E A S Sarma
Former Secretary to the Government of India

To

Smt Nirmala Sitharaman
Union Finance Minister

Dear Smt Sitharaman,

Knee-jerk policy responses, the absence of a long-term technology vision and an imprudent CPSE disinvestment policy are weakening India's role as a possible global technology leader.

In your Budget Speech this year, you stated, "*Our vision for the Amrit Kaal includes a technology-driven and knowledge-based economy with strong public finances, and a robust financial sector. To achieve this, Jan Bhagidari through Sabka Saath Sabka Prayas is essential".*

The above statement, however well-intentioned, is far too general, not substantiated by a coherent strategy which identifies technologies and natural resources, minerals in particular, critically required for providing India a global lead in crucial manufacturing sectors. Unless such a strategy also puts in place an appropriate institutional framework and a clear funding arrangement based on actual budgetary allocations, it will not deliver the desired outcomes.

Many countries are presently engaged in formulating such strategies and India is lagging far behind.

For example, the USA has identified technologies that are critical from its point of view, the details of which can be seen at

https://www.whitehouse.gov/wp-content/uploads/2022/02/02-2022-Critical-and-Emerging-Technologies-List-Update.pdf

Threatened by intense competition from China and a few other countries, the US has ramped up corrective measures, including legislative initiatives, with a clear focus on what it should achieve.

A more comprehensive inter-country technology assessment has been attempted by the Australian Strategic Policy Institute (ASPI) [https://www.aspi.org.au/], which can be accessed

at https://www.aspi.org.au/report/critical-technology-tracker. The study is an eye-opener, as it shows the following.

1. China leads in 37 out of 44 critical technologies that ASPI is tracking (e.g. *nanoscale and composite materials, high specification manufacturing processes, artificial intelligence, quantum sensors, synthetic biology, photonic sensors, hypersonics, advanced robotics and so on*)
2. In some of those technologies, all of the world's top 10 leading research institutions are based in China and are collectively generating nine times more high-impact research papers than the second-ranked country, the USA.
3. In almost all the 37 technologies in which China leads, it has a near monopoly hold over them.
4. India figures at a distant 3rd/ 4th position in every one of these 44 technologies. The gap between China (also the USA) and India is quite wide.

The technologies that ASPI is tracking closely include those that give a clear edge in sensitive sectors such as defence, communications, energy and so on.

China also dominates in several critical minerals, including having a near monopoly over the supply line for solar photovoltaics (*https://iea.blob.core.windows.net/assets/d2ee601d-6b1a-4cd2-a0e8-db02dc64332c/SpecialReportonSolarPVGlobalSupplyChains.pdf),*

It is not as though India does not have an inherent capacity to assume leadership in several critical technologies. Over the last seven decades, successive governments have assiduously developed outstanding academic institutions, research laboratories and premier scientific institutions, which have generated world-class human resources. However, in the absence of a focused strategy, there has not been enough resonance and convergence to push India to the forefront of technology.

India is fortunately endowed with strategic minerals (uranium, monazite, bauxite, iron ore, zinc etc.) but the rate at which they are depleting is far higher than the rate at which new deposits are added through investments in exploration. India is yet to come to grips with the harsh reality that most of these minerals will not last beyond 15-20 years unless enhanced investments are made in mineral exploration.

It is ironic that India is exporting high-quality iron ore, though the existing deposits will not last long. Many iron ore exporters are known to be indulging in under-invoicing, tax evasion and earning illicit wealth stashed in overseas shell companies, but they enjoy political patronage. The

government has recently made a volte-face in the case of beach sand mining by re-introducing private players, knowing well that beach sands contain monazite, the raw material for thorium, a strategic input for India's future nuclear development programme, in addition to other atomic minerals. In the past, private mining of beach sands opened the floodgates to smuggling monazite outside India. Apparently, the government has yielded to external pressure.

To date, there is no domestic policy to increase emphasis on mineral exploration, regulate mineral production to make it sustainable and prudently manage the demand. Stripping CPSEs of their greenfield mineral blocks and giving them to private miners has worsened the situation, as the latter, driven by profits, place little emphasis on exploration. Compounding this is the regressive approach adopted by the Finance Ministry in forcing mining CPSEs like CIL, ONGC to pay high dividends, instead of encouraging them to invest their surplus resources in exploration.

China's dominance in technology arises primarily from the heavy, well-focused investments it has made decade after decade in R&D in crucial fields of technology and in scientific institutions. It has reposed trust in state-owned enterprises and enabled them to commercialise home-grown technologies and rapidly indigenise technologies imported from the west. It has put in place a unique governance structure for state-owned enterprises, to provide them sufficient autonomy to be able to work in line with national goals.

In contrast, India's R&D investments have stagnated at 0.7% of GDP (*R&D Statistics, 2020, Department of Science & Technology*), among the lowest in the world. Instead of providing public funding to academic institutions in critical technologies, the present policy has forced them to seek private funding, which in turn has often resulted in the funding agencies laying claim over intellectual property rights to indigenously developed innovations and technologies. In the absence of adequate support, many Indian technology innovators are selling their technologies to the west.

Instead of tapping the full potential of the CPSEs and grooming them into global leadership, India is handing them over to private parties having no acumen whatsoever to carry forward their operations. On the other hand, India has plans to support a few private conglomerates to become "global champions" ((https://www.niti.gov.in/battling-barrier-scale), which in turn will choke competition and promote cronyism.

While India has put its CPSEs to a distress sale, it has simultaneously undertaken a scheme to provide heavy subsidies to private companies in the name of encouraging them to produce strategic products. In one case, this scheme implies a whopping subsidy of Rs 75,000 Crores (50% of the

project cost) to a consortium of foreign-listed private conglomerates! The present government's CPSE disinvestment approach and its giving subsidies to private companies are anything but prudent.

What is urgently called for is a long-term technology vision that identifies critical technologies in which India should make an all-out effort to be at the forefront globally. Unless India recognises the scarcity and importance of minerals such as monazite and other atomic minerals, iron, zinc, copper, bauxite, lithium, rare earths etc. and takes urgent measures to optimise their use, it will soon find itself becoming heavily dependent on others, which in turn will affect national security.

Against this background, I suggest that the government proceeds as follows:

1. A standing national technology vision group of experts to be set up to identify the cutting-edge technologies relevant to India, designate the scientific institutions that should carry out targeted R&D work relevant to those technologies and provide an estimate of government funding needed for supporting such R&D effort, so that it may lead to specified outcomes.
2. A “Technology Development Fund", administered by a high-powered Central inter-Ministerial group, can translate such a vision into deliverable outcomes. To maintain a continuing focus on targeted investments in technology development, the annual budgetary allocations provided for R&D and technology development by different Ministries should also be shown under a “Technology Budget” so that the Parliament may be in a position to review and monitor the same readily.
3. The national vision group may also be entrusted with the responsibility of monitoring the implementation of the strategy.
4. Special efforts need to be made to reach out to Indian technology innovators, extend them support and make sure that their innovations benefit India, more than other countries.
5. CPSEs should play a pivotal role in promoting self-reliance in technology. Instead of indiscriminately privatising them, the government's effort should be to identify their respective strengths and tap their full potential, so as to groom them as leaders in technology development. The CPSEs should be encouraged to commercialise indigenously developed technologies and also, where necessary, import and absorb state-of-art technologies from other countries. For this to happen, it is necessary to have a governance structure for the CPSEs that insulates them from Ministerial interference in their day-to-day functioning, promotes professionalism in their management and ensures that they

remain accountable to the Parliament.

6. The government should stop the disinvestment of CPSEs/ monetisation of CPSE assets.
7. The idea of promoting a few private conglomerates as “global champions” is ill-advised, as it chokes competition and encourages cronyism.
8. The recent moves by the government to dilute laws and regulations relating to the environment, mineral development etc. in the guise of promoting “ease of business” are regressive and should be revoked, as they tend to dilute rule-based governance and promote industries that impose heavy social costs. Rule-based governance alone can attract benign investments and technologies.
9. Instead of handing over mineral blocks to private agencies, the government should retain public control over them and adopt a long-term strategy to ensure their prudent, sustainable management. In particular, the government should progressively reduce iron ore exports and instead get them processed into value-added products for domestic use
10. In particular, no private mining should be permitted in the case of beach sands which contain strategic atomic minerals.
11. The national mining policy should limit the annual extraction level for each mineral so as to ensure that the available resources can last at least 40-50 years at any given point of time. Investments in exploration should be so enhanced as to ensure that the rate at which extractable new deposits are added remains higher than the rate of their depletion.

I hope that the concerned Ministries work in concert for developing a long-term technology strategy that enables India to become a global technology leader.

Regards,

Yours sincerely,

E A S Sarma
Visakhapatnam
12-3-2023