal Balabhai Jhaveri.** *Age 20. Gujarat.*
18. **Abbas Varteji .** *Age 20. Gujarat.*
19. **Punjabhai Shah.** *Age 25. Gujarat.*
20. **Madhavjibhai Thakkar.** *Age 40. Cutch.*
21. **Naranjibhai.** *Age 22. Cutch.*
22. **Maganbhai Vora.** *Age 25. Cutch.*
23. **Dungarsibhai.** *Age 27. Cutch.*
24. **Somalal Pragjibhai Patel.** *Age 25. Gujarat.*
25. **Hasmukhram Jakabar.** *Age 25. Gujarat.*
26. **Daudbhai.** *Age 25. Gujarat.*
27. **Ramjibhai Vankar.** *Age 45. Gujarat.*
28. **Dinkarrai Pandya.** *Age 30. Gujarat.*
29. **Dwarkanath.** *Age 30. Maharashtra.*
30. **Gajanan Khare.** *Age 25. Maharashtra.*
31. **Jethalal Ruparel.** *Age 25. Cutch.*
32. **Govind Harkare.** *Age 25. Maharashtra.*
33. **Pandurang.** *Age 22. Maharashtra.*
34. **Vinayakrao Apte.** *Age 33. Maharashtra.*
35. **Ramdhirrai.** *Age 30. United Provinces.*
36. **Bhanushankar Dave.** *Age 22. Gujarat.*
37. **Munshilal.** *Age 25. United Provinces.*
38. **Raghavan.** *Age 25. Kerala.*
39. **Ravjibhai Nathalal Patel, Age 30.** *Gujarat.*
40. **Shivabhai Gokalbhai Patel.** *Age 27. Gujarat.*
41. **Shankarbhai Bhikabhai Patel.** *Age 20. Gujarat.*
42. **Jashbhai Ishwarbhai Patel.** *Age 20. Gujarat.*
43. **Sumangal Prakash.** *Age 25. United Provinces.*
44. **Titus.** *Age 25. Kerala.*
45. **Krishna Nair.** *Age 25. Kerala.*
46. **Tapan Nair.** *Age 25. Tamilnadu.*
47. **Haridas Varjivandas Gandhi.** *Age 25. Gujarat.*
48. **Chimanlal Narsilal Shah.** *Age 25. Gujarat.*
49. **Shankaran.** *Age 25. Kerala.*
50. **Subhramanyam.** *Age 25. Andhra.*
51. **Ramaniklal Maganlal Modi.** *Age 38. Gujarat.*
52. **Madanmohan Chaturvedi.** *Age 27. Rajputana.*
53. **Harilal Mahimtura.** *Age 27. Maharashtra.*
54. **Motibasdas.** *Age 20. Orissa.*
55. **Haridas Muzumdar.** *Age 25. Gujarat.*
56. **Anand Hingorani.** *Age 24. Sindh.*
57. **Mahadev Martand.** *Age 18. Karnataka.*
58. **Jayantiprasad.** *Age 30. United Provinces.*
59. **Hariprasad.** *Age 20. United Provinces.*
60. **Girivardhari Chaudhari.** *Age 20. Bihar.*
61. **Keshav Chitre.** *Age 25. Maharashtra.*

62. **Ambalal Shankarbhai Patel.** *Age 30. Gujarat.*
63. **Vishnu Pant.** *Age 25. Maharashtra.*
64. **Premraj.** *Age 35. Punjab.*
65. **Durgesh Chandra Das.** *Age 44. Bengal.*
66. **Madhavlal Shah.** *Age 27. Gujarat.*
67. **Jyotiram.** *Age 30. United Provinces.*
68. **Surajbhan.** *Age 34. Punjab.*
69. **Bhairav Dutt.** *Age 25. United Provinces.*
70. **Lalji Parmar.** *Age 25. Gujarat.*
71. **Ratnaji Boria.** *Age 18. Gujarat.*
72. **Vishnu Sharma.** *Age 30. Maharashtra.*

73. **Chintamani Shastri.** *Age 40. Maharashtra.*
74. **Narayan Dutt.** *Age 24. Rajputana.*
75. **Manilal Mohandas Gandhi.** *Age 38. Gujarat.*
76. **Surendra.** *Age 30. United Provinces.*
77. **Haribhai Mohani.** *Age 32. Maharashtra.*
78. **Puratan Buch.** *Age 25. Gujarat.*
79. **Kharag Bahadur Singh Giri.** *Age 25. Nepal.*
80. **Satish (Shankar) Kalelkar.** *Age 20. Maharashtra.* ❖



Padmabhushan, Justice C S Dharmadhikaray, eminent Gandhian and Chairman of the Institute for Gandhian Studies, Wardha: You (IIT Bombay) will be presenting Gandhiji to the world through this memorial. It would be a reflection of his thoughts and philosophy.

Dr Sudarshan Iyengar, Vice-Chancellor, Gujarat Vidyapeeth: This memorial should be able to make people experience the day, time and moment of the actual march and make them feel a part of it. It should evoke some spiritual feelings inside, just as it did to Mahatma Gandhi and those who participated in the march.

Prof. Devang Khakhar, Director, IIT Bombay: Although IIT Bombay has been traditionally known for its expertise in science and technology, today at IDC we have very good artists and designers with us. Participating in this project of international importance has been one-of-a-kind experience for us and we are very proud of our association with the upcoming memorial. The contribution of the young sculptors in this national memorial is going to last forever.

Mr. Tushar Gandhi whose grandfather Sh. Manilal Gandhi also participated in the Dandi March: The Dandi March symbolised unity and this memorial and the associated Dandi Marchers' Sculptures workshops, where young participants are coming together from not just different parts of the Country but also globe, is again a reflection of unity in diversity. This memorial is not about Gandhiji but the 80 marchers who took part in the Salt Satyagraha along with him. The entire event/ journey of those marchers will be recreated through this memorial and I think the coming alive of the entire event through a memorial is a unique initiative.

Prof Kirti Trivedi: The Dandi Memorial has been conceptualised not just as a memorial to a specific event, but as a participative and experiential space to help understand the effectiveness of 'Satyagraha – the truth force' as a powerful method in the eternal struggle of 'the right against the might' for the generations to come.

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A Fistful of Salt

ALI BABA

We have grown up reading and hearing about the non-violent revolution launched by Mahatma Gandhi and his band of 80 volunteers on the coast of Gujarat at Dandi in 1930 by picking up a fistful of salt. But I guess many of us have wondered at the choice of common salt to force the then world's only superpower out of the country. IITB's association with the Dandi Memorial Project provided an opportunity to learn some humbling facts.

On the occasion of the 75th anniversary of the march in 2005, the PM announced that a memorial would be constructed at the site and an HLDMC (bureaucratese for Higher Level Dandi Memorial Committee) was finally formed for the purpose in 2008 headed by Mr. Gopalkrishna Gandhi. This was just in time (JIT) for the election in 2009, but after that it made little progress until 2011, when IITB was asked to assist with the design of a solar photovoltaic energy system and later to take charge of the design and execution of the project itself. This must rank as one of the rare instances where IITB is involved in a national project of this significance and prestige. As part of this, a team of young sculptors from across the country arrived on campus to create statues of the marchers and I got to listen to Dr. Y. P. Anand who has produced a history of the salt tax in India.

Salt was one of the earliest currencies used for trade, so one can imagine its importance to human civilisation. It has probably been taxed from the time that rulers felt the need for collecting revenue from the people rather than robbing them outright. There seems to be a correlation between salt tax and despotic rule. The Greek and Roman civilisations did not tax salt, in fact efforts were made to ensure adequate supplies at reasonable rates. Soldiers were paid their wages in salt (sal the Latin for salt, became salary); a man's worth was measured in salt. On the other hand, a Chinese text from 300 BCE describes how the rulers could increase their revenue by taxing salt and monopolising its production and import, as it was an essential item and people would have no choice but to buy it even if it was exorbitantly priced. After the Roman withdrawal from Britain, salt was progressively taxed there and in the eighteenth century the tax on locally produced salt was several times its market value. The high prices gave rise to smuggling of cheaper foreign salt. To stop tax evasion and smuggling, inspectors were appointed which gave rise to corruption. In France, it was called gabelle and was first imposed in 1286. It was one of the causes of the discontent that led to the French Revolution and the tax was abolished in 1790. Unfortunately, it was so intricately linked to the finances of the state that it was re-introduced by Napolean in 1806 and was finally abolished only in 1945.

The tax, against which the Dandi march was organised in 1930, had been with us

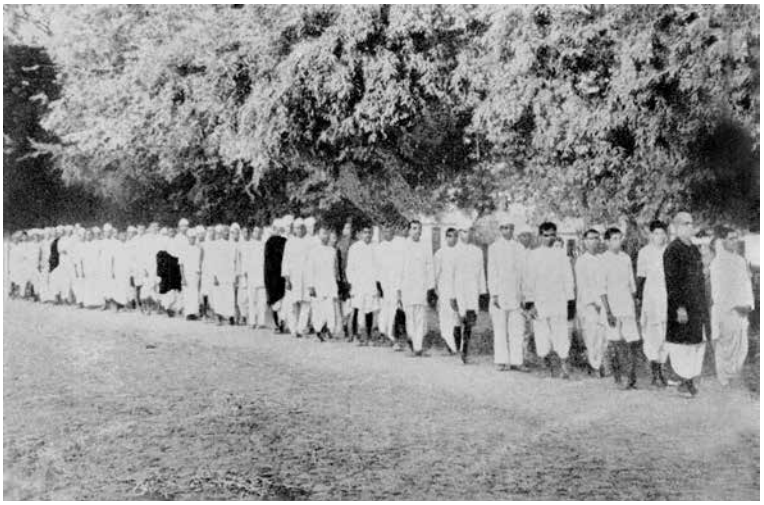

Image Couresy, Sabarmati Ashram, Ahmedabad.

from at least the Mauryan times in one form or another. The Arthashastra by Kautilya describes the duties of the lavananadhyaksha, an officer responsible for collection of salt tax amounting to about 25% of its value. In Bengal, during the Mughal times, it was taxed at 2.5% to 5%. What changed after the Battle of Plassey in 1757 was the high rate of taxation and how cruelly it was enforced. In 1765, Robert Clive formed a Society of Trade to benefit the officers of the East India Company in an effort to get a handle on the indiscriminate loot indulged in by the Company servants. Clive himself was the original robber-trader who had amassed a fortune for himself while being in the service of the Company. This 'Exclusive Company' claimed a monopoly on the production of tobacco, betel nut, and salt and levied duties of 25% on tobacco, 10% on betel nut, and 35% on salt. The Directors of East India Company in London did not approve of this but Clive and his committee in Calcutta dragged their feet on ending the monopoly of the Society. The price of salt rose from Rs 1.25 to Rs 2.47 per maund in the three years that the Society was in control. After the Society's monopoly was abolished in 1768, the price of salt dropped to Rs 1.48 per maund. But the Company continued to use the salt tax to maximise revenue and established a Customs line to prevent the entry of cheap salt from other parts of the country to the Bengal presidency. The Madras and Bombay presidencies fared somewhat better as salt was not as heavily taxed there. This naturally led to a reduction in consumption of salt within the region under the salt monopoly, i.e., Bengal (8 lb per adult) as compared to Madras and Bombay (13 lb per adult). Salt is such an essential mineral requirement for the living being that animals are instinctively drawn to salt deposits and its deficiency in the diet can have disastrous impact on the health of the people and productivity. Underlining this while giving evidence before the Commons Select Committee on Salt in 1836, Dr. John Crawford of the Bengal Medical Service estimated that the cost of the annual requirement of salt for a family of five to a rural labourer was about two months wages.

The excessive tax and control of salt manufacture crippled the cottage industry and there were shortages. To make up for reduced supply of locally manufactured salt, ships returning empty from Britain were loaded with salt for Calcutta, rubbing salt in the wound, so

to say. A tropical country with a vast coastline was importing salt from a country where it was manufactured by boiling brine by burning wood or coal.

The revenue that came from the salt tax could easily have been made up by raising tax on income but that affected a different class of people that the colonial powers did not wish to hurt. Rev. Dr. J. Wilson stated before the 1871 Select Committee on East India Finance that 'increase in the salt duty had been recommended by some high class Indians in order to evade the burden of extra income tax otherwise likely to fall on them'. This perhaps, provides an insight into why the Dandi March caught the imagination of the people while the earlier calls for boycott of foreign goods and cloth had only limited success. After all, the toiling masses of the country could not afford imported goods and what little clothing they possessed was khadi in any case, whereas salt tax hurt them the most. As late as 1924-25, the revenue from salt tax was twenty times the income from land revenue!

Days before starting the Salt March, Gandhiji made a final attempt to persuade the Viceroy of the injustice of the salt tax and compared his salary of Rs 700 per day to the average Indian's income of Rs 0.12 per day while the British PM earned a salary of Rs 180 per day against the average Briton's income of Rs 2 per day. The injustice did not end there because the revenue collected from India was repatriated to Britain rather than being spent for the benefit of India.

Another revelation for me was that the salt tax was finally abolished only in 1947, just months before Independence.

Have things changed that much after Independence? Sudden rise in the price of commodities like onions just prior to an election is a phenomenon that we have almost come to accept as inevitable. Mopping up money from the bottom of the pyramid is a strategy that is used effectively by political parties as well as MNCs of today. The regions that were part of the former Bengal Presidency recently experienced a déjà vu, salt prices soared by more than ten times, to Rs 100 per kg on rumours of shortages. The prices were soon restored but not before some people had made a killing. The colonial rulers may have left, but their legacy endures. ❖

Prof. Aliasgar Qutub Contractor

Prof. Aliasgar Qutub Contractor, former HoD of Chemistry Department, and former Dean Alumni and Corporate Relations, is an alumnus from C'73 and a former editor of Technik. Endowed with a rare gift of narrating "serious" and "heavy" matters with a tongue held firmly in cheek, his incisive and informed views on IIT Bombay and alumni relations are in evidence in his column Sim Sim khul ja. He is currently 40 thieves short of his target.

Innovation, Entrepreneurship and Climate Change: Opportunities in India

RAGHU MURTUGUDDE

The weather service industry in the US is a multi-billion dollar business enterprise and there are fledgling efforts in India by companies like Skymet Weather Services. The Government laboratories like the National Oceanic and Atmospheric Administration in the US produce global weather, climate, hurricane, oceanic and hydrologic forecasts. These are translated to local and regional scales by private companies under what can be broadly grouped into weather services. The buyers include airlines, shipping companies, tourism industry, recreation and sports organisers in addition to the large number of local TV stations. Weather is one of the most watched segments of local weather since people plan how to dress or whether to plan a weekend getaway and so on based on weather forecasts. The burgeoning middle class which is climbing rapidly on the consumption scale to parallel the developed world, will soon demand similar lifestyle products as local weather forecasts every hour. The same model as the US or Europe can be followed in India with the India Meteorological Department (IMD) and the National Center for Medium Range Weather Forecasting (NCMWRF) producing the global weather, cyclone, ocean, and hydrologic forecasts with private companies like Skymet producing local and regional weather information to meet the market demands.

The climate science community and the World Meteorological Organization (WMO) and its World Climate Research Program (WCRP) are grappling with the idea of Climate Services as an analog to the Weather Services to not only extend the timescales of forecast products but also to meet the growing challenge of climate change and climate adaptation and mitigation. For a country like India where the vagaries of the monsoon hammer subsistence farmers during most years, extending the rainfall predictions from weather timescales to monsoon active and break cycle timescales is critical. Such efforts are underway at the Indian Institute of Tropical Meteorology (IITM) and related intra-seasonal prediction efforts are ongoing for years under international projects coordinated by the WCRP. National efforts are desperately needed since the international efforts do not meet the national needs, especially in terms of the observational networks needed to initialize the forecast models and to take them to the local scales using statistical approaches that rely on dense observational networks.

Innumerable opportunities for innovation and entrepreneurship arise out of this national need. The models need to be made faster for computational efficiency since IMD need not be the sole entity incharge of observations and IITM and NCMWRF are not going to be able to invest in the computer science aspects of efficient coding and computing. Observations of weather are already beginning to rely on the ubiquitous cellphone

technology and India is a prime target for exploiting such innovations and leading new inventions in monitoring not only weather but also air and water quality and so on. Private companies like IBM and others are already engaged in seeking funding from the Ministry of Earth Science (MoES) to apply novel techniques of enhancing computational speeds of the global weather and climate models by using GPUs. Delivery of weather and climate information to the millions of farmers is being attempted via texting by services such as the Agromet by IMD and the MoES but it is not hard to imagine that this offers plenty of opportunities for innovation and entrepreneurship and can lead to emergence of a large number of small companies to meet the local needs in each part of the country from the wet regions to the west of the Western Ghats to the semi-arid parts of Karnataka and Maharashtra and the deserts of Rajasthan to the cyclone-prone Andhra and Odisha.

Even more opportunities offer themselves in energy, water, and food security needs for the country when we consider the longer time-scales of climate change. The latest climate assessment report by the Inter-governmental Panel on Climate Change (IPCC) is being released in four parts from September 2013 through November 2014 but it is already clear that it is a big thud. No attention grabbing new results are forthcoming and just a nuanced rewording of the role of humans on our planet's environment is passé by now. It is clear that the IPCC assessment process will be revised and an overhaul is clearly needed since coordination the computing and personnel resources at so many labs across the planet to produce these massive tomes is not an efficient process anymore. The improvements in models are clear in some ways but there is really nothing exciting enough to write home about.

On the political side of the UN Framework Convention on Climate Change (UNFCCC), there is nothing impressive to report on the progress in the deliberations of the Conference of the Parties (COP) each year. COP19 was held in Warsaw last month and is building up to the COP21 in Paris scheduled for 2015 to find a pact to replace the moribund Kyoto Protocol adopted in 1997 and supposedly in effect since 2005. The engagement in the climate negotiations by nearly all the countries in the world is clearly a good sign. As COP19 got underway in Warsaw, the biggest concerns were the real and perceived

Climate negotiations continue to keep all countries engaged but progress will be slow and painful – more painful for the developing countries of course.

inequities among the developed and developing countries and the concept of Loss and Damage. And of course typhoon Haiyan, likely the strongest cyclone on record, which slammed into the Philippines before moving west and north into Vietnam and China, grabbed the headlines for the right reasons at the right time. India played a forceful role and earned some kudos and some jeers in the role it played in protecting the interest of developing countries.

Some of the inequities were supposed to be dealt with the Green Climate Fund set up at COP16 under the UNFCCC which started at around $30 billion per year but is not likely to reach the expected level of $100 billion per year due to the global economic slump. It is not clear that all the funds are indeed being transferred to the developing countries and that is highly unlikely to change till the economic recovery is robustly in place, if at all. The inequities will not sway any minds in the developed world and the concepts such as Common but Differentiated

Responsibilities are also likely to be sidelined. It is also not expected that the developing countries will be let off the hook on emission reductions despite their desire to grow their economies by burning coal or whatever means necessary.

The top-down approach of the Kyoto protocol to emission reductions have never really materialized and it is not clear that effective emission monitoring is in place even in the most developed countries. Unexpected events have played into the global emission levels in the meantime such as an emission reduction by the US due to the economic slowdown and the newly found natural gas sources. The Fukushima nuclear disaster and the resulting radiation leaks have forced Japan to roll back its commitment on emission reductions. But one need not lose heart since President Obama did take a few good steps towards climate action with an executive order and the bottom-up efforts at emission reductions where governments can make voluntary commitments are showing signs of growth.

The European Union has been leading the way for some years and new efforts include a regional agreement between California, Oregon, Washington and British Columbia. One great innovation that India can lead in this context is to build a regional coalition to commit to a bottom-up emission reduction, if not to mitigate climate change then to avoid the fate of the air pollution akin to that in China, which is leading to serious divestment of foreign capital due to unbreathable air quality in most of its big cities on the eastern seaboard. The cost of the effect of air pollution on human health has not been realistically accounted for in India but the growing number of air conditioners is clearly growing much faster than the country's energy supply despite the impressive efforts in wind and solar energy installations across the country. The opportunities for innovation and entrepreneurship in renewable energies and in carbon capture and sequestration at the traditional power plants or even at any other industry are truly a goldmine for the young population of India. One can of course go on about energy-efficient appliances and buildings, fuel-efficient cars, innovations in faster and cheaper public transportation and so on.

Typhoon Haiyan has once again raised the specter of the impact of global warming on extreme weather events. The flash floods in Uttarkhand that led to the catastrophic loss of life and property is another example. While each weather event cannot be attributed to global warming explicitly, all weather is now forming in a warmer, wetter and more energetic atmosphere and thus has a contribution from global warming. The concept of Loss and Damage being discussed at the COP19 is essentially the negative effects resulting from the inability of a given community or a country to adapt to the impacts of climate change. Annual funds of $100 billion under the Green Climate Fund for all the developing countries combined may sound impressive but US allocated over $60 billion for recovery efforts following hurricane Sandy! Can India manage multiple cyclones and flash floods on its own? Does it really want to rely on the developed world and the Loss and Damage funds to recover from catastrophic disasters? India needs to expand its cultural advantage of jugaad to develop its own internal mechanisms for climate adaptation and mitigation. This can only be seen as a massive opportunity for innovation and entrepreneurship.

Climate negotiations continue to keep all countries engaged but progress will be slow and painful – more painful for the developing countries of course. Even simple things like reducing the cost of the Intellectual Property Rights for clean technologies and climate solutions is not forthcoming from the developed world. This is not inconsistent with how the human mind works. As Daniel Goleman lamented recently in a New York

Times article, that the rich just care less. He points to research that shows that the rich or the ones with higher social or political power simply tend to downplay the suffering of the poorer or meeker. The wealthy value material possessions more while the poor tend to give their social network higher regard! Goleman also points out that politics and social distance can lead to exaggeration of minor differences in what Freud called the narcissism of minor differences. This narcissism is likely expressed more strongly during times of resource limitation such as an economic recession. Climate change policies are likely affected by this social distance between the developed and developing countries and the suffering of the developing countries may well get downplayed if not being done so already.

Mani and collaborators and Kathleen Vohs report in Science magazine (Sep 2013) that poverty imposes serious limitations on decision-making abilities of the poor. Self-control is a limited resource and if it is exhausted in making one decision, the other decisions tend to be relegated to intuition rather than rational choices. The poor face too many restrictive choices and end up making more than their share of poor decisions that may relegate them to continued poverty. It is not hard to imagine that developing countries suffer from this same cognitive restraint, especially when it comes to making decisions on climate change for the future, since human beings and political decisions generally tend to discount the future.

These factors clearly make it imperative that the empathy gap between the developed world and the loss and damage of the developing world must be reduced, before we can hope to reduce the economic gap among countries. There is a prevalent belief that climate change will produce winners and losers and this notion often leads to the hedging of the bets on responding to climate change at the individual country level and at the global level. But it is clear from Sandy, Haiyan, and Uttarkhand floods that this belief may be totally misplaced. The COPs must thus face the ugly truth about climate change and begin to agree on the easy and obvious things like the cost of IPRs for the developing world while finding a rapid pathway to consensus on the more challenging issues such as common but differentiated or undifferentiated responsibilities to ourselves and our posterity. But countries like India will do better by seeing climate change as a massive challenge but one with infinite opportunities for innovation and entrepreneurship. We must seize every opportunity that arises while shoring up our shores against cyclones and building our infrastructure to deal with come what may. ❖

Raghu Murtugudde
B. TECH., AERO ENGG.,'83

Raghu Murtugudde is an '83 Aero alum following which he continued to sell firewood with his father in Dharwad for 6 months and returned to Aero as a project scientist. He went to the US for an MS in Aero from UT-Arlington, and a Ph.D. In ME at Columbia Univ. During his stint at NASA and as a faculty at UMD he took his CFD expertise to climate modeling including climate impacts. He has been engaged with NGOs on sustainable agriculture methods and research on human mind and its limitations in accepting risks that are not obvious and imminent like climate change.

Innovation? Begin with Governance of our Educational Institutions

SUDHEENDRA KULKARNI

To achieve excellence and global reputation, our educational institutions need something more than innovative technologies and pedagogic techniques — they need effective self-governance and an eco-system that protects their autonomy

The opening session of the daylong thinkfest to celebrate the 25th anniversary of NDTV in New Delhi on December 14 was star-studded. The topic of the panel discussion was 'Science, Innovation and the Future of India'. And the discussants included Dr. C.N.R. Rao, one of the two Indians honoured with 'Bharat Ratna' this year; Nobel laureate scientist Dr. Venkatraman Ramakrishnan; renowned agri-scientist Dr. M.S. Swaminanthan; and N. Chandrasekharan, CEO of TCS.

Somehow the discussion kept coming back to the system of education in India. The panelists' common lament was: India is neglecting quality in schools and universities. If rote learning is the hallmark of our education system, how can our country become a hub of innovation? Prof. Rao was blunt: "We've failed to support education as we should. Before we talk of science, we need to do more for schools."

This concern was also articulated by President Pranab Mukherjee in the closing ceremony of NDTV@25, which was, unusually, held at the newly built auditorium at Rashtrapati Bhavan. "India must take its rightful place among nations and invest in education and innovation to build a world-class education system," he said. Pushing for reforms in education and innovation, he bemoaned that Indian universities had not been able to produce any Nobel Laureate after Sir C.V. Raman. And Raman's Nobel came way back in 1930.

I would have liked President Mukherjee, as the head of the Indian Republic, to point out the root of the problem. And the root of the problem is not so much the lack of innovation in education; rather, it is the lack of innovation in the governance of education, a subject that governments are loath to discuss.

Generally, we Indians debate innovation in education in terms of new technology and techniques to be used to enrich learning experience both inside the classroom and outside. These are no doubt needed. The Internet provides an ocean of useful resources for teaching and learning. Their ubiquitous use must form the basis of reforming education in our schools, colleges and universities. This is indeed happening to some extent. In another welcome development, there is far greater emphasis these days on teacher training. Here too technology can bring in — and is indeed bringing in — a lot of innovation.

Many teachers in IITs, with IITB taking the lead, are engaged in simultaneous e-training of teachers in engineering colleges in remote locations across India.

However, the key area where innovation is most needed — and where it is most thwarted by the governance eco-system in India — is how our educational institutions are governed. There is a direct correlation between governance and excellence in education. Institutions that are not well governed — or, rather, that are not allowed to be well governed — can hardly be expected to impart high-quality education on a sustained basis, even if they are well-endowed with other pre-requisites for good education such as good teachers, good labs, good campus, etc.

The first and foremost pre-requisite of excellence in education is autonomy in governance, especially autonomy for those institutions that have proven potential to rise higher on the quality ladder. India has numerous educational institutions at all levels — school, college, university — and in all streams of learning — engineering, medicine, management, arts, architecture, and so on — which can achieve excellence and global reputation. Many of them also have capable, committed and ambitious leaders who want to take their institutions higher up on the excellence curve. If the potential of these institutions is not being translated into actual performance, the blame must squarely lie in the manner in which the educational bureaucracies in central and state governments exercise a vice-like grip over them.

The way our state universities are governed is indeed an advertisement for how not to govern universities. Over 80 per cent of universities in India are administered by states; the remaining are central universities, which are both better funded and also, relatively speaking, slightly better governed. In states, the baneful interference of politicians and bureaucrats begins with the appointment of vice chancellors and extends to many areas of administration. As a result, many universities which once had a high reputation — at least nationally though not internationally — are descending into mediocrity.

A case in point is the University of Mumbai. Not a fortnight passes before newspapers in the city carrying some negative report or the other about maladministration of this university, which was once not only a pride of the city but also set the quality benchmark for other universities in the country. Those in the know of the affairs of the University of Mumbai say that its steep decline is largely due to government control, which has stifled

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merit, bred inefficiency, indiscipline and corruption, and allowed caste and parochial considerations — not to speak of unionism of students and teachers — create havoc.

A different kind of example is that of the College of Engineering Pune (CoEP). It is one of the great success stories in quality upgradation in recent years. This happened entirely due to the fact that, a decade ago, a group of non-governmental and non-political champions of excellence in education led a campaign for the grant of autonomy to promising educational institutions in Maharashtra. Reluctantly, the state government agreed to give autonomy to four institutions in the state, CoEP being one of them. The other was the University Department of Chemical Technology (UDCT). The latter, thankfully, was delinked from the University of Mumbai

and has now become the Institute of Chemical Technology (ICT). A fully autonomous institution, ICT is well on its way to becoming a world-class institution.

CoEP, on the other hand, shows how even autonomous institutions can find their autonomy threatened. Under the guidance of an enlightened board of governors headed by F.C. Kohli, the nonagenarian doyen of IT industry in India and a tireless votary of educational reforms, and under the hands-on leadership of its dynamic director Dr. Anil Sahasrabuddhe, an alumnus of IITB, CoEP has achieved a major self-transformation in the past ten years using its autonomous status. Institutional support from IITB has played an important role in CoEP's quality enhancement.

The way our state universities are governed is indeed an advertisement for how not to govern universities.

However, last fortnight CoEP encountered a major setback. A group of disgruntled teachers from the pre-autonomy era challenged the innovative ways of merit-based faculty selection in the court. The Bombay High Court ruled that CoEP cannot use its autonomy in respect of hiring of faculty and that teachers can only be selected by the Maharashtra Public Service Commission (MPSC). The court's reasoning was that since the state government provides public funds to CoEP, it must retain control over the college, including in the crucial area of faculty selection.

The court's decision is prima facie retrograde. It is well known that MPSC, a state government body, is notorious for inefficiency — and worse. It is equally well known that quality faculty is the sine qua non of quality education. Indeed, it is precisely to liberate CoEP from such deleterious external government control that Kohli and other reform-minded eminent personalities had pitched for autonomy to this and other potential centres of excellence in Maharashtra. Sadly, the court ruling has annulled this logic.

CoEP's experience shows that, in the Indian scenario, hurdles to autonomy can appear from unexpected quarters even after formal autonomy is given. This is happening because the principle of autonomy and institutional self-governance has not been understood and internalised by the larger system of governance in India. As a result, thousands of good and promising institutions, which can attain excellence, are groaning under the burden of irrational, unnecessary and quality-killing external control.

The direct outcome of this denial of innovation in governance of educational institutions is the denial of opportunity for good education to millions of young, bright and aspiring Indian students. ❖

Sudheendra Kulkarni
B. TECH., CIVIL ENGG.,'80, H2

Sudheendra Kulkarni was a special aide to Prime Minister Vajpayee from 1998-2004. He was a member of the National Executive, Bharatiya Janata Party and is a well known columnist with the Indian Express. His book Music of the 'Spinning Wheel: Mahatma Gandhi's Manifesto for the Internet Age' was launched by Dr. A.P.J Abdul Kalam in the presence of L.K. Advani, Arun Shourie, Sahshi Tharoor and several other eminent personalities. Comments are welcome at sudheenkulkarni@gmail.com)

Skype is illegal in some Countries

RUSTOM KANGA

In some countries where I go
Using Skype is illegal , you know
And for illegal things they often cut
Something off or whip your butt.
But the executioner is kind and nice
After his dissection he'll apply ice
He doesn't use a sword any more
To make the pain last he uses a saw
For theft your right hand he will cut
For Peeping Toms your eyes he'll shut… permanently
So when they caught me using Skype
I pointed out that I could not type
I type with one finger, I said
And I never, ever use my head.

*Toide wa – doko desu ka**

*(*Translation: Where is the toilet):Inspired by the amazing talking toilets that have evolved in Japan*

RUSTOM KANGA

When you first arrive in Tokyo
And 're feeling somewhat dumb
'Çause you cannot speak the language
Makes you so lonesome
You don't ever have to panic
There's a toilet nearby
It will answer all your questions
And listen without a sigh
You can ask for the exchange rate
Or the price of Exxon shares
Or what's on in Roppongi
Or the return Shinkansen fares
While it sprays your nether end
And dries it with a breeze
Of perfume scented, quite compelling
Warm air so you don't freeze.
All the while its playing
A polka with a beat
Its so friendly and comfortable
You wouldn't leave that seat

And it will read you poetry
And laugh at all your jokes
Its smart Japanese wizardry
I tell you it's no hoax
The ultimate intelligence
In a toilet near you
It makes you want to go again
When you've nothing else to do

Epilogue:

Epilogue

I have had a strong objection
From my toilet back at home
It is sad I never mentioned it
In my Nipponesque tome
It too can recite Shakespeare
And do poetry and such
But it doesn't get a chance to speak
Because I talk too much

Dr Rustom Kanga
B.TECH. CHEM.ENGG, C'73

Dr Rustom Kanga went on to get a Masters in Management and a Doctorate in Finance from the London School of Economics. After a career in the oil and computer industries he founded his own company, iOmniscient, which focuses on Artificial Intelligence based Video Analysis. Rustom indulges himself by writing humourous stories, songs and poems.

Out of the Closet

God has indeed been very kind to me. He put me through the best school and the best college one could possibly ask for. Hyderabad Public School (HPS) was originally Jagirdars' College that was built for the Nizams and royalty of the Nizam state and was thrown open to the "public" in the early sixties. While many of my schoolmates were still princes, there were a whole lot of other contemporaries who went on to become eminent businessmen, industrialists, Tollywood stars, cricketers, ghazal singers, CXOs, diplomats, media barons, MPs, MLAs, Central ministers and even a Chief Minister. Likewise with IIT Bombay. My contemporaries in HPS, amongst so many others, include AP CM Kiran Kumar Reddy and Minister HRD Mallipudi Mangapati Pallam Raju. My contemporaries in IIT, again amongst so many others, include Goa CM Manohar Parrikar and Nandan Nilekani.

MMP-that's what we called Pallam in school, became a member of Lok Sabha when he was barely 27. His grandfather was a freedom fighter and his father too was a Central Minister in the eighties. Pallam was ranked highly as a Minister of State for Defence and his performance caused his elevation to a minister of cabinet rank and he was given the important portfolio of HRD. Apart from that, Pallam has served on many Boards of public limited companies, has served as the Chairman of the Parliamentary Standing Committee on Information Technology, has represented the Country in the United Nations General Assembly at New York, USA in October 2004. The Institution of Electronics & Telecommunications Engineers (IETE), New Delhi, has recently conferred a 'FELLOW' on him. Just as it exists in IITB, the spirit of camaraderie is high amongst HPS alumni. You can greet each other with a back slapping bonhomie. You can poke a minister in the ribs and need not address him as "sir". You can whisk him away from a party into a quiet corner and put forth a whole lot of demands without offending him. In one such party at a common friend's place, I cajoled, browbeat and coerced MMP to give us an interview for FUNDAMATICS. *It was on our mind ever since we got the news that he was given the HRD portfolio last year. After all, all matters pertaining to IIT come directly under the HRD Minister's purview. Besides, we have launched the Global Alumni Business Forum at IITBAA and during our pilot launch in Goa last July, there had been a constant clamour from alumni to rope in Pallam and his MHRD since most of our entrepreneurs who participated in Goa were working in the space of education.*

The unexpected meeting gave me an opportunity to also broach these and similar issues with Pallam. Despite his many pre-occupations, travels abroad and stormy Lok Sabha sessions, Pallam found time to give the interview. Another privilege that I enjoyed as a schoolmate was to pose tough questions set by my colleagues on the Board of IITBAA. If the questions can be likened to an IIT weekly test, Pallam cracked a straight "A". Normally, this interview would have passed off as one conducted under one of the bee pseudonyms, in the same manner that we conducted interviews in the past. But my boss on the editorial Board Queenbee insisted this time that given the status of our interviewee and the importance of the I should step "out of the closet" and conduct this interview as the Chair of IITBAA.

Bakul Desai

A HaRD Interview with Minister Pallam Raju

BD: **You were promoted by the Honourable PM from MoS rank to cabinet minister level and given charge of the HRD ministry with Shashi Tharoor as your MoS. What do you attribute your elevation to? Your good record in the defence ministry?**

PR: I would expect that my almost seven year track record in the Ministry of Defence would have certainly been one of the main factors in my elevation. I am grateful to the Prime Minister and the Congress President for reposing their faith in me.

BD: **Your ministry is an important one and all aspects of education come under your purview. But as alumni of IITB, we would like to restrict this interview to IIT related issues. Firstly, what is your broad vision about IIT education in general and the role it can play in nation building?**

PR: It is my belief that for IITs, the challenges emerge from the increasing globalization of education. As modern academic institutions, IITs are expected to operate in a dynamic and a competitive ecosystem where stakeholders namely - students, faculty, non-faculty, industry, alumni, society, technology and market forces are redefining the education industry every day. Staying competitive in such an environment means continuously adjusting and adapting an Institution's approach to meet the changing needs and expectations of today's youth and that of the country.

The IITs should provide an education that is current and comparable with that given by the best universities in the world. The Institutes are achieving this standard at the undergraduate level and graduates have made important contributions to nation building and progress in several field. The IITs must now focus on excellence in postgraduate education and research, especially at the PhD level. Such manpower with high qualifications is needed for R&D based innovation to address the nation's problems and to make Indian businesses more competitive.

But it is not just about the market aspect of education, the nation too needs greater engagement of IITs to tackle some of the burning issues. It's here that we need to exercise imagination to explore ways in which specific competencies, and I know there are many, in the IIT system can be brought forth to address various issues. IITs need to engage with private and public sector industry as also the governments, both at the Centre and States, to play a greater role in the development of the nation. IITs have started to engage with national challenges like urban development, transport, sustainable solutions to energy, water, affordable housing, defense research, food security.

IITs need to move into value creation with substantive benefits to industry and society for achieving competitive advantage. IITs are setting up Research Parks for promoting re-

search and business entrepreneurship and for addressing industrial needs.

In last one year, we have tried to put on table a number of ideas for IITs to emerge as modern institutions of excellence. A framework for Peer Review of IITs has been prepared and the IITs have already begun the process of Internal Review, which will be followed by the External Peer Review. Similarly a framework on Green Office is being put in place and I hope that the systems are being put in place for IITs to become living examples of application of technology and modern ideas.

BD: **Last year, there was a huge controversy about changing the format of the JEE exam and your predecessor Kapil Sibal met with a lot of resistance from various IIT senates, students and even alumni. Though a compromise was arrived at, many feel that the JEE format should be rolled back to its earlier state where it was free from controversy and considered the most honest, foolproof and tamperproof system. Would you consider a relook? Or is a rollback simply out of the question?**

PR: Last year's changes were questioned more because we were trying out an untested system against a well established one. You will be aware that as far as IIT system is concerned, earlier absolute percentage (say 60% for general category) in Boards was the cut-off criteria against percentile (top 20 percentile) criteria adopted in 2013. The major argument for this change was that the percentiles of different Boards, who evaluate differently, can be compared, while comparing absolute percentages will be unfair to the students of some Boards, especially the ones known for strict marking. The system based on absolute percentages was therefore not fair to all. The percentile system is fairer, and therefore it is being continued.

BD: **While the effort of your ministry at expanding the number of IITs is laudable, many feel that the IIT brand will suffer dilution and we may see a comedown in standards. Where will you get top class faculty at GoI pay scales? How will you build such a huge infrastructure? Where will so much money come from? I am told that out of the total education budget of Rs 66,000 crores IITs will get Rs 2,200 crores in 2013-2014. Till 2012-2013 all IITs put together got just over Rs 1,000 crores.**

PR: There has been a lot of discussion around whether new IITs have dented the brand IIT. I would answer the question from a slightly different perspective. After success of Sarva Siksha Abhiyan (SSA) and Rastriya Madhyamik Siksha Abhiyan (RMSA), a larger number of students are entering the higher education. Therefore, you would agree that we need to enlarge the space for quality education. New IITs were needed to cater to this increasing number of students wanting to go for quality education. Otherwise, these students would start looking for off-shore education, which may not be good for the country.

I do agree with you that there is an acute shortage of faculty when you perceive it from the 10:1 student/faculty ratio. However, the current ratio of 16:1 is not bad at all when you see other premier institutions world over including in our neighbourhood like NUS etc.

To attract the best faculty, the salaries of the faculty have significantly improved after the 6th Pay Commission. In fact, the faculty members now get the best salaries in the government sector. Recently, we have approached the Ministry of Home Affairs to consider our demand to relax the US$ 25,000 limit for Visa with a view to allow foreign faculty. We expect a positive outcome from these efforts.

I am also of the opinion that with Massive Online Open Course (MOOCs), the concept of classroom teaching has undergone change. Therefore, there is a strong case for networking across IITs for use of online and offline resources to make pedagogy not only interesting but more engaging as well.

All of the new IITs are functioning in temporary premises with provision for classrooms, labs, equipment and hostels. Some of them, starting from IIT Mandi, have started moving to permanent campuses in a phased manner. The number of students in the eight new IITs is 5011. They have also been given the freedom to recruit faculty and non-faculty staff within the norms of faculty, non-faculty and students ratio of 1:1.1:10. To draw good faculty and non-faculty to these Institutes, Cabinet approval has been obtained to allow mobility of staff from old Central Engineering Institutions (CEIs) with old pension scheme on 10 year long term deputation to the new CEIs.

BD: **IITs rank a distant 200+ in the QS world ranking despite employing the best faculty talent and attracting the best students. Do you attribute this dismal performance to inadequate funding and below par research facilities made available to IITs? Look at MIT that spends $ 40,000 per student whereas IITs spend less than $ 2,000 per student.**

PR: We have set up a Committee to look into the ranking issue. The Committee has interacted with QS and the THE ranking agencies. The Ministry has been actively facilitating this engagement.

The table below indicates Ranking of IITs among World Universities by Times Higher Education (THE) in the years 2011-12 and 2012-13.

YEAR	NAME OF INSTITUTE	WORLD UNIVERSITY RANKINGS
2011-12	IIT Bombay	301-350
The other IITs were ranked below 400. Therefore, they do not appear on the THE website.		
2012-13	IIT Bombay	251-275
	IIT Kharagpur	226-250
	IIT Roorkee	351-400

The table below indicates Ranking of IITs among World Universities by QS in the years 2011 and 2012 as per information available on their website.

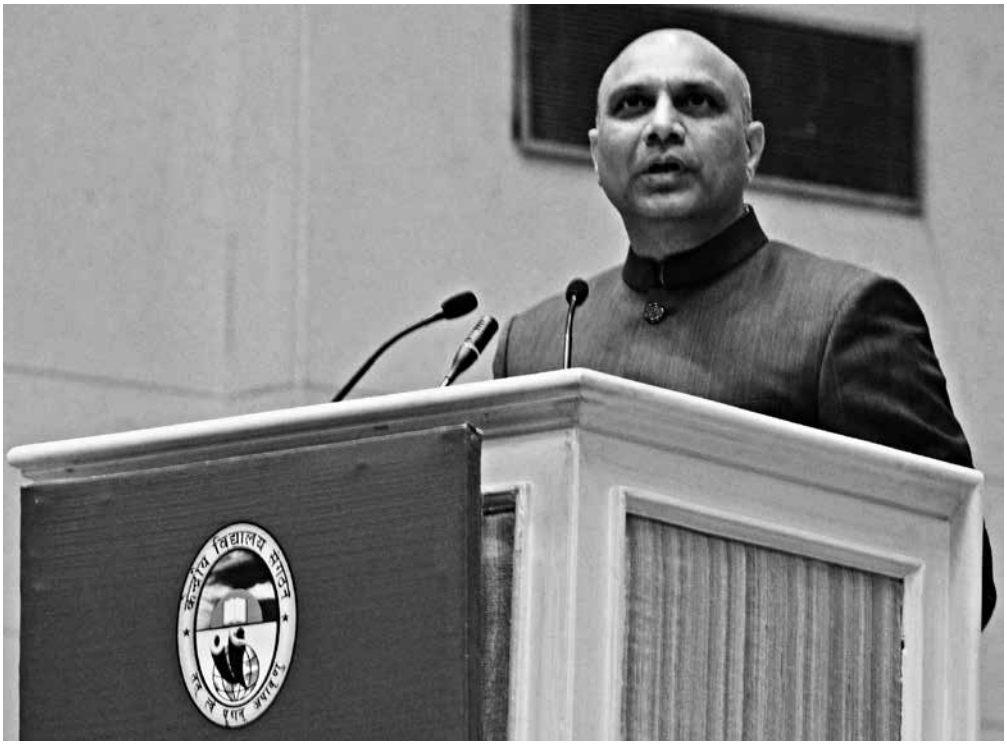
NAME OF INSTITUTE	WORLD UNIVERSITY RANKINGS 2011	WORLD UNIVERSITY RANKINGS 2012
IIT Delhi	218	212
IIT Kanpur	306	278
IIT Bombay	225	227
IIT Madras	281	312
IIT Kharagpur	341	349

As shown in the table above, the rankings of IIT Delhi and IIT Kanpur have improved in 2012

The variation in rankings is primarily because the different ranking agencies use different indicators and assign different weightages for each indicator.

The Ministry has organized workshops in coordination with the THE and the QS ranking agencies for informing heads of academic institutions about the issues involved in the ranking process. Based on these discussions, the following issues have emerged that enable a better understanding of the rankings methodology.

1. IITs are primarily science and technology oriented institutions. The typical World and Asia Rankings are meant for universities and consider items like arts, medicine, social sciences, etc. In terms of rankings related to Engineering and Technology, IITs are ranked between 30 and 100 and are therefore within the top 100 institutions.
2. Also in most of the widely publicized rankings, like QS and THE, a large percentage (from 40% to 60%) is based on surveys and not on hard data like graduates, publications, citations, etc.
3. There is a 15% weightage on internationalization where the IITs score low as



they have low presence of international faculty and students. On the other hand IITs have very strong international research collaborations with industry which is not counted.

4. IITs have a very good track record in international terms when it comes to research publications / citations and are rated very high on this count. But this does not count for more than 30% weightage.
5. IITs are also affected on faculty:student ratio as some of the agencies count research staff as faculty. Since as of now IITs do not have a large non-faculty research staff with PhDs, they get adversely affected by such calculations. This also accounts for about 10% to 15% weightage in some cases.
6. Computation of citations is fairly disparate for different agencies and they are themselves refining and modifying the same from time to time.
7. Most agencies do not consider important areas of contribution of IITs like contribution of alumni (top 10 in the world), impact on national development goals, entrepreneurship generation, etc. where IITs have excelled compared to others in the world.
8. In some cases, complete data is not taken (like industry income set to 0 in a recent survey for one IIT), which seriously affect the rank.

The Committee is expected to come out with strategies to address these issues. Systems are being put in place for sharing information with rating agencies in an active manner.

I would only partially agree that inadequate funding may be responsible for this performance. IITs get the highest funds among all the institutions in India. In fact, on an annual basis, we give nearly 3900 crore to IITs from MHRD only, with plan funds constituting

2400 crore and non-plan another 1400 crore. Besides this, different departments including DST, DBT, DRDO, MSME etc provide research funding to IITs on competitive basis. We are also setting up CIHEC (Council for Industry and Higher Education Cooperation) with a view to enlarge the scope of Industry-Academia engagement for mobilizing additional research funds.

Besides this, we are also encouraging IITs to increase their internal revenues. A part of this increase will come from increased fee, which has been increased for the new UG students from Rs. 50,000/- to Rs. 90000/-from the current academic year. A new Block Grant Scheme has been put in place to rationalize the non-plan support to IITs. As part of this scheme, IITs can build their corpus fund. They also get matching grant (additional) from the Central government for revenues generated in addition to the 30% of the non-plan expenditure.

World over, the best colleges get large contributions from their alumni and have large interest incomes. This is slowly but steadily happening in IITs. But IITs need greater engagement with alumni world over.

BD: **Most IIT graduates do their post graduation in some of the best universities abroad, come back to their alma mater and end up getting disillusioned with the system which apparently suffers from inadequate funding, insufficient autonomy and bureaucratic clearances. What can you do to improve the situation? Can the IITs be granted greater financial autonomy? Can there be greater devolution of powers to the Board of Governors of each IIT? We are told that everytime IIT faculty member needs to travel by an airline other than AI, they need to get permission from a JS in Ministry of Civil Aviation.**

PR: We have been providing greater autonomy to IITs over years. There is no representative of the ministry on the Board of Governors of IITs. IITs don't have to seek ministry's approval for recruiting the faculty. This year, we extended this to the recruitment of the non-faculty besides allowing them to have their own management structures. So, the IITs now have a chance to put in place modern management systems with best human resource.

Autonomy is what I am committed to ensure so that that these institutions of national importance, achieve greater international excellence. However, autonomy has to be complemented by greater accountability and transparency as these are public institutions. The IIT Council website is one such effort to ensure transparency and accountability besides brand communication to a bigger audience of stakeholders and greater peer learning. The Kakodkar Committee has suggested a framework for governance and autonomy. However, a consensus needs to emerge on these issues.

I think IITs need to seize the moment and take these institutions to greater heights.

BD: **Talking about our own IIT Bombay, when I was here from 1977 to 1982, our campus was green and pristine. There were lots of open spaces. Our hostels rooms were not great, but we all had a room to ourselves. But now, IIT looks like a concrete jungle. 2 people are packed in a 6'X8' room. One of the students has to live from a suitcase packed under the bed. One uses the study table while the other has to sit on a chair in the corridor outside. There is also a shortage of study spaces and other important infrastructural facilities. Obviously, your ministry's guidelines about scale-up in the number of students is causing this situation. Can we not advise a structured expansion?**

PR: I agree that the sudden expansion of IITs on account of OBC reservation did put a lot of pressure on the IIT system. But I am sure these are short-term troubles and soon the situation is going to ease out. The student population has increased considerably. In IITB

itself 9000 students are now on the rolls from the time when you were a student. I think just about 2000 were on the rolls then.

The built up area has consequently increased. The Institute has a master plan in which significant areas are designated as green areas and will not have any buildings. In the remaining areas taller buildings are being built to conserve green areas. The campus has far more trees than in the 70s. As per the decision of the Council of the IITs, each IIT is expected to set up a Green Office. We would ask the Green Office in each IIT to look into the issues of greenery, open spaces and the optimum capacity for each IIT. There are plenty of open areas all over the campus; the only densely built up area is the academic area. This is intentional to keep the academic area pedestrian - faculty and students can easily walk between classes and labs in different departments.

The number of students admitted into the Institute is based on classroom and laboratory resources available. This has led to overcrowding in the hostels but at the same time provided a much larger number of students the opportunity of a great education. 1500 rooms have been built and 3800 are at various stages of construction. The doubling of students will end in three years time.

Several new study spaces are being built including in the Library and the Lecture Hall Complex. The Departments also open class rooms for study after class hours.

BD: **You may have noticed that IITans excel not just in the realm of technology, but have made a mark for themselves in diverse fields like politics, policy making, administrative services, NGOs etc. Within your own political fraternity, we have Jairam Ramesh, Manohar Parrikar, Ajit Singh, Jai Narayan Vyas, Sudheendra Kulkarni, ArvindKejriwal, Nandan Nilekani and a few others. Can we look at developing humanities, social sciences and management disciplines within the IIT system?**

PR: I am convinced that a holistic development of an individual requires not only imparting engineering education and skills but also providing humanities, social sciences and management inputs. Each IIT is free to take a call on these issues. Strong humanities, social sciences and management departments are needed for interdisciplinarity, which is the need of the hour. We had a Design workshop recently to focus on cross disciplinary education. IITs have been encouraged to set up Design schools so that a more holistic curricula and perspectives evolve.

BD: **What are your views on expanding the IIT system to foreign students and foreign faculty and possible funding of foreign students?**

PR: As far as foreign students are concerned, the IIT Council has already taken a decision to allow nearly 10 percent foreign students. It is now for IITs to implement it.

On the foreign faculty, as I mentioned to you earlier, we have approached the Ministry of Home Affairs to consider our demand to relax the US$ 25,000 limit for Visa with a view to allow foreign faculty. We expect a positive outcome from these efforts. However, IITs can recruit foreign faculty on a contract for a limited period.

BD: **IIT alumni, and IIT Bombay alumni in particular, are among the most active alumni with a good track record of paying back to the system and to society. There are hundreds of alumni who would like to engage with your ministry and help with policy making, improving the system and moving things forward. Can you look at a system where IIT alumni associations are recognized by your ministry and can we evolve a formal working relationship?**

PR: I don't think there is any need for recognising alumni associations as they are a vibrant and progressive force of highest standing. But, I agree that we can engage with IIT alumni in policy making, improving

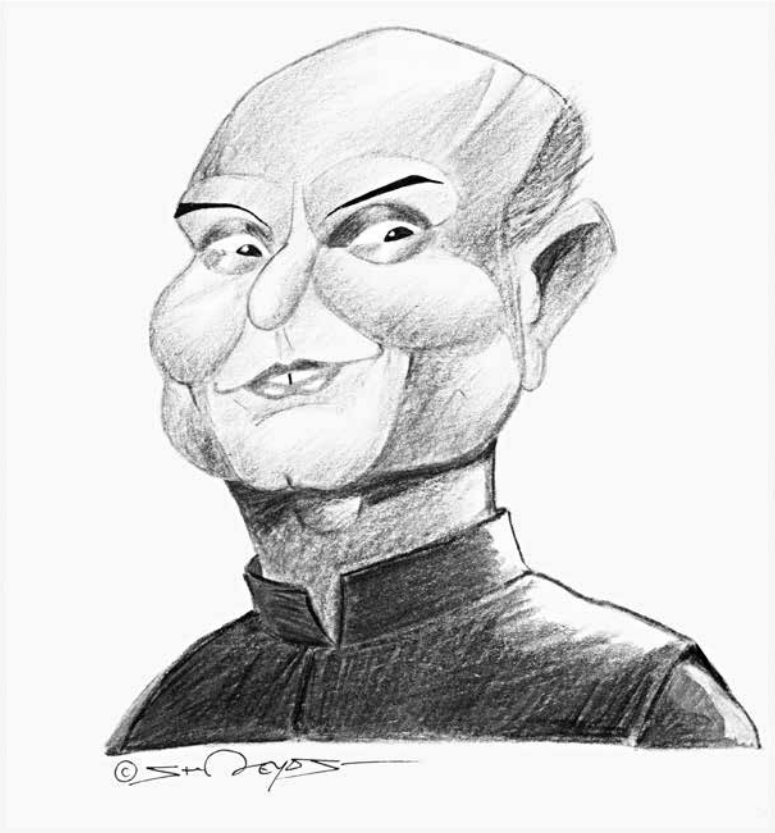


Image Courtesy : Shreyas Navare, Hindustan Times

the system and moving things forward. I will positively consider this issue if the IIT alumni body comes up with a draft proposal for formalising such an engagement. We may involve the IIT Chairman and IIT Director so that there is a greater coherence and convergence in ideas and actions.

BD: **IITBAA has floated a Global Business Forum for its alumni entrepreneurs and innovators and the current focus is on education and skill development. We had a pilot launch in Goa last July and the initial response was overwhelming. Can you meet us one day and allow us to make a presentation and extend your ministry's patronage to us?**

PR: Sure. We can decide on a convenient date for the meeting. My office can coordinate with you on a mutually convenient date for the meeting.

BD: **One last question. IIT alumni contribute substantially to IIT and get a 100% tax rebate. But a few great programs are administered by IITBAA and donors to IITBAA get only a 50% tax rebate. Can you help us get a 100% tax break for IITBAA donors? This may result in more donations flowing in and will strengthen IITBAA's hand to run programs which cannot be implemented directly by IITB.**

PR: Please send a proposal on this issue and we will forward it to Ministry of Finance with our strong recommendations. ❖

The Equator Question

... And Why It's So Interesting

BEHERUZ SETHNA

Let me start with an acknowledgement and a question.

First, the acknowledgement: This question came from the book, The Man Who Knew Infinity: A Life of the Genius Ramanujan, by Robert Kanigel. The book, of course, is about Srinivasa Ramanujan and he is the person who developed the basis for this question. So, the first part of my article may seem familiar to readers of the book (and if you already know the answer, don't shout it out!) – but I have added wrinkles as you will see from my mention of a nanoparticle which Ramanujan probably didn't deal with very often 100 years ago, and it is enjoyable nevertheless. The second part comes from me and that is: What makes this question so interesting?

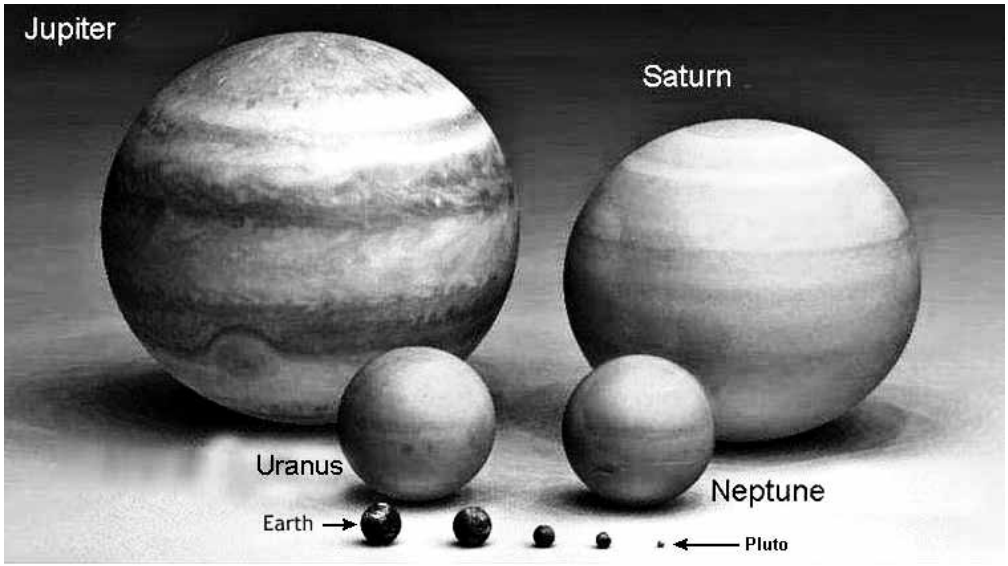
Now let me set the background for the question: The circumference of the Earth at the equator is approximately 24,901.55 miles or 40,075.16 kilometers. I know the IIT mind, and several of you are already checking with Google if I'm right. Don't worry about the precision of these numbers, because I'm about to make some simplifying assumptions anyway: Assume that the Earth is a perfect sphere (we know that it isn't since it is more an ellipsoid shape with the circumference at equator being larger than the one touching the poles), and that we can approximate the circumference to 25,000 miles, which when converted into kilometers is 40,234 km.

So, if a tight metal belt is strapped around the circumference of the Earth at the equator, the metal belt is exactly 25,000 miles or 40,234 km long.

I know the IIT mind, and several of you are already checking with Google if I'm right.

Now, as I often do after a heavy meal, loosen the metal belt one "notch" of 50 ft. or 15.24 m. The tight belt was affixed exactly at the circumference of the equator, so now assume that the loosened belt stands uniformly above the surface of the Earth, as shown in the figure, obviously exaggerated for clarity.

Note that 50 ft. or 15.24 m is about the length of a large room, so it is very small increase in the length of a belt of 25,000 miles or 40,234 km. The loosened belt actually represents an increase of 0.0000004 – that's six zeros after the decimal point (or, expressed as a percentage, 0.00004%) -- so, that's what I meant by the gap in the figure being obviously exaggerated for clarity.



Here's **Question 1:** What will just fit in the gap that is created?

a. A nanoparticle?
b. A sheet of paper?
c. A mouse?
d. A cat?
e. A crawling baby?
f. Something smaller than A?
g. Something larger than F?

Okay, I know all the readers of *Fundamatics* are really smart and can compute the answer, but don't cheat – here, we are looking for your immediate first impression. Write it down.

Here's **Question 2:** I now repeat this scenario on Jupiter which has 11.2 times Earth's equatorial diameter, and yet keep the size of the loosened notch the same (50 ft. or 15.24 m). The picture shows Earth in the left front and Jupiter in the left rear row. In this case, the belt circumference increases by 0.00000003 (seven zeros after the decimal) or 0.000003%.

What will just fit in the gap that is created?

a. A nanoparticle?
b. A sheet of paper?
c. A mouse?
d. A cat?
e. A crawling baby?
f. Something smaller than A?
g. Something larger than F?

Write down your answer.

Now, check the answers to both questions on Page 52.

Did yo
in my
used

Answer to Question 1: Even though the belt is loosened by only 50 ft. or 15.24 m, which is an increase of 0.0000004, the gap created is large enough for the tallest person you probably have ever seen to walk through. The gap created is 7.96 ft. or 2.43 m tall!

Answer to Question 2: Even though the belt is loosened by only 50 ft. or 15.24 m, which is an increase of 0.00000003, the gap created is large enough for the tallest person you probably have ever seen to walk through. The gap created is 7.96 ft. or 2.43 m tall!

Did you think I made an error in my copy-paste action, and used the same answers by mistake?

Here is the solution to the question:

Let C = Circumference

And r = Radius

Situation 1 is the tight belt:

$C_1 = 2 \pi r_1$ So, $r_1 = C_1 / 2 \pi$

Situation 2 is the very slightly loosened belt: $C_2 = 2 \pi r_2$ So, $r_2 = C_2 / 2 \pi$

Therefore: $r_2 - r_1 = (C_2 - C_1) / 2 \pi$

The circumference changes by 15.24 m, so:

$r_2 - r_1 = 15 / (2 * 3.14)$

$= 15 / 6.28$

$= 2.43$ m (or 7.96 ft.)

Note: This answer is independent of the circumference, so the solution for Jupiter is the same!

Now, it gets more interesting.

Why does this seem so counterintuitive?

The belt size (circumference) is increased by such an incredibly small proportion: 0.0000004 (0.00004%), and even adding an additional zero for Jupiter, that we cannot conceive how that could make any difference at all. That's why it's so puzzling.

See Page 54 for the solution.

Although we increased the belt size (circumference) by such an incredibly small proportion: 0.0000004 (0.00004%), we cannot conceive how that would lead to such a large gap of 2.43 m or almost 8 feet. That's why it's so counterintuitive.

The solution to the quandary lies in our limited perspective.

Actually, while we are focused on the gap and the size of the object that can fit through the gap, we might have failed to realize that

A different perspective broadens our understanding and lessens the limiting effect of our background

the relevant item is the radius of the loosened belt. The radius increased by the same incredibly small proportion: 0.0000004 (0.00004%)! It is a ~15 m increase on a radius of ~40+ million m.

It's just that we humans are so used to standing on the surface of the Earth that everything is perceived relative to our ground level – we don't think of things relative to the center of the Earth (which is the "anchor" for the mathematical solution). We just think of things relative to where we stand.

And, so it is for so many other things – we just think of things relative to where we stand. Such are our limitations – whether we are talking of our state, language, country, gender, organization, or background. We are not the anchor for everything. A different perspective broadens our understanding and lessens the limiting effect of our background. ❖

Behruz Sethna

B. TECH., 1971, ELEC.ENGG, H4

Dr. Beheruz Sethna recently retired as the Professor of Business and President of the University of West Georgia (UWG). A distinguished alum from both IITB and IIMA, he is the first known person of Indian origin ever to become president of a university anywhere in America. He also obtained the University's first endowed Chair. Beheruz has published a book and 69 papers (30 since becoming UWG President), several case studies, and obtained externally funded research from the U.S. Department of Energy, IBM, AT&T and others. Amongst his many awards, he has been named among the 100 most influential Georgians. He has also recently been awarded Founder's Award the highest honor from the University of West Georgia.

Of Prompt Peters and Late Latifs, and of Regretful Robins and Ignorant Ibrahims

LAZYBEE

Sometime in the eighteenth century, Linnaeus laid down the basics of classification of diverse life forms. This led to developments that we are all too aware of, complicated stuff all Greek and Latin to most of us and endless tension during exam times. This, of course, did not mean that all the species have been found and properly classified. New theories keep coming up all the time forcing us to reorient our thinking. A recent study carried out jointly at the Universities of N Carolina and Arizona by Profs Kulkarni and Kulkarni (research sponsorship promised by Mahindra and Mahindra) and coordinated by Prof Gaitonde (PICAA IITB) has brought out some starting facts about species homo alumnus. This study was confined to the alumnus of IIT Bombay but could well be extended to the entire species.

As per the findings of the study, the species is far from homogenous as it was long held, and can be further classified into four sub-species; each with a different neural make up.

We publish below an abstract of the findings. Those interested in the details can await the publication of full treatise in the forthcoming issue of Nature and / or log on to the site www.homoalumnus.edu.

The general characteristics of the species being by and large present in all the sub-species, it is quite common for a specimen of one sub-species to be mistaken for another and sometimes traits belonging to one becoming manifest in another. But still the researchers have reason to believe that these divisions among sub-species do exist and the classification needs to be modified to incorporate these findings.

1. Alumnus promptus (or Prompt Peters in everyday parlance): This sub-species is characterized by a strong memory and a well-developed area in the 'association cortex' part of brain which is considered to be the centre of all nostalgic feelings. As a result, the sub-species is likely to experience an urge to participate in the alumni activities and is not averse to going to any extent to contact and bring others of the species together, not necessarily only the A. Promptus variety.

2. Alumnus retardus (or Late Latifs): This sub-species is characterized by a weak memory and a lazy disposition. Specimens belonging to this sub-species require constant prodding, cajoling and even threats to get activated even if it is for the common good of the species. A. Retardus sometimes seem to suffer from delusions of their own importance in the scheme of things and have perfected the art of cash-flow planning. However, once activated, these have a tendency to get vociferous and start demanding that they be accorded priority in everything as befits their deemed status.

3. Alumnus regrettus (or Regretful Robins): This sub-species is characterized by a certain touch of schizophrenia. They may have a fairly strong memory and a well-developed 'as-

sociation cortex', sometimes as developed as the A. Promptus, but in their case the association cortex is under the influence of the limbic system, the part of brain which is the centre of work and family related emotions. This leads to a certain amount of vacillating behaviour and a sense of melancholia as the association cortex is not allowed to play its rightful role.

4. Alumnus ignoramus (or Ignorant Ibrahims): This is the most interesting sub-species of all as the specimens vie with each other in exploring the unknown frontiers of bliss. The research indicates that, on an average, these specimens require 3 years 7 months and 14 days to wake up to the fact that some important event like Silver Jubilee get-together has passed them by without them noticing it. There has also been an instant where a specimen claimed that he has forgotten in which hostel he had spent the 4/5 years of his stay in IIT. (Rejoice ye classmates of mine, for the honor does not belong to us. Thank God for small mercies.) As yet, the researchers have not come across a case where some specimen has claimed that he had forgotten which IIT he passed out from. But with number of IITs about to grow and the intake of students set to explode, the researchers opine that the day may not be too far when that milestone is also reached.

The research indicates that, on an average, these specimens require 3 years 7 months and 14 days to wake up to the fact that some important event like Silver Jubilee get-together has passed them by without them noticing it

Readers who are keen to understand the basics of behaviour of alumni as a species may refer to the standard textbooks available in the Central Library, viz:

1. "Alumni: Their Natural Habitat and Behavioural Patterns" by Al Muni (grand-nephew of late actor Paul Muni)
2. "Alumni and Half-life of Their Relation with Alma Mater" by Stew Dent

Post Script: Long before Fundamtics was born there was another individual who wrote under the pseudo name Lazybee. This article was originally published as a part of his Silver Jubilee Reunion and we have reproduced it for your edification as the work of the original Lazybee. We cannot tell you who he is but leave you with a clue - he belongs to the class of 1976. ❖

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Unmaking Jugaad:

In Conversation with Jamshyd Godrej

STUMBLEBEE

A Fundamatics issue devoted to innovation cannot be complete without the industry perspective, and who better to provide it than Mr. Jamshyd Godrej, CMD, Godrej and Boyce. Stumblebee caught up with Mr. Godrej on the sidelines of a CII Meeting on Manufacturing that was being chaired by him.

Stumblebee: Thank you, Mr. Godrej, for sparing time to talk to Fundamatics despite your busy schedule today. The focus of this particular conversation is Innovation. Since we have just come out of a meeting on Manufacturing, in that context or in general, where do you think India stands in terms of Innovation? We seem to have this great ability to do jugaad which is like the poor man's innovation. But when it comes to innovations which make a big difference to the economy, we don't see many examples. In general where do you think India stands in terms of innovation? We would like you to share your thoughts.

Godrej: Yes, well, I entirely agree with you on that. The word jugaad somehow or the other demeans innovation. If you only look at quick and dirty solutions then you are not looking at solutions which are long lasting and make a huge difference to people's lives. In India, the mind is very fertile, people have a lot of ideas, which is a very good thing. We need to encourage that. However, what seems to be lacking is the ability to convert those ideas into something concrete, whether it's a product or a service. That requires discipline, because you need to take this funnel of ideas and really test each one of them through various screens, through various interactions to understand what is it that consumers or users really believe or think about a certain way of doing things. Where we have been quite weak is in this business of how to relate to consumers and in understanding what the latent needs of consumers are. It is very rare that you would get a consumer to really tell you what it is they want and are willing to buy. Bill Gates has talked about this issue many times. So has Steve Jobs, who has always said that had he gone and asked a consumer if she would like such a phone, he would probably not have got a positive reply. So, the point is, there's always that latent need and how do you capture that and convert that. CII has been doing a very innovative program with Prof. Shoji Shiba, he is going to launch his book soon in Delhi and Mumbai. His point is that if you take a fish bowl, and if you want to know how the fish is thinking and feeling, you need to jump into the fish bowl. If you merely observe it from the outside, all you will see is him swimming around. If you cannot immerse yourself in the issue you will never find the innovative answer to the issue or the problem.

Stumblebee: Do you think there is reluctance on our part?

Godrej: Yes, this is the thing. Jumping into the fish bowl requires a leap of faith which

seems to be missing to a very large extent. I think it's partly to do with history. In the past, all innovations and products have come from abroad. We were always told 'you are no good at it', 'people only want things from abroad', 'if it is imported it will sell'. There is a mindset issue here which has to be changed. Another reason might be the absence of systematic and critical ways of looking at things through the right lenses and by implementing proper methods. This also seems to be missing today.

Innovation is not just a dream; it has to be about ideas that have to be translated through a very hard and rigorous type of exercise in order to create and deliver the right type of product or service that the customer wants.

Stumblebee: So are you saying that the weak kind of scientific temper we seem to exhibit has hindered our ability to compete and innovate?

Godrej: Well, no! I would say it's more of a lack in thoroughness - we're just not thorough enough in going through that rigorous process of making sure that at every stage you look at all issues, options and try to understand not only what the product can do but also what are the competing types of systems. They may not be the same thing. They may be something else. You can shave using an electric shaver or using a blade. They are two different things, and you can't design an electric shaver by looking at a blade. The thing here is the thoroughness and the process…

Stumblebee: Not the chalta hai attitude…

Godrej: This jugaad and chalta hai, it is good to talk about it and I know that people have written books about it, but that's not the answer at all. The answer really is in going through this whole process and understanding what is it that the consumers will really buy. Look at other industries and see how things have worked or not worked. If you look at the German method of teaching, right from the school, they put a lot of emphasis on doing things with your own hands, in the sense that you must feel pride in working with your hands. You may not become the greatest scientist in the world, but you know how to do welding or sawing or cutting. That personal experience of doing things is very important. We don't give enough recognition and honour to people working with their hands. The personal experience of doing things is very valuable and that is something that needs to change in our culture.

Stumblebee: I was just reading the story of Bell Labs (The Idea Factory: Bell Labs and the Great Age of American Innovation)and what I found was that almost everyone who was recruited there, and who went on to make a name for themselves, were actually people from small towns who had worked with their hands. Of course, they had PhDs later on.

Godrej: So it's that grounding and experience that makes a huge difference in your outlook. You may be the most brilliant scientist but if you cannot fix a small thing in your house… Some of it is cultural, some of it is historical and some of it has to do with the feeling that we are not really capable of doing it. I think the other thing which has reinforced this feeling is that in the recent past several companies have come up with very innovative ideas which have not been commercially successful. I also believe that innovation involves several dimensions; it's not just about the product idea and how to execute it but also about how to present it, how to attach a certain kind of value to it. People in India are more value driven than price driven; cheap is not everything, it is the kind of value a product offers that matters most. The mindset of the consumer is that she is looking for value and not cheap. The difference between value and cheap has not come through. When you think of a product or service, it may be the most innovative and fantastic thing that you could come up with but if you can't present it in the right way and people don't see the value in it .... even in Apple products.. they are the

most expensive yet people line up for them for days.. why? People are looking for value. It is interesting that in many sectors in India today people are going for the top end. There is a huge market at the bottom of the pyramid, but they also want value not just cheap. For example, Crompton developed a fan for the rural market, they made it smaller, lighter and presented it as a rural fan. The rural fellows told them that we see all your ads on TV about this big fan which is sold in cities, we want that not this. So innovation has to do with many things, not just the product idea, execution, but also how you present it. At the end of the day you want it to be commercially successful, because that is what drives innovation. This is the reason why few companies in India have come up with innovative ideas that have been commercially successful.

Stumblebee: What in your mind comes out as a good example of innovation that has originated in India?

Godrej: Many start ups in India have copied a concept. Take Flipkart, for example. They have copied Amazon but they are doing it their way. They understand the many constraints that exist and they have tried to address those constraints within their business model. I think copying can be legitimate as long as you copy the concept and idea but execute it in a way that is required for you to be successful. People have forever copied ideas, a car looks like a car with four wheels and steering and clutch, whether it is a Maruti 800 or a Mercedes, but they feel different.

With start-ups you will have failure, but we do not know how to accept failure, to reward failure – actually saying you did a great job by putting this there even though it did not succeed. This is another cultural thing, this also has to change.

Stumblebee: Your company has been employing IIT B graduates and interacting with IIT B in many ways. Would you like to share some of your experiences?

Godrej: Actually, we have tried over the years to work closely with IIT It's five minutes away so no one can say it is far away so we can't deal with them. But, I think, until recently, the idea that students and professors should embed themselves with industry and have a deeper exchange and understanding has not been appreciated. In the past, they were happy to sit there and pontificate and say that 'if you want some advice, from me come to me; but I have no responsibility for what advice I give.'- That's changing. There is no doubt about it; also, professors are being incentivized to work with industry. And industry is realizing that we are now in a competitive situation, we need to work closely with universities, because that's where knowledge is and you can learn a lot about various things, and so I think that is changing. In the past we have tried to employ as many people as we can from IIT, but you know what, they always end up going into marketing or accounting, that also has to change.

Stumblebee: This is a concern that we in academia also have, how do you think universities can address this problem?

Godrej: I think one key issue is that from day one, when a student joins IIT, he/she needs to start working with the industry on a project. Every semester, something needs to be done where they start working with industry. You are not then in a temple. You are in an atmosphere of constant interchange where they get to learn about the industry and the industry gets to learn about them. I think this concept of working with the industry from day one is really critical to helping students understand and appreciate the challenges in industry. Very often they have not appreciated the challenge, in the past it was always about who pays the best. You would get more students to look at industry seriously if they started working with industry early on. You could give them a semester off to work with industry.

Stumblebee: As academics we feel this is certainly something we should do, but I don't think we have enough buy-in from industry, with exceptions.

Godrej: It works both ways. We should meet more often.

I think we should also find things to do where the industry comes to the campus and the professors are involved, a lot more interaction is possible at every level.

Stumblebee: One of the things that IIT B is going to implement is the idea of a tech park where industry will get space to do R&D, provided they are engaged with IIT to a certain extent.

Godrej: All these types of ideas should be implemented and experimented with, to find the right solutions. I think the industry and university have their own set of phobias which have to be overcome in order for the two worlds to come together and collaborate. We have got to find ways to bring them together. In the U.S.A., professors do go and work in the industry for a few years and then go back to teaching. This kind of movement and interaction happens a lot. Based on this, we should develop a similar scheme.

Stumblebee: I agree with you! Very few of our professors take their sabbaticals in the industry.

Godrej: We should develop some ideas that would encourage professors to come and work with us for a short time period and, similarly, executives should be encouraged to teach at educational institutions.

Stumblebee: At IIT B we have a fairly transparent process. For example, we have some kind of provision for people from the industry to come in and spend some time at IIT. But the only problem lies with the compensation we have to offer.

Godrej: The industry must put them on deputation, they can pay. I don't think we can expect IIT to pay anything to the industry. It has to be worked out; start in a small way and it will happen.

Stumblebee: In fact our alumni have started a business forum which is going to be launched soon. Maybe we can present this challenge to them and see how we can take this forward.

Godrej: We'll be very happy to participate and work together; I feel that if the industry doesn't take this right step forward, they will ultimately hurt themselves. Constant interaction and interchange has to happen if we want to come up with solutions and innovative ideas.

Stumblebee: There has to be a win-win situation otherwise it will not work.

Godrej: Absolutely! Both sides have a lot to gain from continuous interaction.

Stumblebee: Thank you Mr. Godrej for talking to us and providing valuable insights on innovation and how we can make a success of it. ❖

The Encounter

Original Marathi story 'भेट' by GA Kulkarni

TRANSLATED BY S D PANDIT

Mr GA Kulkarni (known just as 'GA') was one of the wonders of Marathi literature.Wikipedia describes him as '...legendary author ... who brought a new strength and vitality to Marathi short story and was admittedly the most distinguished exponent of that genre ...'

His writing is marked by an astounding canvas which ranges from the wretched to the sublime, touching virtually everything in between - commonplace, exotic, philosophical, mystical...

He has the ability to take the reader suddenly by surprise with unexpected flashes of imagination and thought, unexpected but most apt similes and, often, a totally different light shed on things previously known in another context. He gripped the imagination of readers and critics alike during his lifetime and still continues to do so,twenty-fiveyears after his death.

The young man, whose face bore the mark of royal birth, came out silently from the palace gates and looked around with the bewildered eyes of a newcomer. The City sprawled below, its roads looking like blood vessels in a body. Lives of unknown people, with unknown joys and unknown sorrows, trickled down their lengths like living drops. All this was new to the Prince. This was the first time he was stepping into this world unaccompanied by servants and friends. As he turned to leave, his face showed a keenness for new adventure.

Just outside the main gates, he ran into a man overcome with old age. His hair had turned completely white; and he had an unhealed wound on his forehead. There was such misery in the eyes of the old man as no man would ever have seen; an agony that no man would be able to bear.

"May I come with you, Prince?" he asked. The prince was startled by this living picture of the extremes of old age and misery. For the first time, he realized that a man could grow to be so old. In the palace he was always surrounded by friends in the heady peak of youth and entertained with the music of the anklets of proud beauties. He was stunned to see the old man, bent with the burden of years beyond counting. The fire in his young blood froze a little and his soul was covered with the patina of age, as if in that one instant he had spent a score of years of his life.

Wordlessly, they started walking together along the road. A little way on, a blind girl was begging by the roadside, rattling her bowl. Seeing her, the prince's steps faltered and a blood-red brand seared his consciousness. In the palace, children played around him; but their faces were as blooming flowers, the hope of a happy future in their eyes and the tinkle of golden ornaments lending their lives a note of prosperity.

"What an extreme of misery!" the price exclaimed in a trembling voice, "She emerged

from the dark of her mother's womb, and is now condemned to an eternal darkness of her own."

"Yes, her misery is beyond measure, but it is going to end some time," the old man said, his voice stone-like, steady and emotionless.

The prince, numb with agony, was walking on with leaden steps. The suffering of all mankind had become the burden of his soul and he now wanted to go away from that maddened, restless crowd. Unconsciously, his steps turned towards the funeral ground.

A solitary pyre was burning there and the mourners were sitting silently a little apart. The body on the pyre had a helpless, abandoned look. The man's whole life, now become the shroud that wrapped him in isolation, was burning with him in a fiery envelope.

"Who is this? Whose journey has ended today?" the Prince could not help asking. His face looked older and his voice was filled with infinite sadness.

"The trader Lakshminandani" Someone answered with bowed head.

The Prince was speechless with astonishment and abruptly sat down under a nearby tree. Stoically bearing the pain of his wound, the old man too sat down next to him.

"This is the trader Lakshminandan!" the prince said sadly, "His treasure-filled ships sailed the seven oceans; in his alm-houses thousands had their fill daily; even the boundless power of the Ganges' waters was tamed by the steps he built on her banks and every temple by the riverside was crowned with the golden spires that he donated. And now, at the end of his journey, he is lying, shrouded in a single cloth. This is the sum and substance of human life! This is its ultimate meaning! It was only today that I have come to know this, for till now I had spent all my life on a bed of lotuses."

"Though human life is full of misery, it has an end; and death is a friend of man," the old man said, in the same dispassionate voice.

The young man was roused, and turning to him, asked, "Tell me, old man, don't these scenes bring tears of blood to your eyes? That girl, condemned from birth to living in eternal darkness; the anthill of age that keeps rising around one's life even as one forgets everything else in the pleasures of youth and in the end, this helpless, meaningless full-stop! Don't you think the entire human life is transient, and walks with the feet of misery and death?"

The old man said nothing; but his eyes shone for a moment with ancient memories, as if the seven suns had together risen and illuminated a boundless ocean of darkness. But renewed pain soon filled them again with misery, and the light went out.

"You have the gift of intelligence, O Prince," he said, "Many before you have seen such scenes; but how many felt sympathy as you did? You have so far lived on a bed of lotuses; but one day you will have a lotus for your seatii and sitting thus, you will enlighten others. I have endured all the misery there could be; listen to me. Even though all this is full of pain and misery, there is something yet more horrible. You are pained at death; at the transience of life. But that very transience, that very assurance of death in the end, is what makes human life attractive. That alone saves men from the hated shackles of an eternity of pleasures and the unbearable burden of endless suffering. As the novelty of childhood wears off, it turns shallow; then it is lost forever and gives way to the intoxicating passions of heady youth; when the body tires with the pleasurable fatigue that they bring, there comes old age with its wisdom and detachment; and when that is overtaken by a feeble and helpless state, death comes and gently snuffs life out. What more could a man look for in a happy life, young man?"

The old man's words startled the prince. "Is there something more dreadful than this?" he asked in surprise; but once again he was overcome with distress at the thought of the

girl's unseeing eyes, the misery of old age and the lonely helplessness of the body on the pyre.

"Yes, there is something more dreadful. Here the pleasures are fleeting, but so is the pain. Compared to such a life, permanence and immortality are unimaginably horrendous."

"But you too, old man, are tied - like all men, to the same wheel of transience. What can you know of the bane of immortality?" the Prince asked.

"I am not so bound – that good fortune is forever denied to me," the old man said in a shaking voice and, unable in his agitation to remain seated, abruptly stood up. "Who, if not I, can have knowledge of that torture? Look at me carefully, O Gautama; I am Ashwatthamaiii."

And having said these words, he once again picked up his weak old body and resumed his journey on the endless road. ❖

(From the collection 'सांजशकुन')

Shrikrishna Pandit
B. TECH.,ELEC ENGG., '73

Shrikrishna Pandit is an IITB alumnus who has worked in the field of EPC Projects most of the time. His translation work started more than 20 years ago, proceeding -of necessity- very slowly, but he has stuck to it, translating literary pieces both Marathi to English and English to Marathi.This short story is an extract from a collection of GA stories translated by him published by Popular Prakashan Pvt. Ltd, Mumbai, an old and respected publishing house, who have published most of GA's Marathi work.

Innovating is Not a Luxury Option

S MURALIDHARAN

Innovation is most often thought of as "nice to have" and not often enough as "need to have"; as a kind of metaphorical icing on the technological cake. It is also mostly associated with technology, especially computer technologies. The term Innovation conjures images of exotic advances in computing and proliferation of ever more complex consumer products based on computers. It is a term that appears to have been monopolized by the tech industry and rarely appears in any other discourse, especially in India.

I would argue that innovation can happen in non-technical areas too and the latter are a prerequisite for the Indian society to move on from where we are today to a better place with less poverty, more opportunities for everyone, and where wealth creation goes hand in hand with social equity. I would go so far as to say that without serious and widespread social innovation in all aspects of Indian life, the future could be catastrophic for our society, nation, and way of life. Innovation is a necessity and not a mere icing on the Indian cake.

The need for innovation is thrust upon us by developments, many of which are out of our control. Our population, which is set to overtake China's in two decades, is one such factor. The need for innovation is also a prerequisite for social harmony at a time of rapid and seismic demographic changes. Economic development comes with concentration of wealth, increased inequality and unequal access to resources and opportunities. If this is not addressed imaginatively, social harmony will be put at risk. Our present political and economic system has failed to address this so far, as is evident from the greater concentration of wealth since the high growth era began.

Large and less developed populations seem to be predisposed to governance deficits and political kleptocracy. Is there no escape from this condition? Are we also condemned to wallow in the Hindu Rate of growth in the long term or can we rekindle and sustain China-like high growth within a democratic framework? Can we spread the benefits of such growth more equitably without resorting to the socialist, confiscatory, means that we used to practice? Can we get on such high growth path without letting political classes' corrupt and rent-seeking behaviour illegally siphon the fiscal resources and benefits to themselves?

In the face of global, standardized consumer culture of fast-food, nuclear families and unfettered sexualized everything, should we seek comfort in the familiar medieval traditions (read khap panchayats, subjugation and objectification of women, caste oppression, etc.), or can we embrace modernity and evolve our own unique cultural identity that combines core traditional values with a modern patina of informed liberalism? Can we make primary healthcare and education available to

all and can we deliver them where people are rather than expecting people to come in search of them? Can we stop the present mindless migration to our crumbling cities in search of basic survival or can we make economic opportunities available to people in the countryside?

Will we continue to focus on rapid growth led by urban, service-oriented economy requiring high-skills and one which employs a few thousand, or can we innovate enough to bring economic prosperity to the over 700 million low-skilled labour living in the rural areas? Will a dozen metropolises continue to be the foci of our development or will we be able to create thousands of semi-urban growth centres? Can we improve the quality of life in rural areas and thus arrest the urban migration or will we let the migration continue unabated creating sprawling megalopolises with crumbling social services and infrastructure that grab ever larger slice of the economic pie at the cost of the rural areas, thus encouraging even more urban migration?

The list can go on. My intent here is only to highlight some of the pressing social and economic issues and point to a framework for finding solutions.

How can we do what needs to be done? Or can we do it at all? I would posit that the only way we can do the things that need to be done is through innovation: not through innovation in technology, but in the way we govern ourselves, how we feed our population, how we create opportunities for the burgeoning population, how we provide access to civic amenities and safety nets, how we foster comity and togetherness between different sections of the society, how we create economic successes without destroying our souls and even in how we view ourselves. To me innovation is not the luxury coach in the socioeconomic train; it is the very engine that will pull our country well into the twenty first century. Whether India shines or not will depend on how well we innovate our way out of the much-lamented mess we are in, especially in the areas of governance, social harmony, economic progress, and how we create and sustain opportunities for the burgeoning youth population to become productive drivers of the economic engine.

Let us look at some of the areas that cry out for innovation: I am deliberately leaving out technology which, wonderful as it is, is only an enabler. The real innovations have to happen in economic, political, and social sectors of India for it to shine. Otherwise "India Shining" will remain a futile, meaningless PR exercise with only the elite tier benefiting from it.

I would go so far as to say that without serious and widespread social innovation in all aspects of Indian life, the future could be catastrophic for our society, nation, and way of life. Innovation is a necessity and not a mere icing on the Indian cake.

Innovation in Governance

A country of over 1.2 billion people, of which half is under the age of 16, is ruled by septuagenarians out of touch with the aspirations of masses and whose political acumen consists mainly of exploiting social, religious, and economic divides for electoral gains. Issues are hardly ever debated widely, let alone considered wisely, but decided surreptitiously within party cabals with an eye on electoral arithmetic. In a country that prides itself as being the largest democracy, real views and real issues appear not to have any serious impact on the polity or the society. Electoral

frauds and manipulations are also the norm rather than exceptions. It is no surprise that the mass of voters view elections as a one-off source of freebies and the middle class simply does not participate in the process.

Is bad governance a necessary corollary to a large democracy? Is democracy itself unsuitable for a population so large as this? The answer to both would be NO. Despite the lack of China-like homogeneity, India can succeed despite diversity; one can go so far as to say

To me, innovation is not the luxury coach in the socioeconomic train; it is the very engine that will pull our country well into the twenty first century.

that the very size of India can give it advantages many advanced nations lack. Do not forget that until about two hundred years ago, when we were far more fragmented geographically, socially and politically than we are now, India accounted for 20% or more of global GDP. Others have moved forward even as we slid backwards.

The representative democracy visualized by our founding fathers appears to have morphed over time into a governing class distant from those it governs; it has grown into a rent-seeking monster that has made corruption a huge industry; and it has created a schism between the Centre and the Provinces by seeking to centralize more and more even in the face of greater popular desire for local decision-making. The promised ground-level democracy has largely failed to materialize despite much hullabaloo about Panchayati Raj.

In order for our economy to flourish, our polity has to provide an acceptable level of clean and truly democratic governance which is responsive and accountable to the people it governs. This can only come about through innovative political structures which are not mired in the time-warp of nineteenth century political idealism or in the discredited centripetal socialism of the twentieth century. Instead of getting stuck with one discredited "ism" or another, we have to innovate governance structures which allow billions to actively participate in making decisions affecting them as against selling their votes to the highest bidder once every five years.

Participative democracy may have been born in the compact Greek city-states, but is it impossible to implement in our vast country given current technological capabilities? I would submit not. Direct grassroots level democracy is possible, is within our means, and I would say necessary. Innovative governance structures, implemented using technological enablers, can narrow the distance between the ruled and the rulers and enormously improve not only the governance but also nurture and restore faith in democracy which appears to be waning each day.

Demographic Dividend or Demographic Bomb?

The answer depends on how we decide to deal with it. Half the population is under the age of 45 of which most are under 16. Any time now we will have to find jobs for them all. There are also the issues of educating them, and meeting their rising expectations. Service-sector jobs are too few and require higher skills than what most of this cohort will possess. We do not have the investments to create manufacturing jobs for them all; even if we did manage to do that, can we find markets for what we will produce? I think not. Besides, China is unlikely to yield the ground they have occupied successfully for the last 30 years. On the other hand, we have very poor social and commercial services at the rural level. Can we innovate systems for delivering various goods and services to those areas and

could we create jobs for the vast throngs by doing that? Can we create new paradigm using this vast manpower at our disposal? How much and for how long India shines depends on how well we manage to do this. Failure to do this may well result in social unrest and eventual fragmentation of India as we know it.

What happens fifty years down the road when India begins to age rapidly as Japan did in the last three decades and China is doing right now? Will we have adequate services for the seniors such as geriatric healthcare to name just one aspect? Who will pay for those? Will our intergenerational solidarity hold, with the new working generation supporting the older non-working one, or will it dissolve in acrimony as it is happening in America right now? If not, what can we do? Can we rethink the role of elders or will we think of them merely as idle consumers of services? Can we build geriatric services as businesses? Can we take steps to encourage the younger generation to save for their retirement such that they can become self-supporting in their sunset years or will we let them consume their way into a future of penury?

Education & Health Services

Decades after independence we are still unable to deliver literacy and basic education to the vast throngs of citizens in dispersed rural communities. The problem faced in delivering primary healthcare is depressingly similar. We have been unable to persuade educators and healthcare workers to go where the population lives. Are there ways of achieving the delivery of these two crucial services to where people are without expecting healthcare and education workers to make personal sacrifices in the interest of the larger society? Is it possible that we can create profitable businesses out of such deliveries by employing vast throngs of enterprising youth who would otherwise be unemployed? Can we go further and make the youth themselves owners of such enterprises? I submit that if we can think out of the box and not in terms of established paradigms, we can. We simply cannot afford not to.

Social Harmony

For too long politics has seen diversity as a valuable vote bank and has played one community or section against another for their own electoral gains. The so-called champions of the disadvantaged sections have dropped the pretences of helping their brethren and brazenly justify their self-enrichment on the basis that it is now "their turn", even as their constituency looks on in dazed incomprehension at their lack of progress even under "their own rule". Does India have to go forward only in terms defined by historical religious and caste divides or can these differences be made not to matter in public life? Can we evolve communication strategies that cut out the crooked middlemen exploiting these vote banks? Traditional thinking has so far failed to deliver. It is clearly time to think differently now.

Economic Development

Nehruvian socialism betrayed an abiding mistrust of the "trading" classes, as it did an overweening confidence in the abilities and intent of a few power-elite. The former betrayed a poor understanding of economics (middlemen are actually essential for risk disaggregation and dispersion in an economy) and the latter the arrogance of the then elite rulers. It is no surprise that the economy struggled to provide even the basic necessities. I remember my days at IITB, eagerly awaiting the next letter from a brother in the US, a letter carrying a fresh shaving blade! We have moved away from those days, but still the vestiges of centralized economic decision-making remain.

Our centralized economic planning failed even to see - let alone counter - the rise of China as the world's factory even as our own manufacturing was tied up in constricting and often conflicting maze of rules. Enterprise was

viewed with suspicion and grant of licenses was often for a quid pro quo. Despite much diversion of banking funds to the so-called SME sector over the last 50 years, there is nothing much to show for it. In the meantime, the services sector rose to be the biggest chunk of our economy. Agriculture employs over 60% of our population but accounts for less than 20% of the economy.

Do things have to be this way? Will our economy become a two-speed economy of urbanized services sector employing highly-skilled graduates serving foreign consumers and a majority of impoverished farmers looking for the next handout from the government which the urban elite resent on ideological grounds? What about the manufacturing sector marooned somewhere in between these two? Can we come up with small business paradigms which make money for their entrepreneurs even as they provide much needed services to the rural population in terms of education, health services, electronic markets and market information for their produce, weather information, etc. Conventional wisdom has it that the services sector cannot provide the required number of jobs to the rapidly-growing youthful population. We are not going to be able to scale up manufacturing to the level required to absorb all of the new workforce - where are the required investments, just to name one impediment?

Innovating Is The Answer

I have no illusions about the magnitude of the task nor am I an alarmist. I believe that the problems which we have accumulated over the last few decades do not lend themselves to easy solutions. We need to think out of the box and innovate; not just to make a better widget that can sing and dance and one that we use to hang our most private thoughts out to dry in public, but one that can help us solve our hitherto intractable problems. If Facebook can have a billion users who can "like" or thumb down a post, then we already have the technology for a direct democracy; we just have to think through how we can use it to mobilize people to have their say on any given issue. It seems it can even be done as a for-profit business!

We must never lose sight of the objective. The objective is not to make a better, cleverer, widget; it is to provide a better life to the present and future citizens. The temptation to see the technological developments as an end in themselves is high for those who pioneer them; but the real innovations that make a difference are the ones in the social sphere, which might use technological advances to make possible things that were hitherto not.

What are we waiting for? ❖

S Muralidharan
M.SC., PHYSICS,'72

S Muralidharan, the self-styled "Cool Cat" of H9, joined the Banking industry in '72 and went on to found India's biggest private Life Insurance Company in 2001. He retired in 2011 and lives in Chennai. A jazz fan, he never missed a Mumtaz movie at the Convo, sometimes watching both shows.

The Planet of the Gods

SATISH HATTIANGADI

1. The Road to Destruction

Abrahm, Vishy and Shiv made up the Triumvirate that ruled Plantilox. Plantilox was a company – at least, something resembling a company, for in that day and age, in that location, there was no Company Law in existence, and so Plantilox could not have been a company. But it controlled the resources of the entire planet. What competition there was for the resources from other 'companies' had been eliminated by barter or by getting those involved to hop over into the Plantilox fold.

The great invention that made Plantilox what it was today was the development of the 3-D organic molecular printer. This terrific product could create organic molecules by inserting atoms at specific locations, so that the atom chains could grow into whatever complexity desired. And then the design of the printer was enhanced, so that it could simultaneously produce and grow multiple chains of atoms.

The next step in the development was to program the printer to produce DNA. This was followed by the production of DNA as well as all the other organic material that goes to make up a living cell. And as if that was not enough, the printer went on to make entire living organisms.

That was when sexual reproduction stopped on the planet. Parents would go up to Plantilox and ask for children with specific special features and capabilities. Plantilox would then program and print the desired

Plantilox was a wonderful place - idyllic surroundings, almost perfect harmony among the 'people' who happened to be Gods, with global growth rates adequate to keep all the Gods happy and contented

child into existence. Within a generation, all the 'living' parents had died, and left this population of specially equipped, non-dying breed that had been printed into existence. The normal aging process had been eliminated. And the special powers granted to all those beings truly made them – Gods.

Yes, Plantilox ruled the planet of the Gods. And at the helm of Plantilox were those three – Abrahm, Vishy and Shiv.

The three were themselves Gods, with no in-built decaying mechanism. Abrahm was the expert at the printing programs, and was known as the creator of Plantilox. Vishy, on the other hand, was a designer, one who could modify Abrahm's designs to produce the right features in the finished product to have a harmonious blend with the other denizens of Plantilox. Shiv's role was to locate those creations that had somehow gone out of control, and bring them back into the fold, if possible, or destroy them.

Plantilox was a wonderful place, idyllic surroundings, almost perfect harmony among the 'people' who happened to be Gods, with global growth rates adequate to keep all the Gods happy and contented.

Yes. Plantilox was perfect. It could go on forever and ever, with all the Gods in happy coexistence.

But those three, Abrahm, Vishy and Shiv, knew that this happy state could not go on forever. This is because Plantilox existed in a universe, and had to follow the norms of the universe. And one of the norms of the universe was that energy conversion from one form to another always left a part of the original energy as 'irrecoverable'. This 'irrecoverable' energy accumulated in the system, and led to not just global, but universal 'warming'. The term 'entropy', which was used to measure the extent of irrecoverable energy, thus became an ever-expanding function. Along with the 'warming', entropy was also proportional to the chaos in the system. Thus, the whole universe, and even the tiniest component of it, could be seen as traversing an arc starting from low entropy state (which was highly ordered, as the entropy was low) to a very high entropy state, characterised by extremely high chaos.

Now, if entropy was the law of the universe taking everything towards chaos, then the DNA molecule was the exact opposite, taking its surroundings and itself from one level of order to a higher level of order

Yes, this entropy, often called 'the arrow of time', was definitely taking the universe from a state of order to a state of chaotic disorder. And Plantilox, as a part of the universe, was sooner or later going to get caught up in this universal drift towards chaos and get annihilated.

This was the problem that was engaging Abrahm and Vishy and Shiv. Was there anything in the whole universe that could stem the unbridled growth of entropy? Anything that could at least slow it down, if not take entropy in reverse gear?

They got the God with a thousand eyes to look into the skies with a thousand telescopes for a thousand years, and they could not find anything that could slow down or reverse the unidirectional growth of entropy. But after a thousand years of looking out onto the universe, they found the tiniest thing right there on Plantilox itself, staring at them for all those thousand years that they were searching the skies.

Yes, right there, on Plantilox, in every cell of every living body created by the miraculous 3-D molecular printer, there was this molecule called the DNA.

Now, if entropy was the law of the universe taking everything towards chaos, then the DNA molecule was the exact opposite, taking its surroundings and itself from one level of order to a higher level of order.

Even in a single-cell organism, the DNA controls the whole cell. Not only that, by controlling the products it ejects from inside the cell and retains outside its cell wall, this single-cell organism starts controlling its environment.

Yes, more living cells mean more order, and therefore less chaos. But DNA went much further than that. Left to itself, the DNA multiplied. And as it multiplied, from one generation to the next, the DNA itself evolved from one state of complexity to a higher state of complexity. As the DNA went to a higher state of complexity, it in fact went into a lower entropy state!

Yes, Abrahm and Vishy and Shiv now had the weapon with which to fight against the

forces of chaos – DNA was the weapon.

2. The Preparations for War

Abrahm, Vishy and Shiv realised what had to be done to counter the effects of rising entropy. They had to spread out DNA all over the universe. When adequate DNA existed in the universe, the ordering influence of DNA would counterbalance the chaotic effect of increasing entropy.

Yes, the Gods were now getting ready to fight the forces of chaos! It was now a matter of time, and effort, for the Gods to come to grips with entropy, and thus make life truly eternal!

Easier said than done! It was one thing to know that DNA was the antidote for entropy. But how were they to transfer DNA all over the universe?

They would have to create rockets. And the rockets would have to be large enough to carry whole communities from one planet to another. And the time required for such inter-galactic travel meant enormous storage of food and fuel, which in turn meant that the rockets would have to be even bigger.

They toyed with the idea for a while, but had to give it up. The universe was far too big, and the distances between planets that could support life far too great to transport communities to populate the planets.

The three of them spent a long time wondering what to do. And then, one day, they saw Vishy smiling. When Abrahm and Shiv walked up to Vishy, they were both dazzled by that smile. And they both knew – from past experience – that Vishy smiles like that only when he has some trick up his sleeve!

"We were wrong. We were thinking big. And the more we thought big, the bigger the problem got. If we think smaller and smaller, then the problem also gets smaller and smaller, hence easier to solve!"

Abrahm and Shiv looked at each other. Was Vishy saying something profound or was he just pulling their leg?

Vishy laughed at their perplexity. "Instead of transporting a complex animal, we can think of sending a few single-cell organisms in a hermetically sealed capsule. To take these capsules, we do not need large rockets. Small rockets could take them into outer space, from where the capsules could be shot towards various galactic formations. We may have to spray millions of such doses for a few to hit appropriate planets. Many more doses would land on meteors, some of which might also end up, sooner or later, on some suitable planet."

It was now a matter of time, and effort, for the Gods to come to grips with entropy, and thus make life truly eternal!

"But what is the use of sending single cell organisms?" Abrahm asked.

"Let me reinsert the death genes. And then those single-cell organisms are going to go through repeated cycles of birth and life and death. With many cycles, all kinds of complex life-forms will come up. Maybe a day will come when one of those planets will spray DNA towards our planet!"

"That will be the day!" smiled Shiv.

There was no harm trying, anyway. So Vishy got down to designing the unit that would go from one planet to another, across aeons of time and from one to another distant galaxy. He made an external metallic shell, insulated on the inside, but with inbuilt fractures, so that the metallic shell would break apart on impact. The insulation itself had a tiny hole, through which water or any other fluid would get sucked inside. On contact with the fluid, the inner layer of the insulation would burn, causing the insulation to burst open, as well as smashing the vial of

single-celled creatures to crack open and come out.

On Abrahm's advice, Vishy also made some 'catalysts' – smaller packets of DNA that could attach to the DNA of the single cell and help that DNA to mutate – and hence speed up evolution. Over time, these "catalysts of change" evolved into the various viruses, while the single-cell creature evolved into all the flora and fauna that we see on the earth.

Vishy had made those units so tiny – they looked like miniature knitting needles – that a rocket could easily take several hundred thousand beyond the gravity barrier of the planet, and shoot those needles in all directions, at about one tenth the speed of light.

It took about forty-five years for one of those needles to come and hit the earth, as they were emanating from a planet near Alpha Centauri, about 4.5 light years away. The impact happened on the sea-bed, and the single cell creatures made their first appearance on earth.

Now, after several millennia of evolution, mankind is looking at Alpha Centauri, wondering if we could send some probe to locate extra-terrestrial life.

One of these days, some of our scientists at ISRO will realize the wisdom of making things small, and we may end up sending single cell organisms back to that planet of the Gods! ❖

Satish Hattiangadi
B.TECH.,CHEM ENGG., '75 H5

Satish Hattiangadi did his Masters in Chemical Engineering from the University of Massachussets, Lowell (at that time Lowell Technological Institute). He did a Post Graduate Diploma in Software Technology from NCSDCT, and has worked extensively in software development. He is married to his classmate from IIT Bomay, Leja. Satish has all along been working alone, and tends to work 24/7 till the problem at hand is solved. He has retired from software development for the last eight years, and has been a regular participant in his Rotary Club and Rotary District activities. He is also member of the Executive Committee of the Mumbai Chapter of IITBAA.

Empowerment in a Landscape of Lights

HUMBLEBEE

Running a business on a social entrepreneurship model is no easy task. It requires a fine balancing act between a profit centred approach and the larger social goals of your enterprise. Last year Forbes India Magazine reported that for the year (ending March 30, 2012) SELCO's revenue stood at Rs. 17 crore from which it was expected to make a profit of Rs. 1.2 crore. It had by then sold solar lighting to more than 100,000 households, many of them in extremely poor hamlets.

It was this resounding success of SELCO along with their model of decentralised energy solutions for the underserved—the millions of rural poor in India; that motivated me to reach out to Dr Harish Hande, the Magsaysay Award winning founder, for an interview with Fundamatics. But an hour's telephonic conversation with him convinced me to change track mid-course.

Here was a successful entrepreneur who told me that his personal belief is that he should own no assets in life and shared that he was at a point when his bank balance was so low that the visa authorities questioned his ability to sustain himself for a planned trip to Europe. A business man who does not believe in making money! Having possessions!! And someone who told me that the technician who spends 6 hours daily with a client as opposed to him who now spend 20 hours in a year with a client deserved a greater stake in the organsiation. Not because he is a closet leftist but because he considers it a pragmatic approach of creating financial inclusivity and sustainability for the organisation in a holistic manner.

But what was even more interesting was what he shared about SELCO as it made me realise that this was the more unique narrative and the real story worth featuring. Because the SELCO model is about innovation at many levels, most importantly in inverting existing ideas, thought processes, beliefs and above all power structures and hierarchies. SELCO is not just about a successful model for social entrepreneurship but about empowering the rural poor and turning hitherto employees and service providers into employers and clients. The transformative potential of such a narrative is huge. Harish is thus merely the voice—albeit an alternative one—that recounts the SELCO story with no attempt on my part to formulate it into the 'right' political discourse. The reader is less interested in what I think and can make what they wish from what he shares. I did ask Harish about his personal journey but it was only to put in context the evolution of the concept and practice that is SELCO and how it can be replicated to create the right eco system for an energy revolution in India.

The evolution of a Solar Evangelist

Harish told me about growing up in the steel town of Rourkela in Odisha where he did all his schooling up to 12th standard. He followed it with a degree in Energy Engineering

from IIT Kharagpur (the first IIT to set up an Energy Engineering department in India long before IIT Bombay). There was an element of chance here as although Harish opted for Energy engineering from the available options based on his JEE rank, his interest revolved more around Mechanical Engineering and thermodynamics.

From the world of theory and Mathematics, Harish discovered a true interest in Energy only from his third year onward but it did start off from an existing interest in solar energy. By the time he applied for a Master's programme in the US, his interest had further focused to a sustainable energy perspective. His Master's and PhD were pursued in the US at the University of Massachusetts, Lowell, also in energy engineering with a focus on rural electrification. It is worth pointing out that all of Harish's education was focused on mastering one discipline and all his training and field work was in one area. Harish pointed out *"in 1991 I had the chance to go to the Dominican Republic and there I met quite a few people who were using solar energy and these were poor, impoverished farmers who were decentralised in many ways. This made me look at decentralised energy more deeply. My travels in India and Sri Lanka provided insights not only on decentralised energy but also on the linkages between poverty and sustainable energy"*.

What SELCO tries to do is customisation of the technology along with appropriate financial products delivered at the door step of the end user with after sales services.

Harish explains the SELCO model

In synopsis what SELCO tries to do is to provide a customised solution at the door step of the end user. What we mean by customised solution is that is that it would be customised in terms of the utilisation of the technology or it could be technology in combination with an appropriate financial structure. This is possible as SELCO works with third party banks to finance the end user depending on their cash flow. For instance a paddy farmer will get a loan for 5 years and he will repay on a yearly basis, a peanut or a sugarcane farmer will repay twice a year, a school teacher once a month. A potato vendor will want a yellow light that will subdue the blemishes in her potatoes, whereas a tomato vendor wants white light because tomatoes appear redder in a white light. It is basically customisation of the technology along with appropriate financial products delivered at the doorstep of the end user with after sales services. We have 41 offices in Karnataka alone based on the concept that the area of jurisdiction of a technician for sales and service should be not more than a 2-hour drive on a motorcycle. We work with appropriate banks in that area to provide financial services to the end user. So far all repairs have been done by SELCO technicians and even today 95% of the after sales services are taken care of by SELCO technicians but we have also started working with a lot of technicians who work in repairing TVs, pumps and the likes to train them to become service associates for simple after-sales services. For the more complicated services it is always SELCO representatives.

There is an intensive focus and belief on the human interaction at SELCO, be it between the end user and our technicians or our

local branch manager and the bank manager and the end user. A few years ago, over 200 clients attended the wedding of a SELCO technician, which is a testament that highlights how this interaction becomes personal in many ways.

On Scalability and Creating an Eco system for an Energy Revolution

Let us bifurcate SELCO and the concept that underlines it. The concept, to provide door step service using third party finance, is highly scalable and that means the SELCO model needs to be replicated. In fact that is why the SELCO Incubation Centre was created—to inspire the next generation of youngsters to generate more innovative ideas. They do not have to make the same mistakes that we've made in the last 19 years. This can be done by focusing on the processes. To learn the processes in a manner that these are considered hard and fast but are malleable so that they can to be changed and modified based on the segment and the area that you come from. For instance, we have helped start one in West Bengal, one in Rajasthan, and now another one in Manipur. They need not take the name of SELCO as we have positioned ourselves as an open source organisation.

A Street Vendor Model

The only other equivalent model to ours is that of the Street Vendors and here the process of street vending is replicated. A street vendor's business is customised based on where they are located and to local needs. For example, the vegetable seller near my house will sell a different set of vegetables as compared to the street vendor near your house. But you will never hear of two things. A street vendor going out of business and even if one might fail others won't. Street vending as a concept is successful and that is the model that we are trying to pushto empower numerous entrepreneurs.

SELCO Incubation Centre started in July

2012. Approximately 50 people have gone through it. In every Incubation cycle approximately 150 people apply. We select about 10 from them who will go through this rigorous process. Currently there are 5 who have graduated out completely and there is another lot of 15 who are in different stages of incubation. Of the five, two have already secured funding another should get funded by December 15th; the others should be ready for investments by June 2014.

If you create ecosystems where ability and experience are given precedence over received knowledge then things do work differently and hierarchies can be inverted. It happens at SELCO every day.

On Mistakes that Entrepreneurs Commonly Make

My experience is in the social entrepreneurship space and the most common mistake people make who want to enter the social entrepreneurship space is that they think – "let me first write a proposal, get the money, and then I will start".

Money is only one part of the linkage, the more important question is, " do you have an understanding of what you want to do?" The first funding I raised was only after 3 years. I did not even come out of the rural areas for 3 years. This is because if I wanted to put solar energy in the hands of the end user, I needed to ask myself, "do I know what he feels, what his needs are?" If I want to set up an office, "do I know how the manager who will work in that office feels? Does the technician who will install the systems know what is the expected reaction that he will get from the end user?"

The important question for me was "How well do you know your end user or the eco-system in the rural areas?"

People need to spend more time in knowing their customers and focusing on the processes and for that, you do not need money. To write a business plan for a potential idea that we have not experienced ourselves, where the authenticity of your presentation is based only on how best to present it using power point, is not enough. People now think that if I have an idea and if I put in a PPT, I am an entrepreneur. And then all I have to see is how I will scale up in the next 5 years and earn millions. My question to them is, "Have you felt it? Have you gone through it? Have you actually gone through the rut of it?" That is the challenge, intimately knowing all the parts of what you are trying to achieve. To focus on writing a business plan and then marketing it by going on Twitter and Facebook is the wrong way to approach it. What is required is an investment of time and energy to understand the whole process right from scratch.

I have nothing against people who want to become entrepreneurs for the sole purpose of making money. But it remains a fact that some of the most successful organisations around the world were started with the intention of bringing new ideas forward and building upon them. They clearly didn't think only in terms of money. And any successful Business be it GE or Reliance for example, all took time to build up. Processes take time and if money comes before your passion then it is a very short term view and an unsustainable way of thinking.

I think social entrepreneurship is for people who can balance their financial ambitions with a social responsibility and environmental sustainability. It is also a process that requires patience because building an organisation involves time and sustained and consistent effort.

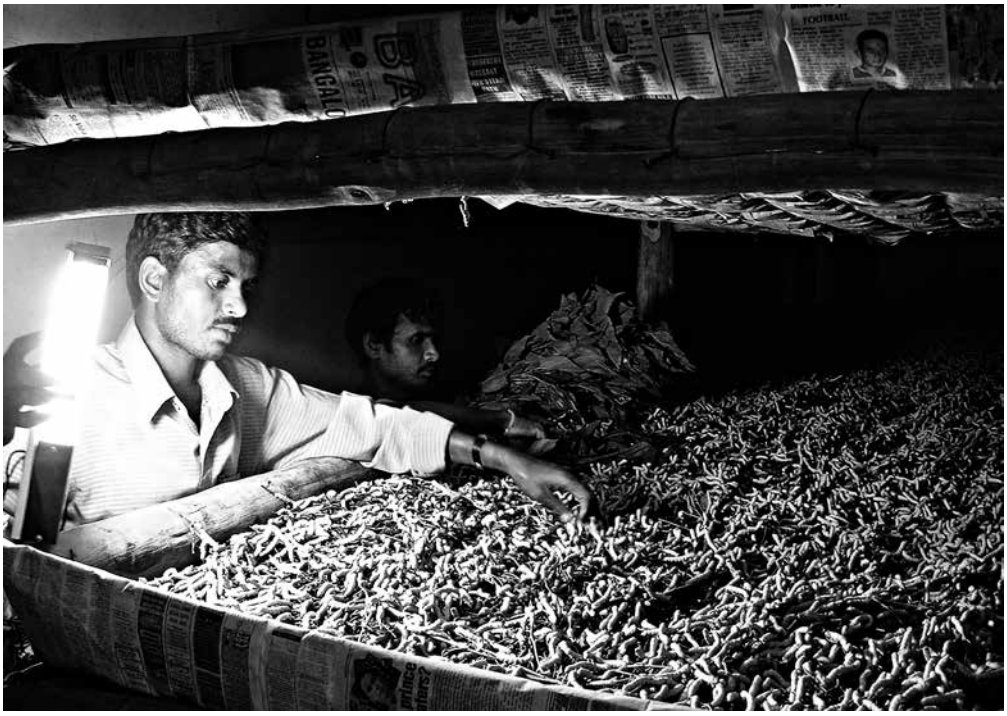
On the Importance of Innovation

For us at SELCO, innovation is key but it has various definitions, it could be about how you position yourself as an anthropologist because the intervention of selling energy services is not like selling the same kind of service to everybody. The needs of the end users are different, their financial outputs are different and their market linkages are different. It is about figuring out what part of this ecosystem is missing. Are you for instance, able to first, figure out what the missing link is? Second ask yourself, "what is a sustainable way of plugging that linkage." and finally, "how do you scale that process up?" This is not about scale from an organisational perspective but scale from a process perspective.

Let me illustrate by an example. When you look to serve very poor communities as clients, where the bank refuses to give them loans, SELCO initially creates a guarantee mechanism for our customers with the Banks and then slowly as the people pay back to the bank we withdraw ourselves from the guarantee mechanism as the people have been transformed to bankable individuals on their own.

The truth is, we want the poor to become service providers, so that we can have better savings. Unless and until we can create an eco system where the poor become employers and not employees, we will not see a change. But how do you give 70% of the Indian population who seem to be left out of the growth story, an equal opportunity? We need to provide them with proper tools and equipment that can empower them.

Take SELCO's work with the Siddi community for instance, they earn 1600 rupees a month of which they spend 140 on Kerosene and candles and 40 on mobile charging as they have to take their mobiles somewhere and they spend Rs 5/charge and 8 such charges a month. This 200/month amounts to Rs 12,500



in 5 years but a solar system at 14% with two lights and a mobile charger costs Rs 9,000 in 5 years. It is not Technology; it is not affordability that stops them from moving over. It is the banks refusing them loans. When we asked the banks for this money the first time, they refused saying that these are people who have nothing. When we asked them what they wanted they said that they wanted 100% guarantee. So we gave them 100% guarantee. After 6 months when we asked them how the collections were they said that they were fantastic. We asked them "if you had this information what guarantee would you have taken from us and they said 20%." So we immediately removed our 80% of the guarantee money out. But the best response was from one of the Siddi end users when we asked if they were happy. Their response was that yes the light is great but as soon as my solar loan is done, I will take a loan for a sewing machine. This means that they had become bankable and the system itself had become more financially inclusive. For us that is more important. The concept is not to keep solar as the centerpiece but sustainable energy becoming a catalyst for a more holistic development for the end user rather than just giving them a light.

Innovation is about Change...in your thinking

Innovation is not just about a product or a process but can have a deeper connotations in terms of challenging fundamental beliefs and inverting hierarchies. There is a degree of insensitivity among our urban population which needs to change. Sensitivity is crucial. I remember going to a well known research company in Bangalore for a talk. The question I was asked there by the Vice President was, since I travel so frequently to rural areas and since I am from an IIT, could I actually have an intellectual discussion with people in the rural areas! In another Company someone proudly proclaimed "my kids also go to rural

areas to teach the kids." My response to them was "have you also thought that the kids in the rural areas can also teach something to your kids?" We have replaced British colonialism with an educated class and another class system in our country and that needs to break. There is an inequality even in our thinking. There is a respect for human labour in the West but here in India there is still no fundamental respect for human labour.

It is perhaps for this reason that at SELCO no resumes are collected when people are hired and a person's position in the company is decided not by their degree or qualifications but on what a person can do, how they perform and their ability to deliver. Most people at SELCO do not know of my degrees or my IIT background. This is because the system is set up in a way where such things have little or no relevance. I have irritated Vice Chancellors at Universities where I have been invited to speak because I always make sure that the company colleague who drives the car accompanies me to dinner and we sit together. When SELCO employees travel for work everybody stays in the same accommodation and eats the same food. At SELCO such insidious hierarchies are absent and if you see our reporting structures strange things are happening. People often report to people who are much less qualified in terms of degrees that they have. So if you create ecosystems where ability and experience are given precedence over received knowledge then things do work differently and hierarchies can be inverted. It happens at SELCO every day. It can be done by people who set examples and initiate change.

The going is not always easy as resistance often comes from the outside. Once when we had sent a colleague to a client Company the people in the organisation refused to meet him because he was a technician. I called up and asked the chairman to ask, "May I understand why?" I told him that the technician had a greater understanding of his problem and that he would be the one to find a solution. I then asked him if he was more interested in the protocol regarding who should come or was he more interested in solving the problem?

For me the biggest hurdle towards growth and progress in our country is the problem of wrong perceptions. Many of us are trapped into believing that people from certain sections of the society are unequal to us. As long as we have this mentality we cannot achieve our goal of sustainable development.

Post Script:

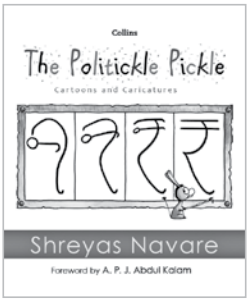
I don't know about the readers but for me there was enough food for thought and inspiration in the conversation. Buried in the text and sub text of the conversation there are many a lesson for not just the budding entrepreneurs looking for answers but for the average educated, increasingly disconnected and alienated urban Indian unplugged from the everyday subject of rural experience. More as it sets a challenge for us as modern subjects on the margins of the global capital to produce new ways of thinking about oneself today.

Leadership, be it of a person or from an organisation, is after all not measured in the words that you speak but in the choices you make. SELCO has made choices that focus not just in their own growth but more importantly also in the holistic growth of the clients that they serve. And it is this part of the story that is truly inspirational and unique. My concluding thoughts are that there is something Gandhian about the SELCO model for was it not Gandhi who said "You must be the change you wish to see in the world." I hope the reader will also agree. ❖

The Politickle Pickle:

The Greatness of Simplicity, Exactitude, and Lightness

QUEENBEE



Let's face it, a cartoonist whose work has received praise from the greatest of them all—the great R K Laxman—as work that shows great promise needs no endorsement or book review from me.

But I chose to write this review for the recently released book of cartoons called "The Politickle Pickle" by Shreyas Navare as my sincere and impartial offering to the reader of a book worth reading and keeping. One to which you will return to again and again.

Why?

Well, first of all cartoonists are a rare breed and a good political cartoonist, the rarest of them all. I personally think that Shreyas is one of the best amongst the current crop and perhaps the one who is destined for true greatness in his craft because his work displays three qualities that are the hallmark of greatness:

Simplicity, exactitude, and lightness. Let me explain what I mean.

Simplicity, because his cartoons and his alter ego (Zero) wander into our world in a simple and spare style asking uncomfortable questions and sparing nothing and no one, pointing out the hollowness of our political system and how we are complicit in it all, without once losing his sense of inner happiness and hope and better still imbuing us with its ebullient effervescence.

Exactitude, as his work is an evocation of clear, incisive, memorable visual imagery combined with an exact and precise choice of words that display not just an innate maturity of expression but subtleties of thought and imagination that is exceptional in one so young.

Lightness—not the lightness of frivolity but a weightless gravity that does not bog you down. Inderjit Hazra speaks of the angry young man quality of his cartoons in his introduction in the book. This is because Shreyas carries the reality that is India today within him, feels what we feel and accepts it as his particular burden and in the process lightens our load. We identify with Tuktuk's questions as they are a metaphor for the common citizen's daily anger, agony, and frustrations and yet one that offers us a beacon of hope. As I turned each page of Politickle Pickle there was a stone in my heart, a lump in my throat and yet a smile on my face that made it all worthwhile.

I am tempted to cite Milan Kundera's book, The Unbearable Lightness of Being, to illustrate my point. It is a book which is all about the bitter confirmation of the ineluctable weight of living and the all pervading frustration and hopelessness of the human

Image Courtesy : Shreyas Navare, Politickle Pickle

condition. Whenever you are condemned by this feeling of heaviness you can pick up Politickle Pickle or look at any cartoon from Shreyas to escape to an alternative space not as an act of escapism but one where you look at things with a different perspective—of lightness that is thoughtfulness and hope.

You can safely buy this book and it will be money well spent. Not because cartoonists are an endangered species who need all the help that they can get but, because in it you will find a constant companion who will give you solace with a smile. And we need all the smiles thatwe can get.

Queen Bee (and if you have not figured it already, a fan of Shreyas Navare).

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Time to Encash it:

The Skills Opportunity

REVATHI KASTURI

The recently released census data on age-wise distribution of the population shows that India now has a rare demographic and economic opportunity. The population increased by 17.7% from 102. 86 crore to 121.06 crore during 2001-2011. But the increase in the 0-9 age group was only 0.4 per cent.The good news is that the number of people in the 15-59 age group has increased by about 25%. This group, which is the working age category, also forms 60% of the country's population. It means that the country has many more people who can work and support those in the children and old age category.

This is a classic case of demographic dividend which countries usually get only once in their history and sometimes only for a short period. Developed countries once gained from it but now have a larger older population and small young and child populations. China took great advantage of the dividend in the last few decades, but the situation is now turning unfavourable with the birth rate and the number of working people declining and old age population increasing. To make the best use of its opportunity, India should expedite economic growth and provide more employment to the people who are in the working age group. This also means providing more educational facilities and implementing skill development plans for those who need it. A good part of those in the working age category, even those who are considered to be qualified, need such programmes. Industry and services will have to provide the greatest share of these jobs because the employment potential in agriculture is limited. But a good part of the growth in population is in rural areas, and so urbanisation and investment in industry and infrastructure will need to be boosted. It is necessary to give productive jobs to those who need them.

The change in age-wise and geographical distribution of population will lead to social and other changes too. We can expect an increased migration of people from the northern states, looking for employment. Inability to provide employment to people who need it can lead to discontent and disaffection. The opportunity which has now come should not be wasted.

"Focusing on skilling our people will create several industries and professions where India will become the global talent pool. Our nurses, teachers, healthcare workers for elderly, construction workers, chefs, hospitality experts have great potential global opportunities if we skill people with quality standards and in sufficient numbers," Mr Ramadorai, NSDA (National Skill Development Agency) Chairman, said at a recent event in Pune.

What are the challenges so far? Let us hear some voices.

Mr Pallam Raju, the former Union HRD Minister, while inaugurating a skill development workshop said that a lot of issues con-

fronting the sector need to be addressed. They range from demand supply mismatch and poor quality of training to lack of infrastructure, shortage of quality trainers, relevance of skills and lack of standardisation. Absence of a labour market information system, of clarity on industry skill requirement and low awareness of existing courses, besides perceived lack of dignity, are some of the fronts that have to be addressed, he said. Raju underlined improving the accreditation and certification systems and establishing an institutional mechanism for providing access to information on skill inventory on real time basis. Noting that seven crore more people have to be imparted skills in the next five years, he said that there is a need for concerted action with improvement in the curriculum for skill development.

CEO of National Skill Development Corporation Dilip Chenoy said that though the skilling sector is growing at the rate of 33% annually, "we have to increase it to 133% to 150% if we want to take it to 500 million skilled hands by 2022".

One of the primary impediments to skills training is the question of who pays for it. While firms are not inclined to pay a placement fee for appropriately skilled persons, in many cases trainees are not excited by the remuneration offered. In others, people do not even take up the jobs offered after a stint of free training.

A typical skill development module would cost Rs. 8,000-9,000 for a 200-hour course. While in many cases, students are expected to pay the fee, in other cases companies agree to pay part of it. Industry says it is important that a student pays for the course, as he/she has to be serious about the training.

In addition, the negative perception on skill training also plays a part. "Parents would rather send their children to do a bachelor's in arts than for vocational education and building skills. So, the problem is not only of social acceptance, but also lack of interest," said Shankar S Mantha, Chairman, All India Council for Technical Education (AICTE).

The skill development cycle:

Human capital development involves tapping the potential of youth, and providing them with the knowledge, skills and winning attitude to access jobs and build a bright future for themselves. With the demographic dividend opportunity in India, now is the time we have to focus on this.

Let us look at the whole cycle.

This is a classic case of demographic dividend which countries usually get only once in their history and sometimes only for a short period

We identify the youth, assess their skills and potential, understand their interests and aspirations, counsel them on the opportunities in the market and enroll them into a suitable skill programme.

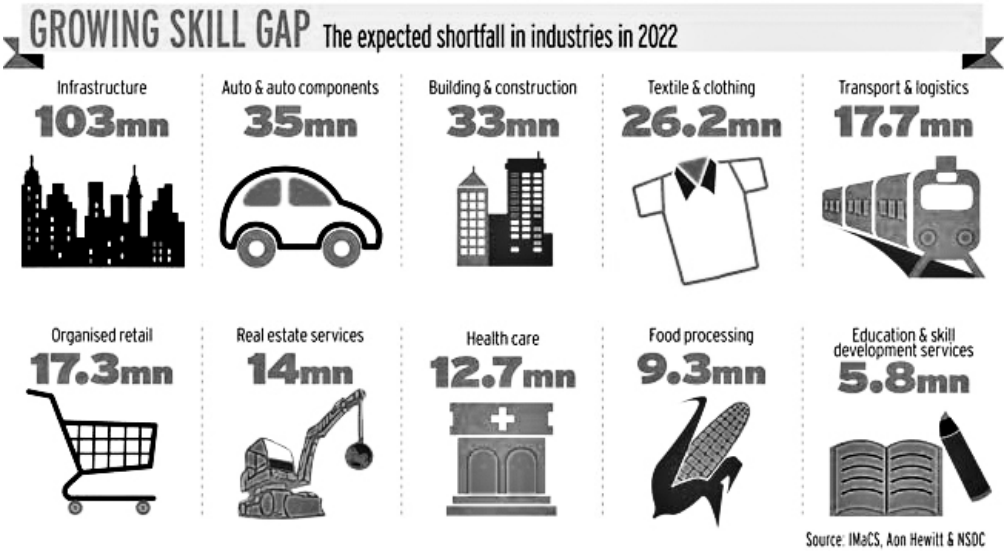
We then deliver quality training so that the learning outcomes are aligned to the skills required for the job. This is challenging because a fixed duration one-size-fits-all course may not yield the desired result. A one month or even a 3 or 6 month programme is unable at times to assist and prepare the youth who have come out of a broken formal education system.

We then do an assessment and deliver an industry-recognised (specific Sector Skills Council (SSC)) led certificate. This certificate should be a green card to access jobs.

Thereafter the youth joins the work force.

Mismatches and leakages take place in all the segments of this process. These are the challenges we face in the skills sector.

A very tight coupling is often not possible between all the segments. For example, even



though a youth is skilled, passes the assessment and gets a job, he may drop out because he doesn't find the salary adequate or finds the job too demanding.

So if you define success by one yardstick i.e. placed students, this would not recognise the countless other factors that determine the youth's ability to hold onto the job.

On a different track, let us look at the much maligned but thriving coaching industry or the exam preparation market. Look at the JEE preparation market. Three lakh students write the test every year. Say 3000 are selected, leading to a 1% success ratio. Of the institutes who prepare for the JEE, some may get zero selections, and some 2 or 3. Even the famous Kota institutions get 20-30 selected out of 1000's. So the success ratio for these institutes is only 1%! As against this, in the skills business the set target is minimum 70% placement! By setting such an unrealistic target, are we are setting ourselves up for failure?

Or look at the formal education market. When a child enters school, the measure of the schools' success is not how many of the students have got into IIT or IAS. We are happy if the pass percentage is high. We look at the number of students who received distinction, etc. Outcomes that are fairly directly linked to the learning imparted in the school.

So can we hold the skills programme accountable for ensuring 70% placement? Or is it high time that this skill building is decoupled from placement? A good 'gate' is the assessment post-training by the industry-led SSC. The training institutes need to turn out a qualified and certified skilled workforce. The SSCs in turn need to have a sound labour market information system in place to understand the demand-supply gap with respect to jobs at various levels.

So who are the stakeholders & what then are the solutions? There is a role for all the stakeholders.

The government has a key role to play.

On a policy level, the Ministry of Human Resource Development (MHRD) has launched a National Vocational Education Qualification Framework (NVEQF). This establishes equivalence between the formal education system and the skills training certifications. For example, it provides mobility for youth to acquire credits through skills training and work experience on the job to get a bache-

lor's degree. This is a great step forward and the implementation has just started. Vocational skills courses will now be rolled out to students in schools from 9th class onwards and through undergraduate education. Students will get credits for it too. This policy, if implemented, will yield results in a few years' time.

The government has yet to align all its skill missions and initiatives. This is begging for attention. Turf wars seem to be the only reason holding it back.

In most countries, skilling the bottom of the pyramid is a government-funded initiative. In several countries, industries take on apprentices and are subsidised or compensated by the government. This is happening in India to a limited extent. This needs to now include certifications which are calibrated and defined by the industry.

Industry has a key role to play.

Salaries, especially in entry-level jobs in services as well as manufacturing, have remained stagnant. While nominal wages have increased, real wages have not. This makes it difficult to attract and retain staff. Industry has to focus on improving productivity and increasing minimum wages, otherwise this situation will remain as it is. Sectors like infrastructure and construction have not made adequate investments in technology. Perhaps that is the only way to improve productivity.

India has been witnessing jobless growth for the past few years. This poses a real challenge. It means that the positions we are filling are largely replacements for those who have left. In the BPO segment, this is popularly described as a revolving-door syndrome where you have associates exiting and entering all the time. We have to identify sectors and industries where net job additions are happening and support skill building initiatives for them. We need to encourage growth in employment generating sectors.

In high skill areas, rather than bemoaning the absence of experienced skilled people, industry would be better off by rolling out an apprentice or internship scheme.

And finally industry has to recognise that many entry-level jobs will not be aspirational. Funding and supporting the youth to undertake a continuing education plan would be the way forward.

The Skills Development Centres & Training partners have a key role.

The Skills Development Centres have a special role to play in translating the vision of the Government and the dreams of the youth into reality. They have to bridge the gap between the formal education system and industry. They have to make ongoing investments in pedagogy, curriculum content and delivery methods to ensure high quality. Learning outcomes must be defined. They must invest in and build scalable engines to cater to the huge numbers.

The youth themselves have a key role to play.

Youth cannot be bystanders and critics. They have to define and create their career paths. We have seen many youngsters who take up jobs not directly related to their formal education doing very well, whilst some others choose to remain unemployed. Today, with the abundance of continuing education programs, it is possible for youth to earn and learn at the same time. This is a sound time-tested approach. Youth need to be pragmatic and rooted in realities.

Anecdotal success stories abound, but have we fixed the model?

There are numerous success stories to be shared, of young girls and boys who have gained skills and confidence and taken up jobs. They are now the primary bread winners in their families. Some youth undergo huge positive transformation through the training program. Not only does it help them get a job, but it also prepares them for life itself.

Every training partner has many such stories to share. But we are looking beyond

anecdotal evidence to fix the system itself and make it sustainable.

Game changer in the skills landscape?

On 15th August 2013, the Prime Minister launched a Rs.1000 crore STAR (Standard Training Assessment & Reward) initiative to get the skills agenda rolling.

This scheme marked a significant departure from earlier schemes and could be a game changer in the skills landscape. Huge expectations have been built up in India. The world is watching us too.

Even though a youth is skilled, passes the assessment and gets a job, he may drop out because he doesn't find the salary adequate or finds the job very demanding

Very simply, the scheme envisages skills training in line with job roles defined by the industry. Trained youth will also undergo a certification process, again by industry. Those who pass will be eligible for Rs 10000. This amount will cover training and certification costs, and in some cases a cash award too.

By linking payouts to certifications, there is an emphasis on outcomes. No stakeholder gets a paisa if the student fails to meet the grade. All the stakeholders are aligned to the learning outcome. The student will get a certificate from the industry body if he is job ready. The training provider gets paid for only those students who meet the exit gate.

Of course to meet its objectives, assessments have to be fair and transparent. The SSCs have to live up to their responsibility, ensure assessments are proctored, and maintain benchmarks and standards on an ongoing basis.

This ambitious program is a huge subsidy for the industry. The industry has to embrace the process to skill and up-skill the existing workforce and work out a mechanism to give skill premiums. This will make the scheme sustainable in the years to come. ❖

Revathi Kasturi

An alumna of IIT Bombay, Revathi Kasturi is an entrepreneur who set up LAQSH to focus on employability skills and bridging the Talent Gap. Prior to that Revathi Kasturi was Managing Director Novell West Asia which includes ASEAN & India & was responsible for building the Novell business in the region. Revathi has over 30 years of experience in the IT Industry and has led businesses engaged in Enterprise Software Development, Systems Integration, Customer Support as well as IT hardware. She has intimate knowledge of the Finance Industry having built and implemented solutions for Securities, Banking and Insurance segments for well over 14 years. She was awarded the Woman of the year by Business Today for the year 2001. She is on the board of NASSCOM as an Executive Council Member. She is also a charter member of TIE Bangalore and is actively working on Fostering Entrepreneurship Amongst Women through TIE for Women.

The Genesis of *Bijli Bachao*

ABHISHEK JAIN

One of the wall hangings in my bedroom says: "Life is a journey and not a destination". I bought it in 2008 when I was working as a consultant in the US. It was the first year of my marriage and I had been working for "paycheck" for 6 years since I graduated from IIT. I have had a successful career with fantastic growth and good learning, but still something was missing. Life was all about running for the "next level", and making more and more money. But the question that haunted me was that every race has a finish or a destination, but what is my destination? There was a constant curiosity about what is next and how do I achieve it. It felt like I was running like a headless chicken without knowing what I am running for.

Paulo Coelho has rightly said that one has to learn to recognize omens, and follow them. Also when you really want something to happen, the whole world conspires to help you achieve it. Since school days I always had a liking for maths, logic and programming. Somehow my branch did not offer me enough of it, so I started looking for opportunities to learn. That led me to work with IIT Bombay's first campus startup in 2000. It was my first experience with a startup and such an environment. It was truly an electrifying environment with some of the best minds in IIT at work. I worked there only for a few months, but the experience left a mark on my mind. It was my first omen that led me to think that one day I will start a company of my own. But there was a fear in my mind, as past family experiences with business were haunting me, and post IIT I took up the best job that came to me.

In 2007, I was in the US and things were quite busy on my project. We had a fantastic team working on a project. Not only were they talented, but also quite entrepreneurial. After successful delivery of the project, some people started floating the idea of coming out of our firm and starting a new company. Although the idea did not materialize, the old inkling that I had of starting on my own came back. This was the second omen, which made me think again that I need to do something of my own. The universe was conspiring so well that everything that I read during those times and every movie that I watched, motivated me to think differently and come out of my comfort zone. But the elusive "business idea" was missing and I kept looking for it.

Somehow my stay in the US did not excite me to stay there permanently and I always kept thinking of moving back. My decision was simplified by the support that I got from my wife, who not only supported me in my move back to India, but also got me hooked onto Energy Efficiency and Climate Change issues, because her work revolved around these topics. My third omen came in the form of a "PAN IIT" meet in 2010 in Delhi, where the topics of discussion revolved around the

pressing problems faced by the country. After coming back from US, I had a constant curiosity about why various problems exist in India when so many solutions exist in the West. Post the "PAN IIT" event, the picture became quite clear to me. I knew that I have to use my skills (IT and otherwise) in solving problems related to sustainable development in India. And from there on, I was just waiting to come out of my job, which finally happened in December 2011. The decision was tough, as I was used to getting a paycheck every month for 9 years, and I dreaded being without a paycheck for some time. But I felt that if I don't take the decision now, I would never be able to take it.

When you really want something to happen, the whole world conspires to help you achieve it

Initially IT + Sustainable Development looked like a very vague idea and I could not think of ways of generating business out of it. My wife and I knew that there are lots of pressing problems that need to be solved, but we were not sure if there is any possibility of doing business. That was the time I started interacting with several of my batchmates who were entrepreneurs. The first lesson that I got was: entrepreneurship is all about experimentation; you try certain things, learn from them and then improve. So it is more of an iterative process. This made me realize that the concept of having a "business idea" to start up is a bit overrated. Not because "business idea" is not required to do business, but because it is something that evolves when you start working in an area. You start small and keep building on it based on learning to come up with the ultimate "business idea". This thought motivated me to not worry too much about the business, and pick up a problem and solve it.

Choosing Energy as the first sector to tackle was obvious as I did have some exposure to it through my wife. Although during the initial research I found several interesting concepts being tried in the US, I realized that many of them were quite challenging to start with in India. But I had to start somewhere. During my research, I found that the biggest challenge with Energy Efficiency in India was lack of information penetration. Although there are various ways by which people can reduce their energy consumption, people at large are not aware about them and in fact not even thinking about them. And even those who get to know about them are not able to analyze the potential benefits of adopting those ways. The problem is behavioral, but as the challenge is related to "information", I felt that IT could assist in solving the problem. A batchmate who also happens to be a blogger gave me hope of generating some business initially through advertisements. And bingo! I had my business idea to start with. Thus was born the idea of "Bijli Bachao", and I started the website www.bijlibachao.com.

It has been 2 years now since I started Bijli Bachao, and the only words that I can use to describe the journey is "roller coaster". A journey with extreme highs and at times extreme lows, but on the whole immensely gratifying. The initial few months were all about spending money, without getting any returns out of it. Although 9 years of a paid job gave me enough money to not worry about expenses initially, a great piece of advice from a friend helped me a lot. My friend advised me not to invest more than the amount that I would be fine losing (if any). When you have money, you tend to adopt easy route, which may not be the best route, but scarcity of it teaches you to use it wisely. You use the cash properly and put it in activities that you understand will give you returns. The losses teach you where not to put your money. Bijli Bachao did not make a single paisa for first 11

months. At times I felt like I was wasting my time. There were days when I felt horrible as well. But then slowly things started working and the situation started improving.

I have learnt a lot in the two years of my journey of being on my own. And all the learning has happened while facing challenges. One of the biggest challenges for an entrepreneur is to keep motivated to do more and do better. The challenge is bigger if you are doing something all alone without co-founders. And this is where your passion in doing your day-to-day activities is quite important. You may have the grandest of ideas or you may be working on something that the world considers "hot". But if you do not enjoy every moment of the time when you are doing your bit on your idea during the days, then it is very difficult to keep yourself motivated. Lack of cash flow and not so interesting work can simply kill motivation. So you always need to find that kind of work in your startup that truly excites you. It can be writing code, designing the product/service, or doing sales.

My friend advised me not to invest more than the amount that I would be fine losing (if any)

During the years, I also got involved with my friend in his startup Villcart (www.villcart.com) that taught me the dynamics of co-founders. I learnt that when you form a company, each co-founder should bring in different value or skills to the table. And outsourcing one of the key skills, or just hiring employees for one of the key skills, can be disastrous. Three coders getting together and starting a product company cannot make a successful startup, as you need co-founders who can design the solution, who have domain knowledge and who are good at selling. Any additional person joining the company with an existing skill should just join as an employee. My friend had a good understanding of ecommerce business but he lacked IT skills. Hiring people to code did not work for him, and finally when I joined him to fill in the gap, the business started doing well.

What I have learnt post IIT can truly be summarized with the words I started with "Life is a journey and not a destination". I have learnt a lot in past 11 years and I continue to do so. As when you go out for a journey, you like to see several places, enjoy several things; in life, it is important to do different things and learn from them. We just have one life, and it is on us to enjoy it. ❖

Abhishek Jain
B. TECH., CHEM. ENGG., 2002, H8

Abhishek Jain worked for Deloitte Consulting for more than 9 years before starting Bijli Bachao (www.bijlibachao.com). He got interested in electricity savings when he came back from US and started setting up his house in India. Rising electricity costs in Mumbai and high consumption by neighbors got him thinking that there is lot of scope of helping others reduce their electricity bills. He thereby decided to use his technology skills to help people reduce their electricity bills.

An Uncommon story of a Common man turned Innovator

BUMBLEBEE

Entrepreneurship is not an easy option for a school dropout who chooses technology innovation in products for his business and as his passion. Ravindra Ganpat Chopade is one such human being who has come a long way from being a school dropout to an inventor. Ravindra has a patent-pending for a printing technology and he is a SINE incubate who has developed 3 kinds of printers that revolutionises embossing technology. He cannot write in English and speaks only in Marathi and Hindi so we decided to write and share his inspirational and life changing story.

Born to a security guard working for IIT Bombay, Ravindra grew up like any other child on campus till he was 12. Typhoid followed by some problems with his leg denied him a chance of going beyond class 6. But the need to survive in a city like Mumbai and the possibility opened by his proximity to IIT enabled him to pursue his passion of tinkering with existing technologies and developing products. Ravindra was interested in electronics from his childhood and he took up a course in Electrical Engineering fundamentals, which was open to the children of IIT staff. It was during this time that he developed his first machine, a manual motion picture machine. His IIT certificate helped him in terms of basic knowledge and also gave him certain credibility in seeking employment. But it did not satiate his hunger for innovation and product development.

The dreamer in him wanted to start something on his own and be a self reliant businessman. But with the grim status of a no good business, thanks to the failed project of owning a photocopy shop near Hostel 10, made Ravindra realise that the demand was not in the photocopying business, but there was demand for quick quality print outs among IIT students working on their project reports and their their thesis. He opened a little printing shop outside Y-Point gate and Ravindra was closer to his dream of being a businessman. He did not account for the stiff competition from other stationery and printing shop owners nearby who tried to force out the new entrant by charging double rates for all the binding assignment that Ravindra's shop was sending their way. Since Ravindra did not have a binding machine, he was forced to comply but his venture was bleeding money.

Necessity is the mother of all inventions and Ravindra was determined to turn this

venture into a success. He was also confident in his ability to open any machine and tinker with it till he could fix it to suit his own needs. So he purchased a second hand manual machine for binding and gold embossing and modified it to suit his business needs.

Business soon increased but the labour intensive nature of typesetting gold embossing once again forced him to start thinking creatively about automation of the embossing technology. As the load of work of embossing was increasing day by day, Ravindra searched for alternatives to the conventional punching type method for doing golden embossing. He visualised a computer-operated machine, which could perform embossing and went hunting to Chor bazaar and Crawford market for a device he could modify.

Accidents are not manmade they say and tinkering can open up possibilities for a man who has latent innovative abilities. One day when Ravindra Chopade, was repairing the wires of his machine he discovered that he could emboss golden words on leather. He kept the golden foil on the leather and wrote his name with a soldering iron on it and found that his name was embossed in gold on leather. This gave him the idea to search for a pen, which could do gold embossing. Ravindra first experimented with a soldering machine and foil on a piece of rexin. When this experiment succeeeded, he approached the modern day answer provider to all our questions— Google. He searched for existing machines and found that one machine, a plotter from a Company named Graptek that could be modified to fit his requirements. However he still could not find an old plotting machine and buying a new one was beyond his budget. Luck once again played a role as one of his father's friends helped him locate one such machine in the scrap heap in front of Mechanical Engineering department. Although he found this scraped machine, he did not have supporting accessories to go with it. It took him a long time to find the right kind of accessories and Autocad 4.5 software. To create the heater, Ravindra took a 12-volt soldering iron, replaced the tip with that of a normal ballpoint pent„ heated it, and operated it. Initially the point would go all the way till the end of the machine and come back to its normal position. He did not know how to make it type. He installed software and slowly discovered how to type out words which his pen plotter machine was built for embossing. With no citation to his name, Ravindra passionately claims that this is a one of a kind of machine in the market that embosses with depth. Generally in printing technology it takes a day for the dye to dry on a paper but when a paper is printed by Ravindra's technology, the words get embossed and is done at a much quicker rate and faster turnaround time. Embossing Devnagri fonts is rare throughout Mumbai, but Ravindra is able to do this with his machine, due to which he attracts a lot of college going students as his customers. Today he has graduated from printing 100 books per week to 1000 books and he is perhaps the only shop in all of Mumbai with the ability to do so.

Ravindra recently filed a patent for a printing technology and is a SINE incubate who has developed 3 kinds of printers that revolutionizes embossing technology.

The next break for Ravindra came when he encountered Madhav Sawant, a man more interested in the machines which Ravindra was using rather than the output from it. Madhav Sawant introduced Ravindra Chopade to the world of patents and told him about SINE. Ravindra's stint with SINE started under a

programme sponsored by Govt of India. After a rigorous proof of concept stage, he received 10 lacs as a grant to develop his machine further. He has even showcased his technology at Techfest.

Ravindra Chorpade has 3 interesting inventions in his basket to share with the world. One is a vinyl cutting machine which was successfully modified into a golden embossing machine. This machine had FIXE software, which provides the filling effect option, which

His stint with SINE started under a programme sponsored by Govt of India. After a rigorous proof of concept stage he received 10 lacs as a grant to develop his machine further.

is instrumental in giving depth to the content embossed on rexin or leather. This machine was converted into a flat bed machine in the year 2003. The current model has been completely built from scratch by him. The second invention was initially developed in the year 2006-07. This machine can be used as an attachment to any printer. The machine traps and uses the heat of the ink on the paper. The foil rolls over the paper as it passes out of the machine and the ink is super imposed with gold from the golden foil rolling over the paper. The attachment supports content up to 1200 dpi. This is a very good machine for gold embossing on any paper. Also, since it comes as an attachment it could be a suitable product in the market. The third machine is a dot matrix printer used for golden embossing. The innovator experimented on about 15 – 20 printers before finally arriving at the precise measure of heat and punch required to achieve the best results. At one point of time he had 22 credit cards, which he used to purchase machines on credit. He accumulated massive debts, which he eventually cleared with great difficulty. This machine has been built by modifying an Epson dot matrix printer. Anything up to 100mm, book, paper, leather, rexin, PVC, and cards can be embossed by this machine. The machine cannot however emboss on metal. A machine that will emboss on ribbons is in the drawing board stage.

On one hand Ravindra Chorpade looks forward to be recognised globally and launch all the three machines in the market either by starting his own venture or under a royalty arrangement through a bigger enterprise who will help him with commercialisation and also help him in R & D efforts to develop other machines. But on the other hand, he is skeptical about competetive giants in the market wiping out his efforts even before he has begun.

Today Ravindra dreams of an opportunity for further training so that he can continue his work, innovate and develop even more sophisticated printing machines. He is a man who has a god-gifted talent for tinkering and exploring with gadgets but little or no knowledge of how to market the products on a larger scale. The way ahead for this talented innovator is to find buyers who will buy his products and help him get a global patent and hopes that this article will enable him to reach out to just such an audience. ❖

Housing Story

ADVITIYA SHARMA

Housing has been founded by a group of graduates from IIT Bombay. And the one thing that most of us founders have in common is that we all come from small towns and villages of the country. I myself am from Jammu and, all my life, I've either stayed at home or in the hostel at IIT. So I've never really had to worry about searching for accommodation.

I remember clearly. It was February of last year- my final semester. We suddenly realized that, for the first time in our lives, we needed to search for a place to stay for the next few years. So, we started our home search process pretty early. But within the first few days, we realized that it was going to be a nightmare.

After around 30 frustrating days of roaming all over the city, we finally found something that barely met our requirements. But the only thought that kept coming back to us again and again and again was that this problem has existed for many years now and, if nothing is done about it, it'll simply continue to exist. I mean, our seniors had faced this problem, we faced this problem and even our juniors would.

And at that moment, we had a realization that, maybe, we could come up with a solution for this problem.

It is this small idea, that 5-6 of us could solve the problem, that has now become Housing.com.

Now all this was really fantastic, but at that time we didn't have any idea about what a start-up was and what we had to do! So, it was really important that we were completely clear about the values on which this company was going to be built- what approach we would take going forward. And I'd like to take you through them.

The first value that we have at Housing is 'Empathy'. You have to empathize with the user. If you look at it, we were trying to solve a problem which we ourselves had faced. So we were the users! And it's always about people. So we did a lot groundwork, a lot research for a month or so, took all those learnings, and started building on the product.

The second and the most important value I think for any start up is 'Focus' . See, the thing is, you've just graduated from I.I.T., you're a first time entrepreneur and most of all, you're very easily distracted. But the only way that Housing was able to grow really fast was by focusing on the top questions that needed to be answered, fast. Every day, we would pick up 3 questions that were urgent and important and just went ahead and solved them. And this is very crucial.

The third and the final value at Housing is 'Great Presentation'. You can have the best product in the world or the best service in the world, but if you present it in a bad way, people will perceive it as worthless. But if you present it in an awesome way, people will love it. And that's why we've given so much emphasis on the UI/UX of our product. I mean, browsing the website is like having fun on the net. That's the amount of consideration that we've put into designing this.

And while we've carried forward these values with us even today, they were admittedly the most strong when we were developing the product. We spent a good one month working on the product and, I still remember, we launched it on the 7th of June last year. Trust me, the moment you get into business, things become really exciting. Let me give you

all a little background of the industry we're operating in. The real estate classified industry started shaping up around 8-10 years ago, and the initial players felt that they're converting a process that's completely offline and making it partially online. And that they're bringing convenience into the system. And, for this, people should love them, right? Wrong! The real problem plaguing real estate for years and years is lack of authentic information. People want information that they can trust, that helps them in making a buying or selling decision. That's why Flipkart or Google is so valuable. And that is why we have an in-house data collection team. These guys are trained for 3-4 weeks before they're sent to the field and they visit the houses of our partner brokers and landlords, take high quality photos, note down details, punch it in the backend and then it's pushed live.

So, data collection is a process that is really unique to Housing in this industry. But the funny thing is that making a new process is really easy. Give me a pen and paper and I'll make you a process. However implementing a new processes is really tough. Why is that? Because it's really tough to change people's psychology! It's really tough to make people feel at ease with a radically new process. In the early days of Housing , brokers and landlords would be very skeptical about a random guy coming from an unfamiliar company and saying, "I want to take photos of your house!"Who wouldn'tThis was one of the first challenges that we faced. And we've faced challenges every single day in this journey.

Sometimes, when you start-up, you tend to believe that there's no support out there, that you're alone. But an amazing thing happens once you take a step forward in the right direction. There are many people out there wanting to help. And Housing has been fortunate enough to have found great partners, and great mentors. We've received

3 rounds of funding in less than 1 year now. The first was by Mr. Zishaan Hayath and his friends, all alumni of I.I.T. And it's great to get support from your group. They put close to INR 50lakh into the company. The 2nd round funding was by Mr. Haresh Chawla, the ex-CEO of Network 18 (CNBC News, Burrp. com, etc.). He put in approximately INR 1.5 crore. And I'm really happy to announce that, recently, we received our first round of venture funding by Nexus Venture Partners. They've pumped in $ 2.5 million into the company. It's really great! It's overwhelming at times.

As a result of this support, I've seen the company grow from 5-6 of us to over 600 people in just 1 year. It feels great to be responsible for the employment and growth of 600 people. We're now live in 10 cities. And, I believe, it is our continued focus towards doing great work for the people that will take us forward. ❖

Advitiya Sharma

Advitiya Sharma one of the Founders of Housing. com comes from a small town in Jammu of Jammu & Kashmir. His whole family is full of doctors with his dad being a Neurosurgeon and mom a Gynecologist. Watching his dad still having to study medicine books at the age of 40 was the biggest motivation for him to not become a doctor. During his schooldays he was passionate about 2 things: Problem Solving and Football. He is a National level football player and a recent graduate from IIT Bombay. He and his friends started Housing. com in his last semester at IIT and have been completely focused on building the venture.

Cool...essence

V. KRISHNAN

"I'm sure I know the way from here,"
You may say on stepping in past the gates
For while Powai has changed almost year on year,
The campus instantly creates
A notion of knowing and belonging
That the flow of time can never corrode.
The cars may be newer but the bull is still snorting:
He knows he's emperor of this road.

The kids still move on motorless bikes,
But many of them sport Bluetoothed ears.
Do they live e-lives with tweets and likes,
With no time for cack and beers?

Pressures of the mind, pleasures of the flesh,
So unlike, never afar;
After failing to decode the RLC mesh,
You can still pass out in the RLC bar.

But no streaming glut of pix and vids
Can ever match the anticipation and the hustle
With which a senior's airmail to the kids
Satiated a pent-up house's muscle.

Now all own a phone with personalized ring.
Perhaps it is sad, none will ever
See how with a coin, chewing gum and string
You could talk for free, forever.

How many of us who got the grade
That's the first letter of the world's preeminent cuss
Believe in our hearts that it truly portrayed
A prof who was simply out to F us?

2nd sem Maths filled the casualty ward!
Professor Joshi, we wailed, had gone overboard.
But was Joshi really doshi, 'Guilty, my Lord',
Or were we one unprepared horde?

Systems breed behaviours; none
Symbolised this better
Than that avatar of evil under the sun,
The sinister RG punter.

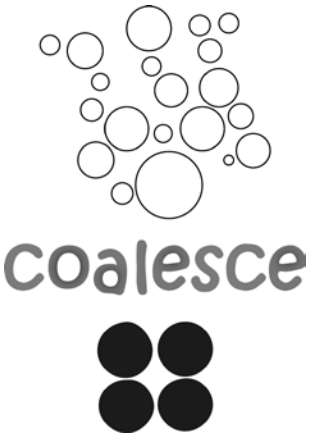
"Rise up by pulling the other down;
Lock him out before the test.
To precede all in your academic gown,
Issue one copy, conceal the rest."

While these acts, we may fear, will never stop,
They were rarely a cause for worry
'Cos they were limited to schemers for the top;
Below, we had camaraderie.

This inventor, capitalist, corporate ruler
Is the hostel mate you had extricated
From the space at the back of the water cooler,
Hopelessly inebriated.

On the meeting of the genders we called the 'social',
The garbing, the shodding, the excess of spray,
The excuses for breathlessness, chiefly bronchial,
With empirical evidence we may say
That as much in life we may strive to endear
Ourselves, there is a reasonable probability
That this exchange we will overhear:
"Is he exciting?" "Well, he's ex-IIT."

It is now a quarter of a century on;
Let's coalesce at the place from where
It's a long time since we have been gone.
For a short time let's be there!



V Krishanan
B. TECH., CS&E, '88, H8

V Krishanan, Jadya to his batch mates Krishanan is reticent enough about himself that he did not wish to add anything else about himself. They are here on campus this December to celebrate their silver Jubilee reunion and this is a poem he wrote on behalf of his batch mates to celebrate their homecoming.

Four Days of Golden Jubilee

Class of 1963

SHANTI MAHAJAN

In 1959, a motley bunch of teenagers, 100 odd in number, from all over India, were selected by IIT Bombay to populate its second batch of undergrads. Four years later, confident and competent adults emerged to march into the world of Academics, Corporations and Entrepreneurs. The next five decades we had the inevitable successes and failures, in our chosen careers and in life, until, finally, in the evening of our lives, Buddha dawned - we are but mere mortals born to die. And in the interim, Nature, through our egos, makes us do the possible and attempt the impossible for reasons unknown, some call it destiny. Having been there and done that, we, in the year of our Golden Jubilee, decided to launch our festivities from our campus – a most appropriate decision if there ever was one.

They call it the breaking of ice when people in an assemblage start talking and mingling with each other. For us, as we checked in at the IIT guest house, in the forenoon of November 24, 2013, the ice did not just break, it melted away, awash in a flood of warmth of bonhomie among buddies.

At the lunch, the noise of incessant chatter and of peals of laughter was not irksome but strangely soothing, a salve to hitherto tired bodies, frayed nerves, and over taxed brains. The ancients of an era gone by were transported back in time to their days of youth. They renewed old acquaintances, reminisced of days gone by, laughed at their follies and foibles, savoured the good life they've had with nary a thought for the future. It was hail-fellow-well-met abandonment all through; and, the spouses were left gaping in amazement at the transformation in their mates.

We soared in euphoria, even sans spirits induced stimuli, to peaks of extreme pleasure when body and soul merge in integrated unmitigated bliss.

In the two evenings at IIT, we emerged from the campus of serendipity to an outside world of chaos and cacophony, to forage for liquid spirits in the pretentious settings of 5-star banquets. As befits a genteel lot, we ate and drank with restraint, chatted and laughed at low decibel levels, lest we disturb the other guests of the hotels.

The days at the campus evoked memories – the splendid isolation of the great Institute of learning far from the madding crowd, in the pastoral hillock of Powai, on the banks of Lake Powai and the forest behind; the lake remains, a bit of forest too, but the rest gone for ever. Instead a township housing hundreds has come up and our campus is virtually in the midst of the steel and concrete jungle. The campus has developed - lovely tree lined avenues, great facilities in the form of modern labs, the additional departments of science and technology, the sports and cultural facilities, the magnificent Victor Menezes Convention Centre – all make us proud. However, the pride is tinged with grief as we saw the dete-

rioration in the architecture of new hostels (after hostel 3) and poor maintenance, and, of course the unsightly township outside. The campus seems overcrowded for lack of space. We lost out – the Institute should have had the whole of the original hillock with many more labs, "tinkering labs", and research centres, hostels that exude style and architecture. But then if wishes were horses beggars would ride and pigs might fly!!

We left our campus for two days at a resort, 150 km or so distant from IIT, and it was another story. Daytime went in comparative sobriety – eating, drinking, and bird-watching and the usual jabbering. Evenings, glorious evenings were altogether different – come the designated Happy Hour and, a score of men and women packed one of the rooms with a twin bed and the usual hotel room furniture, made themselves comfortable – impossible? – but then you weren't there. Men and women sat around or lounged on the beds uninhibited and relaxed. Flibbertigibbets – they were indeed! Tongues loosened, memories sharpened and hearts warmed by liquor and the company, anecdotes followed in an unending stream evoking mirth and comments, all of it maintaining an ear-splitting decibel level.

The raucousness accompanying the anecdotes was thankfully, intermittently mellowed by the punctuation of the songs by our own dulcet voiced singing couple, and, by the poetry – composed by our own poet laureate at the spur of the moment, always risqué and profane, yet relished by the mixed audience.

Shakespeare said "Parting is such sweet sorrow". For the gentlemen of the Class of 1963 and their ladies, parting on the forenoon of November 28, 2013 was indeed sorrowful and heart wrenching; their beings and souls parted refreshed, rejuvenated and with a new born fervor for life, good life, good living in anticipation of another few days of total bliss of the jubilee days gone by, somewhere, sometime. Until then, Au Revoir, Phir Milenge. ❖

Shanti Mahajan

Shanti had a whale of a time in IIT; master-of ceremony for all events held 1959-63; welcoming dignitaries, reading a scroll of welcome later presented to them ary; elected vice-president of Students Gymkhana 1961-62;member of two-man wining IIT B team at All-India Inter College debating Competition at IIT Kharagpur in 1961 and runner-up same competition, same venue in 1962; publishing the most-read Hostel 3 wall-paper – Flibbertigibbet; writing short stories for IIT magazine Pragati etc.

Mahendra Singh

RISHI MOHAN SANWAL

"Rishiji, aap meri baat suniye." Mahendra Singh always began a conversation with that. I didn't mind that. Within a conversation, he frequently interrupted me with that. That sometimes irritated me. But what took the cake was that he interrupted himself with that. He would insert a "Rishiji, listen to me", in the middle of a sentence!

Other than that, he was repetitive. He used to repeat everything he said. I mean, he was really really repetitive. Sometimes, I felt like telling him that I was spending at least 2 hours a day listening to him. But I never did. Because Mahendra Singh delivered. Rather, his trucks did. They delivered GI sheets, and, they did it in time.

GI or Galvanised Iron sheets are the wavy metal sheets that you generally see on rooftops in hill stations. The government decided to provide GI sheets to people for use as medium-term temporary roofs. Mahendra Singh was the contractor hired for transporting the sheets to the quake-affected villages. Rakes full of GI sheets arrived at Bhuj railway station where they were loaded onto Mahendra Singh's trucks that took them to the villages.

Those were the days when rebuilding activities had just started. The district administration was handling unprecedented amount of work. Even with increased staff, extra help was always welcome. That is why Topno, the District Development Officer, took no time in assigning us to work as soon as we landed in Bhuj as volunteers. I was asked to look after the demand and supply of GI sheets. No responsibilities were fixed; no powers defined.

On visiting the railway station I met Rathod, the Deputy Collector in charge of the railway station. There was disorder all around, and Rathod was confused. Though they were sending sheets to Anjar as per orders, the trucks were not being unloaded there. Reportedly there was a manpower shortage at Anjar. I was talking to Rathod, when someone informed Mahendra Singh of my existence and he rushed to the control office.

Without even bothering to know about my identity, he started blasting me. *"Hamara kaam truck chalane ka hai Sahab, murdon ko jilaane ka nahin hai."* "So, he is dissatisfied with the government officials," I thought, "Nothing new, who isn't."

He didn't have much to say, but his amazing ability to keep repeating himself ensured that I had a long discussion with him. Despite getting bored, I kept talking. I had to work with him; it was necessary that he be kept in good humour.

His family had been living in Kutch for ages, and it had been in the transportation business for an equal amount of time. He was proud of both facts. *"Mere dadaji oonth gaadi chalaate the sahab. Bhuj aur Mandvi ke beech main. Hum Mandvi ke rahne vaale hain. Yeh transportation to hamare khoon main hai sahab."* I never contested his skills in arranging good transportation, but still he felt the need to keep convincing me. I had to internalise that Mahendra Singh was the best transporter in town. Not only that, I also needed to remember that the transporters doing fertiliser business are the best transporters.

In a few days, we became a good team. I was impressed by his work. His trucks always arrived on time in the morning. They were loaded and dispatched swiftly. They came back in time. His records were perfect.

Rishi Sanwal with the Secy, Goa Governor - facilitating help from Goa Govt.

Though we were dispatching about thirty thousand sheets per day, rarely was a wrong delivery done.

On the other hand, he liked me because I listened to him! It appeared no one had ever given him that kind of importance. After all, he was a contractor, and administrators are not really fond of listening to their contractors. I, on the other hand, gave him full time to speak; showing a sincere interest in all that was being repeated. In no time, I realised that that was the trick. With Mahendra Singh you could get away with anything, just by listening him out.

Anything? Did I say anything? Then, I must be wrong. Because his affection and love for his employees was unparalleled. His assistants, his drivers and the labourers were all like sons to him. One thing that he could never accept was mistreatment of his employees. Perhaps that is why he commanded such respect from them. Perhaps that is why he was so efficient in his work.

It was not surprising then, that Mahendra Singh stopped loading the trucks when a policeman supervising the loading operations slapped one of his labourers. He wanted to file a police complaint against the policeman in question. Being the gentleman that he was, he wanted a go ahead from the district administration.

The collector was not in town and I had absolutely no idea of what to do.

I made frantic efforts to locate the collector on phone, but was unsuccessful. I tried convincing Mahendra Singh to resume loading and promised to solve the issue as soon as the collector came back. But he refused to oblige. "My labourers are not criminals. Even if he did a mistake, you have no right to beat him. FIR lodge *hone tak, kaam bandh*."

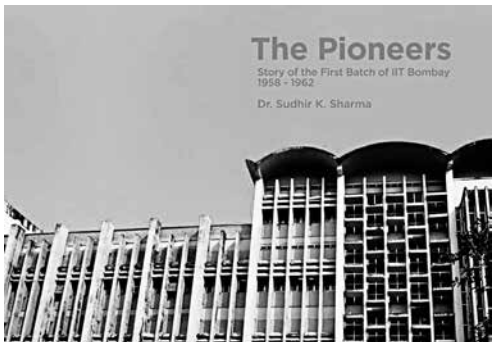
Tried as much as I could, there was no way to convince him. His man had been ill-treated and he refused to begin loading until justice was done. There was nothing to discuss on that. Loading commenced only after the collector came back, and a police complaint was registered against the erring policeman.

But to be fair to Mahendra Singh, that was the only incident when loading stopped. Otherwise, he, his workers, his trucks, and their drivers worked seven days a week; for two months, till the work was over. Together, we ensured that GI sheets reached all villages.

After that I left Bhuj, and joined my job in Bombay. That was almost three years back. But Mahendra Singh still calls me up. Mostly he talks and I listen. After all, that is what our relationship was. ❖

On Art, Science and Engineering of TOPO or TOPPO at IIT Bombay

SUDHIR SHARMA



(This article is excerpted from the book, The Pioneers - Story of the First Batch of IIT Bombay, 1958 – 1962, by Dr. Sudhir K. Sharma)

Earlier this year (2012) Times of India published an article about modified words, called slanguage in use at IIT Bombay which included some comments about TOPO, a practice of copying homework and machine drawings from classmates. Feeling somewhat slighted by not being acknowledged the inventor of the practice at IIT Bombay, the following exchange took place among some of our classmates.

I wrote to all on February 24, 2012

Dear All:

An interesting article appears in today's Times of India about IIT Bombay lingo inventions. May be interesting to read.

The word topo (remember it?) still lives on among students in the halls of hostels of IITB. Maybe the art has been taken to new heights!

I reproduce here treatise on topo from this article:

"Also consider the concept of topo karo or topo maaro, which might emerge as the student invention of the sixties to beat all others, says a student. The term glass topo was IIT-speak confined to the lonely, far-flung Powai campus of those years. The underlying funda: An invented wheel needs no re-inventing. So to topo maaro a design sheet or flowchart, one needed two chair frames, a square piece of glass that fit between the two, a lamp lit at the bottom of the chair, one finished product on top and the unfinished product placed above it. An easy trace-over followed for a new wheel to be generated. The idea may or may not have been original, but glass topo, the name, sure was. TOPO *maar was a quick-fix done the night before submission. But make no mistake, fundas were duly mastered, only later. For there's no escaping fundas at an IIT. No matter how maxed out you are."*

Now let all the TOPOMASTERS *of our batch come out and shed light on the art, science and engineering of* TOPO*!!! LOL...*

Cheers,

Sudhir

Afterthought:

Our batch was the original inventor of topo, glass topo and everything else associated with topo. Unfortunately, we didn't get any

credit for this invention in this article! Maybe this needs to be corrected.

Sudhir

Here are the responses received on Feb 25, 2012:

J.K. Tandon:

It is great to be reminded about TOPO as without that I would have still been in some corner of Powai Jungles. Topo as described in the article was brought forward from either VJTI or BHU. We might have mastered the art. But sure all of us jointly may apply for a patent and some Padma award.

LOL

Ajit Badami:

What about the phrase "TC"? The phrase was very popular and there is no mention of it in TOI!

Ajit Badami

Kailash Mishra:

Priya Bhaiyon,

I feel probably we can claim the onus for Toppo. We had our class mate Venkatraman who was nick named Toppo by two of the eminent examiners namely O. P. Vyas and H. M. Srivastava. They are also our class mates only but were distinguished to award this patented name to Venkatraman. I only doubt as to why the Survey sheets published and distributed by Survey of India calls it Toppo sheet. This toppo sheet of Survey of India draws its name from its literal meaning. It has no connection with the Patent held by Venkatraman. GT is definitely the invention by Institutions which existed before IITB because my mathematics teacher Sri Raghubir Singh (who hailed from Aligarh in UP) used to refer to this term in as far back as 1950 when I was in 6th Class. Eventually Aligarh is legendary for starting all activities like copying, paper leaking, fake certificate printing, fake currency note printing, artificial milk making technique and the list is long enough.

With remembrance and love

Paddu:

Dear All,

Wow!

As usual Mishraji has presented a masterly thesis on Toppo and the irony is he may be the only person in our batch who did not indulge in Toppo. Any takers?

Cheers

Sudhir Sharma:

Oh dear, dear Paddu,

There were a few of us who were topo enablers and not topo doers. They also deserve the same credit as topo doers/inventors. I am suggesting we apply to Govt. of India for TOPORATNA award, the highest and the best, for everyone in our batch for the service to future generations of IITians.

Ajit Badami:

Not just TopoRatna – there should be TCRatna too.

Kailash Mishra:

Dear Sudhir,

We can't claim any credit for GT because it was a patent of and rampant in Engineering Institutions before IITB was born. However we can take the credit for the word Toppo. We may recall that Sri Venkatraman, one of our class mates, in IITB (who I heard is no more with us) had personified toppo in himself and was popularly known as Toppo. I do not know what connection Survey of India has with us because all their Survey Maps are known as toppo sheets.

Fundamental and not Funda was definitely one of our proprietary. You may recall Bhagwan Sharan Vijayvargiya of our second batch hailing from Guna in MP recited a poem which read as under:-

"Patra paya Priya tumhara jaise kisi dhadhakti hui building ki aag bujhane ko,

bin bulaye fire bigrade (not brigade) ki Gadi aa panhunchi ho".

---------- ----------kintu milunga Director se,

joki bina fan wali ek sarkari kothari men

baithata hai,

aur fundamental se ajab nata jodta hai.

(He was requested by his fiancée to come home for Holi for which he recited to meet the Director narrating his attributes and added further that he refused to grant him permission to go home. Vijayvargiya continues to console her by assuring that he will come whether whatever is told by the Director because---)

"Who cares " "No lift" ka siddhant hai hum chatron ka------ etc, etc.

Yours

Bakul Desai (one of the editors of Fundamatics and a later batch Alumni):

Sudhir,

I am glad that you have copied us in these emails. In the next issue of Fundamatics, we are running a set of anecdotes collected from various hostels. There were a couple of submissions on topos, but the explanation was missing. I would like to start the narration of anecdotes with your explanation and then bring in the specific anecdotes from other batches. (would also like to mention that your batch deserves a "patent".) I would like to mention both your name as well as hostel. Were you in H1 or H2?

Sudhir Sharma:

Dear Bakul,

I had included you and Damayanti in our emails so that you come to know what we did 50 years ago and the tradition just continues on and on. You have seen some of the responses from my friends on the topic and that should give you an idea of topo origins in our batch. I will send you any other anecdote that I remember later. Alas, topo is in public domain now and we have lost the golden opportunity to patent it. The patent would have expired after 17 years anyway, ha, ha... Maybe as Jugal says we should get some Padma award. I say we go for the highest of all awards: "TOPORATNA" *award!*

All of us stayed in the first hostel in our first year at Powai (our second year at IIT). In second and third years at Powai, I was in H3 along with Jugal Tandon, Venkatraman, O.P. Vyas, H. M. Srivastava and others (mentioned in Kailash Mishra's email). Kailash Mishra was in H2. At that time hostels were assigned in alphabetic order of last names, I don't know how it was done later and now.

I am sure now everybody is totally enlightened about the origins of TOPO at IIT Bombay and the contributions of the First Batch to perfect it are recorded in history for a well deserved place! ❖

Dr. Sudhir K. Sharma

Sudhir Sharma joined IIT Bombay in 1958 as a member of the first batch and graduated with B. Tech. (Hons.) degree in Metallurgical Engineering in 1962. He obtained his Masters degree from McMaster University in Canada and Ph. D. in Metallurgy and Materials Science from Carnegie Mellon University in Pittsburgh, USA. He spent his entire career in R&D and consulting in iron and steelmaking in USA and is author of thirty five research papers several of which have won best paper awards from the AIST. He is also the author of a coffee table souvenir book titled "The Pioneers, Story of the First Batch of IIT Bombay, 1958 – 1962" which was published last year on the occasion of Golden Jubilee Reunion of graduation of First Batch.

Innovation in Cheating

NOSEYBEE

Necessity is the mother of invention. Apply this cliche to the lives of impoverished hostel inmates of IITB, and you will see why so many IITB students started early with innovation and enterprise. Back then, 50 paise was pricier than a bushel of onions today. Hence, little wonder that early inventors started devising contraptions that would help them make phone calls and connect to the outside world. They also used technology to coat movie passes with wax that could erase a tick mark. They fashioned a raft ala Kon Tiki out of rejected tin cans from the mess to do what? Sail across the Vihar lake of all things.

Examples of practiced innovation in hostels, both legal and illegal....and for that matter, quasi-legal are many and we invite you to furnish us with more such anecdotes. In this edition of Hos-tales, we have started here with some excerpts of accounts of innovation that were published in H4's Madhouse book. We would also like to mention here, an anecdote which tells us why some alumni did NOT take up entrepreneurship. Vijay Desai from C81 recollects with horror, the day when there was power outage at his H4. Then canteen secretary Chetan Shah panicked that the ice cream in the deep freezer would melt into nothingness. That's when, the budding entrepreneur in him decided to play "speculation" and he offered to sell the entire ice cream stock at 25% to whoever was bold and optimistic enough to predict that the power would be restored within minutes. Vijay Desai used to dream big in those days. He saw an opportunity to clear his canteen and mess outstanding with the money he would make as a proud owner of the ice cream stock that would be his as soon as power would be restored. Outage continued till the melting point of the ice cream and the end result of this saga is that Chetan Shah is a successful entrepreneur today while Vijay Desai never ever ventured there.

Moral of the above story: If anyone can come up with innovative ideas to make money for the hostel from a power outage, it can only be an IITBian.

H4 was easily the wackiest hostel. We had Bhise on a raft, Arun Kaul going to lectures on horseback and actually 'parking' the horse in the cycle shed by the library, Coover and Bhingri making hand gliders (one each) crash effortlessly into the hill behind H4. To top it all, we once saw Batty travelling around all day with two bicycles. He cycled on one and wheeled the other one along by holding the handle. After watching him do it five times in one day, an exasperated Fish asked him, "What is your ambition in life?" Before Batty could react, Birjoo Mehta answered on his behalf,"his ambition is to own a four-wheeler."

Inventiveness in IIT, it goes without saying, was widespread. Take Rane. There is a gadget used to extract old nails (or perhaps teeth), bend wires, and so on. Of course it can also be used for some more interesting applications such as pinching female bottoms but that has its attendant risks. I am referring to the humble pliers. So there was Rane (Boss's bosom buddy, I must add). His one passion in life – I'll illustrate with a hypothetical example – give him a pondy and give him a pair of pliers and he would use the former to lovingly wipe and clean the latter. Every waking moment of his life he spent furiously thinking of ways to make the pliers multi-purpose. Perhaps he even did that in his dreams while sleeping, but I wouldn't know about that since I never slept with him. So one day he realized that using Pliers can be hazardous (no, not because he tried one of the interesting applications mentioned above). For example, he learned that you could get electrocuted if you used it to bend a wire that was live and carrying a current. Why anyone would be stupid enough to do that was not a question entertained by our intrepid inventor. What if somebody was? So he hit upon the idea of creating a pair of pliers that would have an 'integrated' tester. Of course 'integrated' is a modern management mantra that you cannot learn without paying a million bucks to Wharton or Sloan's School. Fortunately for Rane this mantra wasn't invented then. So he saved the million bucks, simply called it the Rane Tester-plier and started making plans to set up a factory with the million bucks that he had saved. For the rest of the semester and the next one that began after summer, he didn't stop talking about his tester-plier (or plier-tester depending on whether your political inclination was to the left or to the right). So Doody made a jingle about the world famous Rane Pliers – sung to the tune of a famous ad jungle 'Ranipal Ranipal Ranipal'. It goes,

Rane Pliers, Rane Pliers, Rane Pliers
Is it a tester– no, no, no!
Is it a plier – no, no, no!
It's a tester-plier, plier-tester, tester-plier
Rane Pliers, Rane Pliers, Rane Pliers

Every time anybody saw Rane in the corridor or in the mess, they would break out into this jingle. Loudly. Every time someone from H4 bumped into Rane in the library or in the department or in the Ac Office in MB, they would go - "Hey! Rane pliers, Rane Pliers...". Friday evening while watching the movie in Convo, every time the hero smooched the heroine some group of H4 guys would start singing "Rane Pliers, Rane Pliers...". This was the theme song for that semester all over the campus. I even saw some guys from H5 singing "Rane Pliers, Rane pliers" when they saw Rane walk past H5 gate towards the Gymkhana. It was a special favourite of Saheb Patil (not to be confused with Boss Patil) who was known to even sing it in his weekly bath.

- Satkya

Some of this inventiveness was sometimes visible in other areas as well.

Bingri's (Sanjay Bhingardevi) hang glider, Kaivan's geodesic domes for low cost housing, KT's "KT-ism", featuring a convoluted arrangement of pipes and ingenious mixing contraptions to get hot water in the bathroom in shower format (as opposed to using a bucket), which was a big hit and enjoyed by all in the wing, the Boat Club dudes figuring out solutions to rid Powai lake of the dreadful water hyacinth (aka "vile weed"), Milind Sohoni and gang's enviro attempts to re-green the hill by H4, which kept getting set on fire by the territorial hooch lobby, Sharookh / KRD's electrical circuitry (with built-in AI) to operate appliances (and simultaneously shut unneeded ones) in the room from the bed with a single flick of a

switch, and the same Sharookh's masterful crafting of an electric guitar using wood from a bed, the list is long.

Back to those old decrepit phones. You dialled a number, when the called party said hello, you dropped a 50p coin in the slot for the phone call to continue. 50p was a princely sum, a luxury for most of us non-princes.

In the early days of H4 – the '62 to '67 era – everyone operated the phone with a crooked wire without putting in any coins. For the convenience of all the inmates, the wire contraption was permanently kept next to the phone itself. The inmates from this time report that the telephone department finally removed the phone from such an unprofitable location. They did put it back, thankfully, at some later time. The inventors of the wire contraption had long graduated, and the wire contraption itself disappeared with the phone, but poverty was still the norm when we came along, and so was the ingenuity of the new inmates.

We devised a contraption we called a tickler by drilling a hole in the coin, and tying a string to it. We lowered the tickler into the coin slot for the call, and yanked it out once the call was done. The general average tickler user got his economics to work at 1p per call. Some of the more enterprising amongst us rented out a tickler at 10p per call.

The even more inventive who moreover had the time to read up on the mechanism of a public phone devised a method less cumbersome than drilling a hole through a coin. They used a computer punch card folded in half to make it slightly rigid. They pried the front and side panels of the phone box apart by a millimetre and brought the card down on the wire which would have moved down under the luxurious weight of the 50p coin.

Guys from Kolhapur and Sangli used a method which they swore worked well in their Kolhapur and Sangli. They simply brought the earpiece to their mouth, shouted through it, and quickly moved the earpiece back to their ear to listen to counter shouting. Nobody understood the logic but empirical evidence suggests that it worked quite well, given the number of shouting goons seen with the earpiece of a phone at their mouth.

I still remember the day when an official in a khakhi uniform came to the hostel on his cycle carrying a big bag. He was from the telephone department and the big bag was to carry back the millions of 50p coins he hoped would come trickling down from the phone as soon as he opened it with an official key. His confidence at striking gold stemmed from the fact that the phone meter records showed H4 guys as champion callers. Overcome by curiosity, all of us gathered around Mr. Khakhi as he pulled a funny looking key from his pocket and deftly opened and slid out the coin tray while using his palm to obstruct the valuable coins from flowing out like lava. Nothing flowed out. He looked down, and looked again, and his jaw dropped. He turned his gaze to the assembled and amused onlookers and then stared in disbelief at the coin tray. Amid all the laughter that ensued, I waded my way through the crowd and got a quick peek at the tray. Right in the centre of the tray lay a solitary 50p coin basking in the glory of its coinly solitude. It was surrounded by matchsticks, broken strings, crumpled computer cards, rubber bands, clips, pins and an assortment of wires made of steel, copper, plastic, and a wad of chewed chewing gum.

- Bakul

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IIT showed us four movies in a month with four Fridays and five in some months. The monthly pass came at a princely Rs. 2, which was sheer highway robbery as far as some scientific minds were concerned. If Necessity is the Mother of Invention, IIT

was her maternity ward. The necessity of spreading this Rs. 2 expense over ten people led to an invention called 'coat the pass with wax'. Once the pass was ticked with a pen, or so thought the usher who actually ticked on wax, the successful entrant into the Convo (convocation hall where the movies were screened) rubbed the tick away and slipped the pass out through a grill for the second man to attempt entry. In IIT guys asked each other for the usual match, lighter, cigarette of course. But sometimes they asked if anyone had a candle to spare. If you carried a candle in your pocket, you were respected as an individual with foresight.

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Some of our inventions were certainly illegitimate children of Mother Necessity, like the wax pass, or the devices produced because of the necessity to make phone calls in spite of dire poverty. But some were the result of our ever-restless brains, and a real desire to create.

Sandeep Bhise had this urge to follow in the footsteps of these famous seafarers Columbus and Vasco da Gama, and circumnavigate the globe. But for starters he set a more modest goal: cross Vihar lake on a vessel made by his very own hands.

Many a night and drawing paper was consumed making ever more sophisticated designs of all manners of craft which would float on water. It was soon realized that acquiring the raw materials needed to convert these designs into reality would wipe out Bhise's net worth (at that time) several times over. But the intrepid adventurer in his heart found a way. He befriended the then Mess Secy and collected all the empty kerosene cans that were lying around the kitchen. There were about twenty. The next few days were spent gathering the construction materials – wires to tie the cans, beeswax to plug their openings to make them water proof, and so on.

After a few weeks the raft was ready and was christened SS H4Whore. Bhise, in a cap and undies – he didn't want to risk his clothes getting wet in case the raft sank – and a bunch of guys from H4 took the raft to Vihar lake. A makeshift oar was hastily fashioned out of a piece of wood – everybody had forgotten we would need one to steer the raft.

Bhise mounted the H4Whore and off he went, surrounded by the bunch of guys swimming alongside. Wonder of wonders, the raft did not sink, and Bhise actually made it to the opposite end of the lake. The entourage made it too, in spite of the crocodiles of Vihar.

- Satkya ❖

All the Statistics I Need to Know, I Learned in an Indian Village

RAVI UPADHYE

Imagine that you are travelling through an Indian village during the monsoon season. As you are slugging your wet shoes through the sticky mud on the road, you feel a sting on your ankle. You look down and find a small stream of blood trickling out of two bite marks. Looks like you have been bitten by … by what? A harmless snake, a scorpion, or a king cobra?

In panic, you look for a doctor. The villagers inform you that there are two doctors in the village. Both treat bite wounds. Doctor A has a lousy track record: about 90% of all his patients die, usually on the spot. Doctor B has a much better success rate: about 90% of his patients live. Faced with these stats, and with your IIT education in math, logic and statistics, you would choose Doctor A, right? If you did, you would be correct, making Professor Gopalan proud. Alas, you would also be dead!

This brings me to my story on statistics in an Indian village in western Maharashtra where I went to school for a few years. And in this village, I learned that statistics can be rather dangerous, and one must be very careful about how to use it. My village was a rather primitive place, but fortunately we were blessed with two doctors in the village. The first one was a witch doctor (Doctor B), who healed people with prayers, songs, dances and offerings to the appropriate gods. The second one (Doctor A) was my grandfather, who had a medical degree from the University of Calcutta.

Early in the month of June every year came the monsoons, bringing with them a welcome relief from the heat and humidity that was building up for the last few months. They also brought with them lots of rain, filling up the snake holes with water. So the snakes would leave their snake holes, and seek shelter elsewhere. Every now and then, a villager would step on one of these snakes, and the snake would react by biting back.

Every time this happened, the villagers had two choices: they could take the victim to Grandpa, or they could take him to the witch doctor. In their hearts they believed in the witch doctor more than they believed Grandpa, so they would take the victim to the witch doctor first. Even though there were no radios or faxes or e-mail, somehow we kids always knew when someone was brought to the witch doctor, and we all gathered around to watch the show.

And it was a splendid show! There were prayers to the spirits to lift the curse from the victim. There were songs, and dances, and sacrifices of chickens. The spirits almost always demanded that chickens be sacrificed. If the victim or the folks who brought him in were better dressed than normal, the spirits demanded a goat. It was an awesome site to see a bunch of chickens with their heads cut off, running in circles.

This whole thing lasted for a few hours.

And, amazingly enough, it worked most of the time! At the end of the ceremony, the victim would generally sit up, and even stand up and start walking.

But, of course, in one out of ten cases, the spirits were too angry, and would not agree to lift the curse. At the end of two or three hours, they would tell the witch doctor in no uncertain terms that they would not lift their curse, and that the poor fellow had committed sins too grave to be forgiven. When this happened,

I learned that statistics can be rather dangerous, and one must be very careful about how to use it.

the witch doctor would turn to the victim's relatives, informing them that the spirits were angry, and that there was not much he could do. Perhaps they could take him to the other doctor.

The whole crowd would then move a couple of blocks to Grandpa's house. Most of the time, when they brought the victim in, he would be half dead.

Grandpa would examine the victim, check his pulse, and proceed to mix a shot of polyvenom serum, the combined antidote, and give it to the victim. Most of the time, it was useless. The victim would be too sick and his heartbeat too low to let the antidote have any effect. About 9 out of every 10 victims brought to Grandpa died.

So here were the undisputed statistics: 90% of all the snakebite victims brought to the witch doctor were cured, whereas 90% of all those brought to Grandpa died! Everyone knew this, including Grandpa. Now, you may not give the villagers much credit for knowing a lot of science and biology and such, but they knew their statistics, and it clearly told them that, statistically speaking, their chances were much better if they went to the witch doctor after a snake bite than to Grandpa. So that is what they continued to do, year after year.

This, of course puzzled me a great deal, so one day I asked Grandpa about it. Why is it, I asked, that 90% of the witch doctor's snake bite patients live, whereas 90% of your die? Well, said Grandpa, it may have something to do with the fact that 90% of all the bites in this area are from non-poisonous snakes and mildly poisonous scorpions. The effect of their poison lasts only for about 2-3 hours, but the other 10% can be fatal, if not treated early. So the patients who come to me are those that are bitten by poisonous snakes, and then not given treatment for several hours.

So this was my lesson in Statistics 101, well before I heard of the word Statistics: be suspicious of just following numbers. Understand the phenomena underlying the numbers. And, finally, if the numbers don't make sense, question them. ❖

Ravi Upadhye
B.TECH., CHEM ENGG, '67, PHD UC BERKELY '74

Ravi Upadhye retired from the Lawrence Livermore National Laboratory in 2007 and joined the Berkely faculty as an adjunct, where he teaches Process Design. Ravi is active in Toastmasters (DTM-2004) and acting (4 plays to his credit so far). He lives with his wife Aruna in Pleasanton, CA.

Supporting a Culture of Innovation at IIT Bombay

Class of 2002 Legacy Project

ABHI, SHRO & THE LEGACY PROJECT VOLUNTEER TEAM

It all started with a list- a list of the world's top universities. And it ended with another list- a list of 133 donors from the Class of 2002 who gave generously to their beloved institute. This is the story of everything that happened in between. Well, to be less dramatic, the story of 'Class of 2002 Legacy Project' and the fundraising campaign that made it possible.

Back in the 1950s, our founding fathers set up higher institutes of technical education to facilitate the industrial development of the nation. The IITs were thus established with the vision, and the mandate, to provide world-class education in engineering and technology and to create the future leaders who will bring about an industrial revolution for the betterment of the society and improve the lives of the millions of Indians.

The IITs did partly achieve their objectives. Its graduates stand tall among the best in the world, and one cannot help but admire the countless number of IITians who have played a prominent role in creating innovative technologies, from San Francisco to Sydney. But, therein lies a problem. Even a preliminary survey would reveal that a disproportionately large number of these stalwarts have done their best work outside of India. The jury is still out on exactly how much India has benefited, directly or indirectly, from IIT graduates. But one thing is certain- for a large part of their existence, the IITs were plagued by, among other things, the difficult economic situation in the country and lack of good opportunities for its graduates. The result was arguably the biggest brain drain the world has ever seen, probably matching the exodus of scientists from Germany during the early 20th century, albeit for very different reasons!

At the turn of the century, India evolved itself with the economic reforms and the opening of the markets. The economic situation improved dramatically and more opportunities were available to IITians within the country. But this brought with itself a new set of changes, where the young and the brightest are attracted towards the more lucrative IT and banking sectors, instead of engineering and technology. This has, in turn, affected the quality of technology innovations coming out of the IITs. It is not a surprise that the other Asian technical institutions, who were in a similar or worse state only a couple of decades ago, are now widely considered as more innovative.

And then came the list. In 2013, the QS World University Rankings put IIT Bombay at number 233. Number 233! How's that for a reality check? What does that say about us all along thinking we were the best in the world? Quite a damper it was.

When the IITB Class of 2002 met for the first ever "Decennial" reunion in 2012, we all felt quite strongly about the lack of quality innovation at IIT Bombay. We all loved science

and technology, but many had drifted away for various reasons, some of which are highlighted above. However, an "itch for creativity" still existed in many of us. Life for us is quite different after ten years post graduation, but we believed that it's "not too late" for the young budding engineers currently at IITB It was apparent that if we had better exposure to a culture of innovation during our days at insti, things would have turned out differently career wise, so-to-speak. Therefore, we decided to take some action and the 'Class of 2002 Legacy Project' was born!

The idea was simple- we would launch a project to stimulate innovation in engineering and technology at IITB, by financially supporting projects that develop new and innovative prototypes and fostering an environment of entrepreneurship through mentoring and guidance. And, we would put our money where our mouth is! Now, if only raising money were that easy! But more about that later. There were other urgent issues to tackle first.

If you've been following so far, you probably see the problem. How do you go to the IITB officials and basically tell them that they are not doing their jobs and so you've decided to intervene? Good luck with that! Not that that's what we were trying to say (probably), but it sure was interpreted thus. There were a lot of questions, criticism, suggestions, and criticism disguised as suggestions! We were told, "Your small project cannot make a meaningful difference to the state of affairs" and, "There is nothing wrong with the culture of innovation at IITB"among other things. But let's not go there!

We took the criticism in our stride as we felt that there indeed was some room for improvement in the "state of affairs". All we needed was a "right" avenue for supporting innovation. The challenge was to identify which is the most effective one that we can execute to perfection, all logistical issues and other things considered. A new campus wide competition, perhaps? Or rewarding the best research thesis or dissertation? May be partner with Tech Fest, E-Cell and the likes to support their existing competitions?

And of course, there was the money. How much can we expect to raise? Is it going to be enough to support innovation and make a difference like the detractors had questioned? Should we really take on an ambitious project and assume a risk? What if we fail to raise enough funds? Or, should we raise funds first and then decide on a project accordingly? How do you motivate people to donate if they don't know what they are giving for? What ensued was a round of meetings canvassing the continents and time zones. After considering (and reconsidering) various options, which we are smart enough not to detail here, we finally figured out what to do.

This was opportunity. This is where our Legacy Project came in. We would provide support, financial and otherwise, to develop prototypes and enable ideas to become a reality.

Our journey led us to SINE (Society for Innovation and Entrepreneurship), a technology incubator at IITB SINE administers a business incubator which provides support for technology-based entrepreneurship, and thereby extends the role of IIT Bombay in converting research activity into successful commercial ventures. While discussing with SINE, we realized that while the investment scene for entrepreneurship has improved in India, there is still a gap in funding to support early stage prototyping. Angel and VC funding is available to businesses that have a prototype and a business model. But individuals who have an idea find it challenging to convert that

idea into a prototype in the first place. They usually have to put in their own funds. This is especially true for engineering and hardware prototype ideas, which require relatively larger investment than software and services ideas. The result is a large number of dropped ideas and quashed dreams of many budding entrepreneurs, without even getting a chance to tinker. Many wonderful products that could solve pressing problems of the society die before ever being born. This is simply because no funds were available to make a prototype.

This is was opportunity. This is where our Legacy Project came in. We would provide support, financial and otherwise, to develop prototypes and enable ideas to become a reality. And, by helping create innovative prototypes and products, we would also support a culture of innovation at IITB by empowering students to try new things. We were confident that this project will appeal to (most) people, translating into a strong fundraising. We also thought that if the project strikes a chord with other batches, there is a real possibility of extending the mission into the future. We were all excited and psyched. We started our fundraising campaign with all the vigour that we could muster, and then some. And then, the first shoe dropped.

After a month of emails and phone calls, Facebook updates and Tweets, we had managed to collect less than INR 3 lakhs from fewer than 20 people. And five of those were from the volunteer team. That would probably be enough to support just one prototyping project- a far cry from the objectives we had set for the project. Was everyone who criticised and warned us, correct? One of the statements rang in our heads, "If you can collect INR 5 lakhs, it would be a miracle!"We regrouped, looked at our campaign, identified areas of improvement, and decided to take a few creative approaches. An inter-hostel donation GC was set up with live results posted on FB. What happened next blew our expectations! Within 24 hours, the donations started trickling in. We had struck a chord. Nothing incites a bit of competition more than the good old hostel rivalry. 'Gaali' fights in the age of social media. Imagine that!

By the deadline of Nov 15, we had collected more than 17 lakhs in donations from 133 batchmates. And, along the way, we generated tremendous enthu in the batch and brought everyone together around a cause with an energy not seen since we planned underground 'daaru' parties for our Valfi back in 2002! They came, they saw, they gave. And then, they volunteered to make the project execution a great success.

The Class of 2002 Legacy Project aims to support 8-10 prototype development projects in the next couple of years. But the efforts won't stop here. We have reached out to the other batches to join hands. We will reach out for corporate sponsorships. We aim to create success stories which will further the cause of the project and provide future financial support. We aim to make it an ongoing project with a long lasting impact. We believe that many IITians feel the way we feel, and would surely come forward and help I.I.T.B. achieve the standing among the top technology institutes in the world that it deserves. If you are even an iota excited, please come forward with your help, advice, criticism, and support. And don't forget to bring your wallet.

Remember the list? Let's climb the list. Together. ❖

Creative Bees at Fundamatics

ILLUSTRATION

Shreyas Navare
C'08, SJMSOM, H-13

Shreyas Navare, Mumbai, Senior Manager, Marketing and Corporate Communications at a private bank. He freelances as a Editorial Cartoonist for Hindustan Times. He has covered elections in 6 Indian states through the eyes of a cartoonist on behalf of HT. Shreyas has held many cartoon exhibitions, two of which were inaugurated by Dr. A. P. J. Abdul Kalam. His first solo international cartoon exhibition was held recently at Bangkok. His second exhibition was held at Nehru Centre recently. Cartoons featured in this issue are from the exhibition.

EZINE

Abhishek Thakkar

Abhishek Thakkar or just 'Thakkar' as he was known throughout campus is an alumnus of H5 from '03. Having a lot of it, he loved throwing his weight around, and escaped many a bumps which he'd have got for his PJs. Now he channels all that creative energy in designing beautiful, scalable web and mobile interfaces.

DESIGN

Anand Prahlad
C'07, IDC, H-8

Anand Prahlad is an independent graphic designer and artist. When not designing books, magazines, corporate identities or illustrating, he is an active gardener, culinary expert and amateur musician.
He runs www.thenewvitruvianman.com, where he writes and illustrates articles on design, gastronomy and music, and also www.magic-marinade.com, a food and travel blog.

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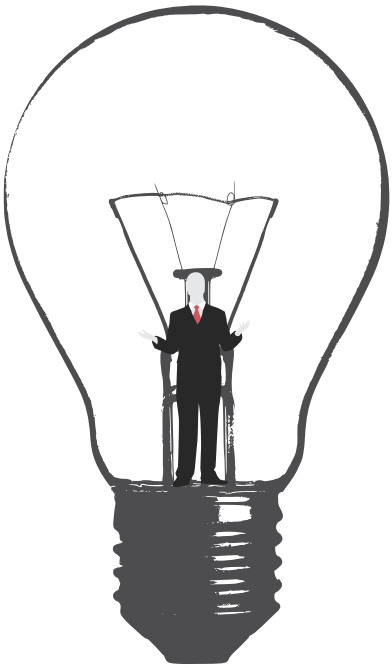

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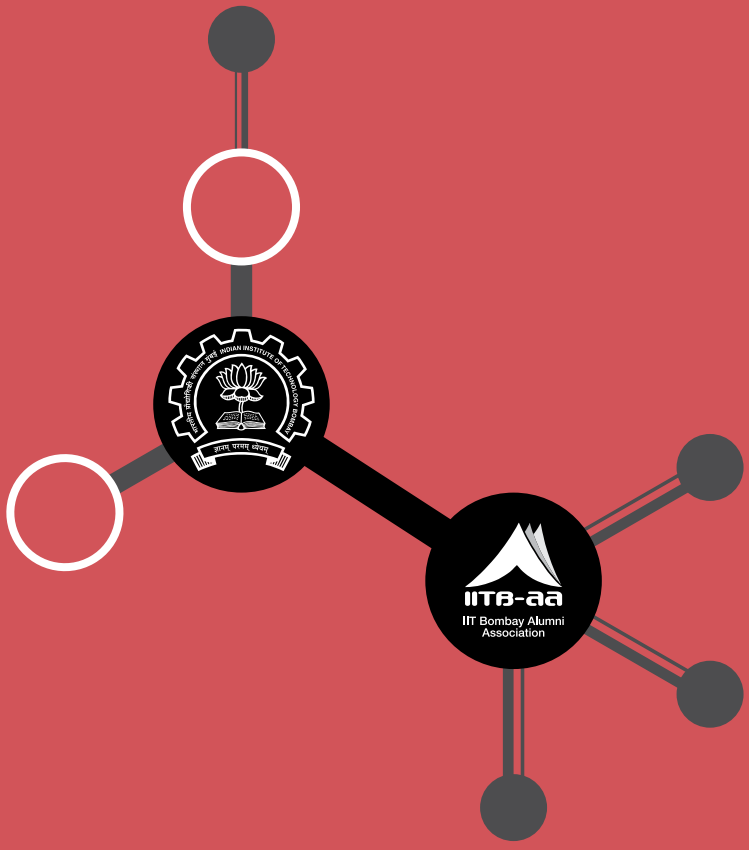
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