



‘Indians had a very imaginative past in their DNA; revving it up holds good promise’

Emphasized **General Anil Chauhan** in his keynote address at National Technology Day-2024 event.

‘Operation Shakti’ and its overall significance...

Operation Shakti signified more than technical prowess of the country. It actually demonstrated two important things. Firstly, it had demonstrated team work. A team of scientists, from BARC, DRDO and Army Engineers, worked in unison and in complete secrecy to achieve this difficult mission. Secondly, it signified our national resolve and the will of our political leadership. India took this historic decision knowing fully well its consequences. We were confident that the country would be able to overcome subsequent hurdles. We firmly believed that 'Hum Honge Kaamyab (We shall emerge successful)'.

Innovation in Technology...

Technology affects education, communication, economy of the country and many other areas. It ultimately goes on to change the socio-cultural behavior of a particular society. Modernization of a society is equated to technological advancement. Developed nations will more reluctantly share advanced technologies to other countries, particularly with technologically-backward nations.



A (nuclear) deterrence is important because India prophesies a No-First-Use (NFU) doctrine. It mandates us to maintain a credible minimum deterrent. This particular aspect will always remain important for India.

We have heard of technology denial regimes in the past and these were of extreme forms. BARC had been subjected to this and it was under embargo for most of the times. India had experienced this in the past and the development of a nation cannot be made hostage to geopolitical desires and policies of other nations. There's a saying that 'Today's Science is Tomorrow's Technology'. Today's science fiction is tomorrow's reality. Today's dreams are tomorrow's missions.

The fruits of being Imaginative...

The ability of being imaginative holds the most important key towards developing new technologies. A society that is imaginative will innovate and by virtue of this the development cycle and transformation will be much faster. Albert Einstein had once said: “True measure of intelligence of a human being is not knowledge, but it is imagination”. “Logic will get you from A to Z but imagination will get you everywhere”.

The imaginative India of the past and its scientific excellence...

India gave to the world the concept of zero, it

evolved the decimal system, it also gave astrology and astronomy. It was far ahead of the time as compared to other nations of that era. In the field of medicine India propounded the concept of Ayurveda. Texts like Charaka Samhita and Sushruta Samhita provided comprehensive knowledge of anatomy, surgery, pharmacology, and disease management. The extraction of metals like iron, copper, bronze etc., were well documented in our ancient texts, reflecting advanced knowledge of chemical processes as well as metallurgy. The pioneering research by Aryabhata and Brahmagupta in the field of mathematics and astrophysics laid the foundations for algebra, trigonometry and the helio-centric model of our solar system.

India of the past and characteristics of an evolved society...

Architecturally, India was much advanced and much ahead of those times. The cities of Mohenjo-Daro and Harappa showcase the civilizational advancement in terms of urban planning and drainage systems. The temples of Khajuraho or the rock cut architecture of Ellora are enduring examples of India's architectural brilliance of those times. Societies which are technologically advanced also invest most of their leisure time in development of art and culture. This feature was also there in the past with us. I think there is no civilization other than that of India where ancient dances and music forms are still practiced today. It was true to us being imaginative, innovative, informative and inventive. This we did it as individuals, and as a complete society.

India of the past occupied centerstage in knowledge sharing networks...

India shared its ancient knowledge with the rest of the world. We didn't keep it to ourselves the way the West is doing today by putting sanctions and restricting the flow of technologies. Merchants, traders and students from all parts of the world came to India to gain knowledge. The universities of Takshashila and Nalanda were probably the MITs, Harvards and Oxfords of today. So, India was not just a Vishwaguru but it was also a Vishwabandhu and a Vishwamitra.

Knowledge enshrined in ancient scriptures, a reflection of India's imaginative past...

Ancient Indian literature spoke of imaginative technologies and a variety of astras (weapons) that were deployed in the battlefields. Mahabharata talked about situational awareness of distant battlefield. Robert J. Oppenheimer of Project Manhattan had reminded us the knowledge enshrined in ancient Sanskrit texts and had quoted the lines from the Gita when he saw the tremendous power of the atom. "If the brilliance of thousand suns were to shine together in the sky that would not match the brilliance of the mighty one (bomb)," which is a manifestation of the concept of Brahmastra envisioned in our ancient times. All of this is a reflection of our imaginative past, which we have inherited in

our DNA. Somehow, because of history, it has got obscured. This imaginative Indian and the thought process underscoring the fact that we can do it and we could be better than the rest exists as part of our DNA. We only need to revive it and we would be able to occupy the centerstage in both science and technology.

Revolution in Technology and its impact on Armed Forces...

Historically, technology has had a revolutionary impact on the conduct of warfare. This has been true from ancient times. Technology has been a strategic enabler and has been responsible for what is called as revolution in military affairs. Now, we have the advent of emerging and disruptive technology like AI, autonomous weapons, stealth, quantum, bio-technology, and human advancements in hypersonics, space, novel materials, energy propulsion, next generation of communication networks, which are impacting warfare. Our defense forces, including our strategic assets therefore remain ahead of this technological curve. For embracing this, I believe that the troika of soldiers, scientists and scholars would prove to be the most important enabler. All three should work cohesively to provide a decisive technological edge over the adversaries over the entire spectrum of conflict, including nuclear.

Nuclear Technology key to maintaining peace...

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Securing the needs of the country through development of multi-faceted technologies...

Technology is not about developing hard power, alone. It has many facets to it and reflects many dimensions and domains of our individual and collective well-being. Tremendous efforts have been put in by scientific community of BARC in areas of water desalination, water purification and waste water treatment technologies. Some of these technologies have been deployed across strategic locations along the Indo-Pak border. Radiation technologies that enhance food safety and increase the shelf life of perishable food items and reduce post-harvest loss contribute to overall national food security. Application of radioisotopes in diagnosis of tumors, pathogens and treatment of cancers secures the well-being of the people.

