

FUNDING WOES HAUNT INDIAN SCIENCE

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Far back in time, science, like monasticism, attracted people who were singularly driven by a passion for seeking the truth. Largely ignored by the rulers and the state machinery of those days, science was either supported by the enlightened and munificent elites or by the investigators themselves from their personal funds. The times have changed since, and we have never had so many people supported by the state, whose purported purpose of work is to understand the world better. Thus, knowledge generation of the natural world has become a highly competitive endeavour among the nations and science funding has often been touted as a marker of social advancement.

With very little participation from the private sector in the country that includes some of the richest by global standards, curiosity-driven basic research in India is primarily sustained by direct funding from the government. Still, it remains static in India and hovers between a paltry 0.6 to 0.8% of GDP over a decade, way below the United States, China, Japan, the European Union countries and South Korea. While India's global R&D expenditure remains static at 1-3% of the global total, the U.S. and China accounted for 25% and 23%, respectively. This trend of under-funding is also reflected in the low proportion of qualified researchers available in India, considering its huge population.

The World Bank statistics indicate that India had 255 researchers per million people in 2017 — a minuscule fraction for its size and population, in contrast to 8,342 per million in Israel, 7,597 in Sweden and 7,498 in South Korea. Compared to 111 in the U.S. and 423 in China, India has only 15 researchers per 1,00,000 population.

The budgetary allocations over the last several years show a consistent downward trend. Much of the total of the funding available goes to DRDO, Department of Space and Atomic Energy, leaving only 30 to 40% for agencies such as Indian Council of Agricultural Research (ICAR), Council of Scientific and Industrial Research (CSIR), Department of Science and Technology (DST), Department of Biotechnology (DBT), Ministry of Earth Sciences (MoES) and Indian Council of Medical Research (ICMR); it is from this last-mentioned allocation that the extra-mural research from the individual investigators are supported. The current financial year (2022-23) is no exemption, borne out by the budgetary allocations for scientific research. The Union Ministry of Science and Technology has earmarked 14,217 crore in the 2022-2023 Union Budget — a drop of 3.9% from last year; the DST and DBT are supposed to receive 5,240 crore and 2,961 crore, respectively.

While the funding trend remained frozen between 2011 and 2018, the number of universities jumped from 752 to 1,016, and doctoral degrees escalated from 10,111 to 24,474, which means that the available number of people required to do scientific work as a career option enlarged exponentially.

Probably realising this demand from the new generation of researchers from the universities, the 2021-22 budget offered 10,000 crore (\$1.37 billion) every year starting from 2021, over the next five years, for a new funding agency called the National Research Foundation (NRF). This agency is expected to boost university science research, as well as the work in social sciences. The journal *Nature* in its editorial dated February 9, 2021, in a somewhat euphoric tone, called it “a ground-breaking change”, giving the fullest credit to the then Principal Scientific Adviser K.

Vijay Raghavan for seeding this idea to the point of fruition.

This newly proposed idea is also in tune with what is being stated in the National Education Policy 2020: "The NRF will provide a reliable base of merit-based but equitable peer-reviewed research funding, helping to develop a culture of research in the country through suitable incentives for and recognition of outstanding research, and by undertaking major initiatives to seed and grow research at state universities and other public institutions where research capability is currently limited".

Despite the announcement of the NRF and a huge fund infusion in the science budget, the 2021 budget speech had also expressed the intention of investing about 4,000 crore over five years for deep-ocean research and biodiversity conservation; and promised to four centres for virological research and a commitment to developing hydrogen energy. Planned to be an autonomous body and therefore less bureaucratic, the NRF was expected to bring thousands of colleges and universities under its ambit. As most of the country's scientific research is being conducted by government laboratories and a few premier institutes, this new forum was thought to be a game-changer by its intent of democratisation of the knowledge base. But it is anybody's guess why the current-year budget was eloquently silent on this initiative of the last financial year, which is yet to be approved by the Cabinet. Such a lack of continuity in government policy towards science funding is a huge deterrent to achieving the fullest potential in scientific research in India.

Gallup poll of sorts among the researchers would surely nail the biggest hindrance in Indian science — the financial bureaucracy, again a legacy of British colonial governance. To unleash the fullest potential of Indian science, a vibrant and responsive financial system is required. Such a system should be autonomous and more participatory, and less bureaucratic — a problem also compounded by the fact that the finance person is made more accountable to the ministry rather than the secretary of the department. It is widely felt that it is often less difficult to have a project approved than to have funds periodically released. A corollary question is how to regain the autonomy of scientific institutions in financial management that has undergone considerable erosion. India must choose to break the bureaucratic barriers that exist in the government departments and develop innovative ways to help basic research flourish.

India cannot aspire to be a global leader in scientific research if enough funds are not injected into basic research by committing to raise the R&D spending to at least 1% of the GDP. It is also important for the private sector to chip in. But for that to happen, the government should incentivise the private players by giving them tax breaks, etc. The promise to set up NRF, independent of political interference, and the related financial commitment needs to be realised, that would go a long way to support extramural research in the universities. Another option is to upgrade the SERB (Science Engineering Research Board) to play the role assigned to the NRF. There are a lot of cues to be obtained from China on how it managed to become a world leader in scientific research. For all this to achieve, a foremost requirement is a dynamic R&D ecosystem, which India lacks today.

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