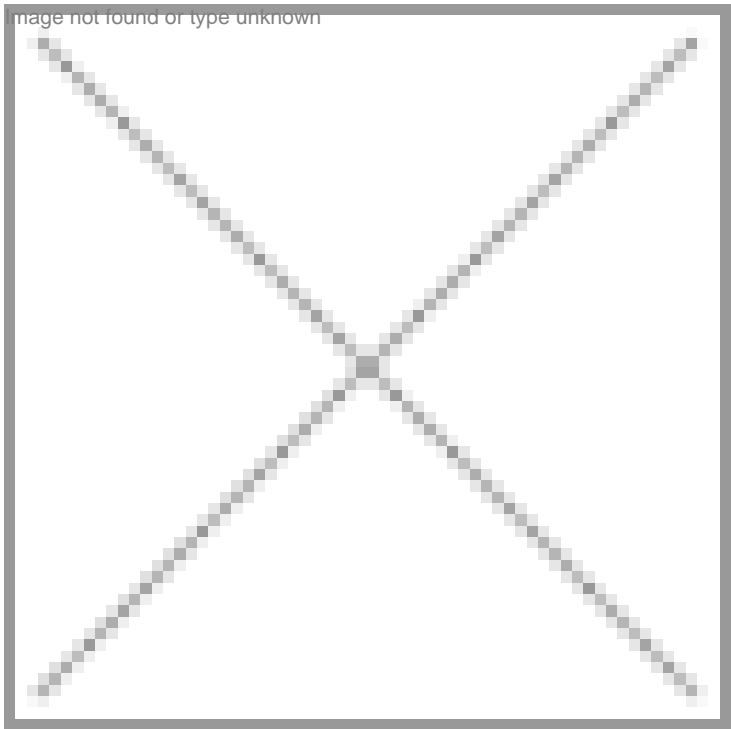
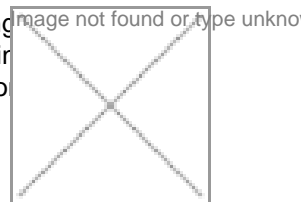


Make India home of innovation

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In recent months, we have seen the movement of the research divisions of some of the world's leading Fortune 500 companies to Indian shores. At least a 100 of them have set up shop to leverage India's "brain power". In this column, Dr Mashelkar makes a strong plea to build on this and make India a global center for innovation.



Knowledge without innovation is of no value. It is through the process of innovation alone that knowledge is converted into wealth and social good, and this process takes place from firm to farm.

When one looks at India today, one feels that centuries of subjugation has perhaps undermined our capacity for innovation and creativity. We cannot anymore allow the 'I' in India to stand for imitation and inhibition, it must stand for innovation.

Innovators are those who do not know that it cannot be done. Innovators are those who see what everyone else sees, but think of what no one else thinks. Innovators refuse *status quo*, they convert inspirations into solutions and ideas into products. Building such innovators will require an all-pervasive attitudinal change towards life and work—a shift from a culture of drift to a culture of dynamism, from a culture of idle prattle to a culture of thought and work, from diffidence to confidence, from despair to hope. Revival of Indian creativity and the innovative spirit needs to be made into a national movement today, in the same spirit and on the same scale as our freedom struggle.

We recognize that the innovation process has both forward linkages and backward linkages. The forward linkages will involve technology innovation and production chain, with the consequent process of diffusion representing a further forward linkage.

For India, equally important is the backward linkage which pertains to literacy, science education, public awareness, the mass media and the use of innovation in science itself to further these.

When it comes to technology innovation, there are three types of technology innovations that stand out. First, there is a large system innovation (such as a man on the moon mission or the green revolution), incremental innovation (such as development of an improved fax machine) and finally radical breakthroughs (such as an accidental breakthrough leading to the antibiotic industry). These invariably take place in formal systems of innovation, namely universities, industrial R&D laboratories, etc.

We have done well in large system innovation; our programs in strategic areas, green revolution, white revolution are indicative of our successes. Incremental innovations take place in industries, which continuously innovate to create products, which displace their own products with the fear that otherwise their competitors will do it for them. In the absence of competition in the market place, our industry has not put demand on innovation, but no more can they afford this. I do hope the new millennium innovation spirit will propel our industry to change course since that alone will determine their survival or success.

As regards to radical breakthroughs, which gave rise accidentally to antibiotic industry and modern chemical and plastic industries, India cannot, unfortunately, claim any major industry in this century that owes its origin to an accidental discovery in India. We need an innovative mind to spot accidents, when they happen. After all eyes do not see what the mind does not know. With the new innovation movement, we hope we will increasingly see such radical breakthroughs come from India.

Innovators do not exist just in formal laboratories, Millions of them exist in villages, in homes and in streets. To encourage community innovation, it is necessary to scout, support, spawn and scale up the green grass-root innovation. This will generate employment on one hand and it will use natural resources sustainably through linking of innovation, enterprise and investment.

I have emphasized so far on S&T based innovations but the concept of innovation is a much wider one. It is particularly important to recognize the need of social innovation. Innovation in India's social, legal and economic institutions, in the system of their governance is as crucial as innovation in the products and production processes of its economy. If paper becomes more important than people, if bureaucracy overrides innovative spirits, if risk taking innovators are shot, if decision making times are larger than new product life cycle times, then innovation cannot survive.

We must also recognize that innovation cannot arise by itself; it is generated and sustained through the efforts of its people. We need to create an environment, in which innovation flourishes. Otherwise, the innovators will either play safe and not innovate, or they will leave to become a part of other innovative societies, which encourage innovation, as India has seen to its dismay; since a lot of its young sons and daughters have left, not due to the lure of the physical income alone, but because of the psychic income that they gain in those innovative societies. We must vow to reverse this process as we enter the new millennium.

The question that we are asking is "why do Indian genes express themselves in Silicon Valley? Why can they not express in India? How can we create Silicon Valleys in our own Indus Valley?".

We must bring back the spirit of that glorious innovative India of the bygone millennia back? Indeed, we have an opportunity to start the resurgence of an innovative India today. The new millennium innovative India will be built only when we pledge to make the national symbol of "I" in "India" to stand for "Innovation".

When we get the fundamentals of knowledge and innovation centric approaches right. I hope these fundamentals, which have an eternal value, will reverberate through our minds in the next millennium and even beyond.

All of us have the right to dream. What would be my dream for Indian science and India in the early part of the new millennium, say for the twenty first century? Obviously, it is an India, where the basic needs of the teeming millions will be fulfilled and we will move on to the top ladder of the World Human Development Index. Drinking water for all, education for all, health for all, peace and prosperity for all, is something that we owed to our people a long time ago, and we must achieve this goal as soon as possible. But let us go beyond that.

What would be the possible headlines that Indian science and India will get in the next century? In my dream, I surfed the net and landed at the India.com portal.

I clicked on "Nobel Awards" and I saw: *"Indians won three Nobel prizes this year. The first one in physics is for the grand unified theory of matter and their interactions. The second one is in physiology and medicine, for providing the first definitive neuro-biological basis of the human cognitive phenomena. The third Nobel Prize in economics was shared by an Indian scientist and an Indian economist working in India, a country, which has already assumed the position of a knowledge super power by capturing 30 percent share of the global output of the global knowledge industry. They won the Nobel prize for their work in Economics of Traditional Knowledge, which beautifully blended economics, science, philosophy and ethics."*

I clicked on "Community Health", and I saw:

"India became the first country in the world to completely eradicate Tuberculosis."

One more click on the Indian Pharma Industry showed:

"The anti-ulcer drug, which was based on a molecule derived from the clues from India's traditional knowledge, maintained its leading global position and posted global sales exceeding five billion dollars."

And the final click on "Research Opportunities" showed:

"Indian brain drain has been completely reversed this year. In fact, India is in an enviable position of having a queue of American and European scholars to join its unique global knowledge production centres in India."

You might say these are crazy dreams. Can a country, which has so many deprived, so many people below the poverty line, so many illiterates, really do it ? What gives me the confidence that it can happen? Twenty first century will be the "century of mind" and India will have the legitimate right to lead. This century will belong to India, which will become a unique intellectual and economic power to reckon with, recapturing all its glory, which it had in the millennia gone by.

RA Mashelkar