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October 2020

Online at <https://mpra.ub.uni-muenchen.de/103502/>
MPRA Paper No. 103502, posted 19 Oct 2020 15:23 UTC

Learning from the Crisis: Public Investment in Research and Development in the Neoliberal Regime in India

Soham Bhattacharya and Agnivo Sarkar¹

During the aftermath of COVID-19 pandemic there is a growing concern and wait for the vaccine of the disease. The wait for the vaccine and its concurrent developments are discussed in detail within the circles associated with Scientific and Technological development in contemporary India. The concern has however, fortunately, also exposed the inherent crises of the current political regime's inability to extend support, both financial and ideological, to the endeavour of scientific knowledge practice in India.

Two distinct and inter-related crises have grown within the scientific research organisations in the country, more importantly, it grew during the current RSS-BJP political regime. One arose out of the neoliberal practices of the State, and the other as an outcome of the larger Hindutva narrative marred with non-scientific claims.

The first crisis, we have identified in the subsequent sections in this note, as the crisis of *instant gratification* under neoliberal economic environment. Analogous to the recent nature of social media interaction, be it twitter posts of political figures or an enraged political battle, the need to respond and take an immediate 'stand' on every issue has been *the* unsaid norm for the intelligentsia in the country. In Scientific research, however, unfortunately, if this so-called immediate need is decided by the laws of the market, the funding provided to continue the not-so-immediate research face the obvious reductions. The expected slow-down in funding for research projects, which are 'immediately non-deliverable to market', has been happening across the globe, and more so in the recent Indian context. The political will of serving instant gratification of the markets by steering the funds away from research and development in India thereby necessitates the state to systematically stall or withdraw support from the same. The manifestation or the implication of this crisis, however, can only be realised in a time such as this; when a virus-driven pandemic has caused massive havoc. The

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state remains out of wits, being reminded of the enormous and systematic fund cuts it has done from the research projects in the recent past.

The second crisis is political and thereby ideological in nature. It starts with epitomising and celebrating the so-called greatness and rigour of the ancient civilisations in terms of their scientific discoveries. This particular crisis in India arises out of denying the important premise of empirical evidence in modern science in the public sphere and then ideologically blending the unproven myths while claiming and restating those myths as 'Science'. From the right-wing Hindutva public figures claiming plastic surgery to be an ancient invention to firm beliefs about the internet being discovered in ancient ages, such statements are established in the public sphere. The state has also provided special sessions in the National Science Congress on such issues, while astrology has come to be regarded as a scientific department in several institutes. The *narrative* of Hindu mythology becoming a substitute for scientific evidence in the public sphere restricts instilling any scientific temper in the country. More importantly, it undermines the actual works of several renowned scholars of India, including globally recognised figures like C V Raman, Satyendranath Bose, P C Baidya and many more.

These two crises together often bring out the hollowness of claims regarding the timeline of Covid-19 vaccine research and similar unjust expectations from scientific research. A neoliberal state policy has been neglecting the funding for scientific research, alongside the political practices of irrational propaganda-making in the country is on the rise, these two together is the crux of the present regime's attitude towards scientific development.

2. Neglect of Public Funding in Research and Development: A Neoliberal Story

During the post-world-war II phase, there was an observed boost in state-funded research practices. If one briefly reviews the USA's funding practices for academic R&D in this phase that might provide an overview of the shift in the funding practices in the majority of the nation now run by neoliberal economic and political ideology. One can understand the crux of the federal interest by revisiting the history of the National Science Foundation's formations. The then US President, Roosevelt, had requested Dr Vannevar Bush, the director of the "Office of Scientific Research and Development, to write a detailed report. As a response, Dr Bush wrote the report titled "Science: The Endless Frontier," which created the roadmap in the advancement of science and technology in the United States. The

formation of NSF (National Science Foundation) was one of the outcomes. In the concluding remarks, he gave the fundamentals behind the government's responsibility to conduct scientific research and education. In our present discussion, we will highlight one of them.

"Whatever the extent of support may be, there must be stability of funds over a period of years so that long-range programs may be undertaken." (Bush, 1945)

The USA promoted a capitalist economic environment and despised the Soviet bloc and any socialist system of the state organisation throughout the second half of the last century. The imperial interests were quite evident from the country's State and foreign policies. However, in promoting academic R&D, the US federal government always took an interest in funding. The government's attitude towards funding practices in research helped to take place major scientific breakthroughs in that country. Nevertheless, during the last few decades, these attitudes started shifting, withdrawing their support, and pushing academia to seek funds from private bodies.

In Fig 1, we have demonstrated the funding pattern of the various funding agencies of the US, from 2000 to 2016. It is evident from the figure, even after 2000 when significant fund cuts happened in the federal agency's grant, the contribution from the industry failed to compensate for the overall decline in the share. Throughout the timeline of post-world war II, in some form or the other, government agencies took care of more than 50% of the total academic expenditure. Government agencies' contribution was as high as 70% in 1970-80 (NSF 2018).

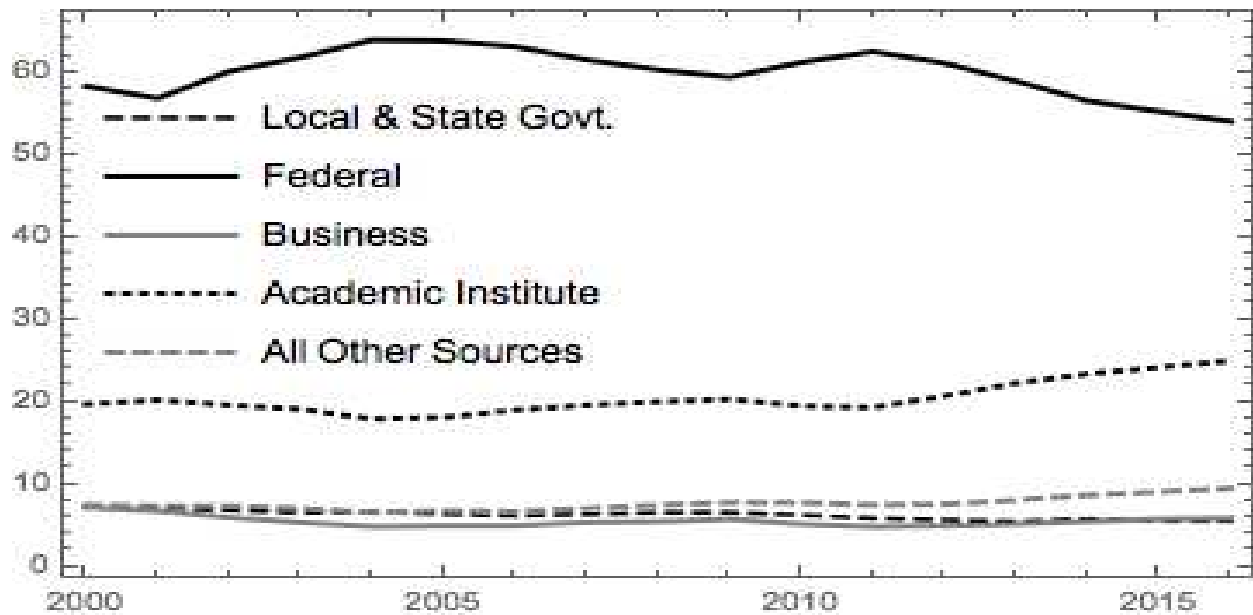


Figure 1: Expenditures and Funding for Academic R&D, Source: NSF.

A similar course of development, although much smaller in scale, can be found in the recent Indian context. The role of the State to promote and encourage research in scientific disciplines was laid out under the Scientific Policy Resolution of 1956 in India (for a detailed discussion, see Gupta 2003). The resolution outlines five tenets, following which one can broadly understand how scientific development was perceived as one of the primary areas that could contribute towards modernising India. The resolution aimed to provide the following:

- i) To foster, promote, and sustain, by all appropriate means, the activation of Science and scientific research in all its aspects- pure, applied, and educational;
- ii) To ensure an adequate supply, within the country, of research scientists of the highest quality, and to recognise their work as an important component of the strength of the nation.
- iii) To encourage, and initiate, with all possible speed, programs for the training of scientific and technical personnel, on a scale adequate to fulfil the country's needs in Science and education, agriculture and industry, and defence.
- iv) To ensure that the creative talent of men and women is encouraged and finds a full scope in scientific activity.

v) To encourage individual initiative knowledge, in an atmosphere of academic freedom, and in general.

vi) To ensure for the people of the country all the benefits that can achieve from the acquisition and application of scientific knowledge.

Over time, India has deviated far from these primary aims of the policy resolution. While all the above concerns remain as important as it was during the 1950s, the research and development expenditure remained well below 1% of GDP in recent times.

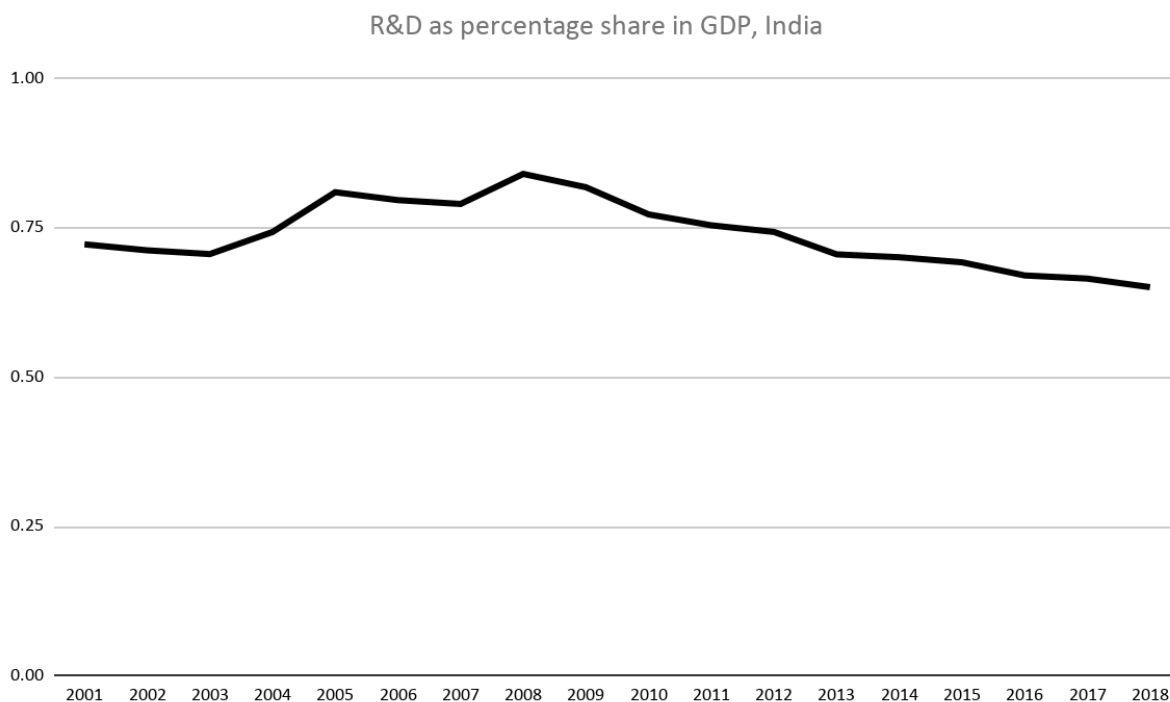
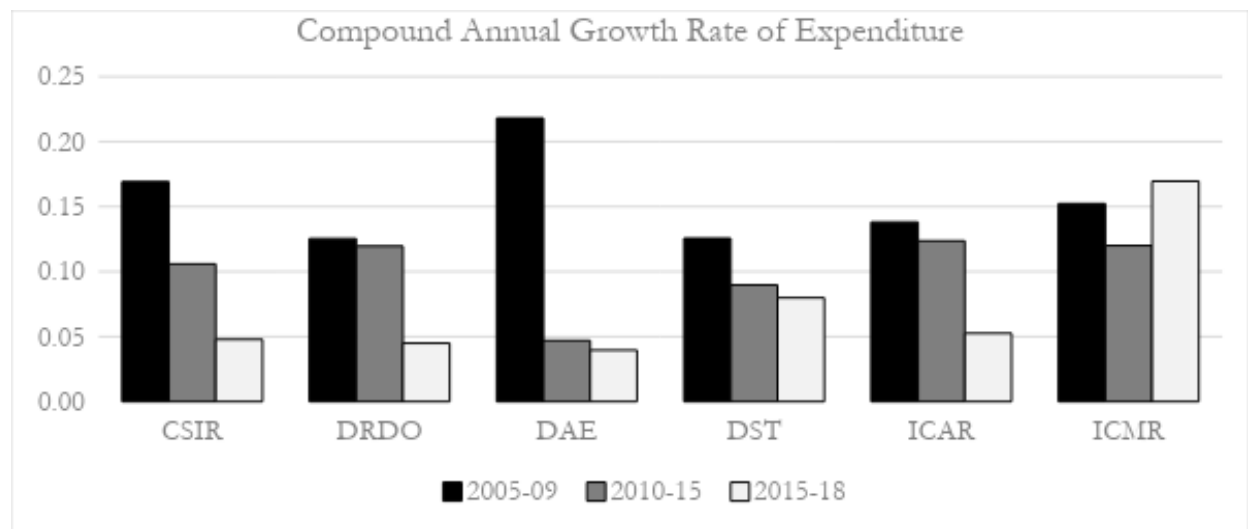


Figure 2: R&D as percentage of GDP in India, Source: DST survey on Expenditure, 2018 (DST, 2020)

Figure 2, depicts the stagnation of spending in research and development (R&D) using the data from the expenditure report published by the Department of Science and Technology in India (DST 2020). In fact, if we look into the point beyond 2010, the spending pattern becomes clearer. At two decimal points of percentage share of GDP, the share of spending has slightly declined after the period of 2010.

Another way to represent the systematic withdrawal or absence of funds with regard to major scientific institutes is shown in figure 2. The growth rate in spending has declined even further during this period. Other than a slightly recovered CAGR in the R&D expenditure for ICMR, all major institutions, including defence research, have seen a relatively low growth in spending by the current government. The growth rate of expenditure, observed during the first decade of the 2000s, are lost in the post-2015 period. Therefore, contrary to the arguments often pushed forward in the same report of (DST 2020) the growth rates in expenditure actually suggests there has not been much thrust in supporting the R&D initiatives under the current regime.

Figure 3: Growth rate in Expenditure for Select Scientific Departments, India, 2005-18.



Source: *DST survey on Expenditure, 2018 (DST, 2020)*

3. Private interests in R&D: The Crisis of Instant Gratification under Neoliberalism

A rigorous attempt by Bozeman and Gaughan (2007) tried to understand the relationship between the academic research and the private industries when grants and contracts are provided by the latter. The data collected for the study made an important observation. The involvement of the industry sector with academic research varies with the disciplines. The association is higher for applied subjects like agriculture, computer science, and engineering. The commitment is far less to the disciplines which often come under the banner of basic sciences like physics, chemistry, and mathematical science. Several scholars, including Noam Chomsky, have pointed out a potential

abuse of public infrastructure for the benefit of private profit making through R&D facilities in the USA (Chomsky 2012). The potential abuse might be seen as an outcome of the intellectual property rights gained by the private corporations and thereby the profits gained out of it, while the use of public research facilities remain largely funded by the government agencies.

At this point, two questions arise: whether the academic expenditure is growing in those fields where industry significantly involves and why the industry does not take an interest in basic research and what is its broader implication. For the first question, we would like to refer to the visible drop in the growth rate of expenditure in the USA, from the first decade to the second decade across all the discipline. The involvement of the industry sector with academic research varies with the disciplines. The association is higher for applied subjects like agriculture, pharmaceutical research, computer science, and engineering. The commitment is far less to the disciplines which often come under the banner of theoretical disciplines such as Physics, Chemistry, and Mathematical science. In a nutshell, from USNSF (2018) reports, we observed that during the last decade, federal funds provided to non-applied research and development has faced a severe low growth phase in the USA.

A study by Crow and Bozeman (1998) during the late 1990s have shown how industry lacks in providing grants or cooperative agreements to universities in the US. The important point is that most industry funds are provided via contracts and often have quite specific deliverables. Even though government agencies can be and are involved with contracting for universities, that's not generally true for research, except for the most applied research. The only significant role played by universities in the realm of individual industry consulting is devoted to set policies while making use of university resources in consulting.

Even with this evidence at hand during early 2000, when we look into the share of public and private expenditure in R&D for Science and Technology in India, we see, almost 60 percent of expenditure still comes from public spending. The private spending when seen in terms of the disciplines, lack interest in spending in R&D across disciplines and have not grown in the Indian context. To give context, the DST 2020 report shows, central government, public sector industries, and state government together constitute 60.3 percent of the total R&D expenditure, from 2015 to 2018. The report also suggests that the two sectors where private industries spend the most are, manufacture of basic pharmaceutical products and manufacture of motor vehicles (DST 2020). Therefore even if the

private industries which enter into providing a fund to promote R&D for selectively applied fields, the expenditure by government sources still remains the primary source of research funding to date.

This evidence, therefore, suggests two certain patterns, during this current neoliberal economic regime. First, the State has been withdrawing a severe amount of financial support from research and development in Science and Technology. Second, even though there are promotional advantages provided to the private business entities, the contribution of these industries has not been compensating enough to sustain the growth in expenditure. These two together bring us to the crisis of instant gratification. In the realm of fundamental research, substantial progress takes place over a long time. One can argue from the industry's perspective, that spending in all forms of research lacks to serve the immediate profit-making purpose. There might be no doubt that the knowledge one acquires by developing minuscule progress in scientific disciplines every day may not have a direct application at the immediate profit making. But one can also certainly argue, without that minuscule progress, there will be no scope for the large scale industry-based research to progress any further.

There are numerous examples from the history of science, which will support the above claim. At the very least, we can take this illustrative and relatable example of a mobile phone navigation system. Without that, many functions which every user can perform in their phones every day, including booking the cab or accessing food deliveries, will have stayed in imagination. However, that navigation system became possible because of a larger body of research concerning the general theory of relativity. At the beginning of the twentieth century, Prof Einstein and several others devoted their scientific concerns to develop the General Theory of Relativity. Again, the general theory of relativity would not have been possible if, in the previous century, several mathematicians did not expand and contribute to the understanding of differential geometry. When Prof Einstein was working on general relativity, Europe was in the middle of a great war. Many of his colleagues got involved in the immediate concern of war, and devoted their interest in defence-related research. They considered it to be the act of serving the nation. And at that particular time, if one becomes a little more jingoistic, it might have been the way of serving the nation. But when looked at retrospectively, there is no substitute to the contribution of general relativity, the work that Prof Einstein and others had started, and more importantly how it has now become relevant even to the defence-related research today. There are other examples as well, from quantum mechanics; to the ongoing technological boom in computers, and so on. Whilst the instant gratification of markets might seem rewarding in the short-

run, but for the state to disengage from funding all other research, destroys the potential in the long run.

In Lieu of Conclusion

The twofold crisis as discussed in the above sections has affected the sphere of academic research in various ways. The negligence towards public funding responsibilities often slows down the progress of all on-going research and development initiatives. At this outset, the recent announcements on the New Education Policy (NEP 2020) liquidates further the potential of public funding in academic R&D in the country.

Section 17 of the new NEP-2020 policy is particularly relevant for our present article. Interestingly, NEP acknowledges that despite the importance of research in the present time our country invests a minuscule per cent (0.68%) of the total GDP in comparison to other developing countries. While discussing this point, the policy mentions some specific countries which can be critically analysed to decode the underlined rightwing privatise mindset which echoes throughout the NEP. Having said that in some manner, NEP solidifies our central hypothesis, which says in recent times the federal bodies are gradually disengaging them to bear various responsibilities of the research activity. But at the same time, it fails to provide any tangible solution to elevate the before mentioned crisis. From the policy perspective, majority emphasis has given to popularise research to attract new generation academics as well as expand the scope for research in different educational spaces. Also, from a peripheral view, this overuse of certain keywords such as "multidisciplinary" in the policy without giving it enough thought. The NEP does not provide any critical analysis on the already existing policies, also fails to recognise the key factors which play the dominant role in the crisis behind the academic R&D. In terms of private funding practices, the NEP encourage the private players to take an interest in the cause but fails to provide any sustainable roadmap engage them to achieve that goal.

First, the systematic seat cuts in higher educational institutions and a stalled growth rate in R&D expenditure changes research from being a 'public good' to an exclusive and inaccessible commodity, which excludes a large section of the population in the country. Academia, broadly speaking, has been historically exclusionary towards female researchers; there is evidence of systematic discrimination against Dalit and Adivasi scholars as well. Public-funded research institutes often stand as an equalising space, which provide access to marginalized sections of the country. Along with these, the negligence

towards providing funds to public institutes for conducting research will create further hindrance to the marginalised sections of the country.

Second, the idea of market-supported research is often a victim of what we defined as a crisis of instant gratification, i.e. the failure of private entities to provide support to immediately non-market deliverable research. Along with this, as Chomsky suggests, if the sole purpose of public funded research spaces is dedicated to provide a profit making environment for the immediate need of industries, this ‘systematic privatisation’ often pushes the non-applied research funds to decline. This destructs the potential of research and development for any developing country.

Finally, India lacks way behind in research funding when we compare to other countries. The allocation of GDP share in R&D is less than 1 per cent in India, whereas countries such as China and the US spend well above 2 percent of their GDP in research and development (DST 2020). Within this inadequate amount of state spending, now if pseudo-science disciplines are introduced as scientific disciplines, the sheer irony of these attempts should be identified and resisted.

These concerted attempts are opposed time and again, by academics, by activists, under many collectives. The State has to realise, even more during this pandemic, that scientific temper and progress in supporting R&D can be the only way out of a global crisis. Given we await another economic crisis followed by the pandemic, at this very hour, depending on the private entities for providing funds to R&D would be a gross misdirection. The need of the hour is to revive the state-spending on academic research while we reiterate that any neglect to that would exacerbate the existing crisis.

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