

Innovations

Strategic Shift in the Government Innovation Policy: India's Interim Budget 2024

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Abstract: *In the Union Budget 2024, the Union finance minister has announced Rs 1 lakh crore corpus to promote research and development by the industry in the private sector. Till recently the Indian government was primarily using tax incentives to encourage private R&D. This announcement by the finance minister marks a strategic change in the government R&D policy. This paper first briefly reviews the effectiveness of the different policy instruments used to stimulate R&D. The paper then reviews the R&D policy pursued by the government in the recent times. With this background this study attempts to assess how effective the recently announced giant corpus will be in boosting R&D by the private sector in India.*

Keywords: *India, budget, R&D policy, R&D tax credit, R&D loan*

Introduction

In the Interim Budget on February 1, 2024, the Union finance minister has announced ₹1 lakh-crore corpus to promote research and development (R&D) activity by the private sector (*The Hindu, Feb, 1*). This fund she has mentioned will have a provision of 50-year loans and will be available at low or zero interest rates. Although the startup and tech industry has welcomed the announcement as this will stimulate R&D activities in this sector, the announcement has also fanned considerable debate in the academic as well as scientific circles. What is the source of this corpus money? Will the funds for research on fundamental and basic sciences be diverted to set up this giant corpus?

This giant corpus is for the sunrise domains. Hard technology disciplines such as renewable energy, biotechnology, artificial intelligence are generally referred to as "sunrise domains". Finance minister Nirmala Sitharaman has mentioned that this Rs 100,000-crore corpus will provide long-term financing to the private sector. It will also provide refinancing with long tenors and low or nil interest rates (*Business Standard, Feb, 1*)

It is argued by the government that such a corpus fund will incentivize the private sector to scale up R&D expenditure considerably in the sunrise domains. Some science administrators have welcomed the plan arguing India already has an innovation ecosystem but commercialization of innovative ideas requires large funds. The private sector, particularly the technology start-ups often requires large funds to commercialize their ideas and products. This amount of fund they often fail to generate internally and also can't acquire from the market.

On the other hand, some scientists are apprehensive about setting up of such a fund. Since the source of this corpus fund is not mentioned in the budget speech, they are conjecturing whether this means a cut in the budget for public sector science departments. Why the government is incentivizing R&D in the private sector only? It should concurrently increase the budget for government science and technology departments.

Economic Theory on R&D incentive

The literature on innovation economics suggest that if industrial R&D is left to the hands of the private sector, there is high probability that these enterprises will underinvest in R&D (Ravšelj & Aristovnik, 2020) This implies that the actual amount of R&D investment will be less than the socially optimal level. Arrow (1962), observes that market failure leads to lower private R&D investment than the socially optimum level. This tendency of the private sector to underinvest is due to the problem of appropriability. The problem of appropriability is the failure of private enterprises to completely appropriate the returns of their own R&D investment. Governments all over the world try to overcome this problem of underinvestment by giving incentives to the private sector to encourage them to undertake R&D on a continued basis.

Government can stimulate in-house R&D by the industry either through direct subsidies or low-interest loans or through indirect method like R&D tax credits. Studies suggest that any type of direct public support for R&D increases the propensity of undertaking R&D (Busom et al., 2014). Firms often find it difficult to borrow externally for funding R&D because private financiers are reluctant to invest in intangible assets like knowledge creation. This problem is greater for small and medium firms, and technology-intensive start-ups.

Small and medium enterprises generally face financial constraints and find difficulty in borrowing from external sources. Studies have found that they are more inclined to use direct public funding like subsidy and low interest loans and less likely to use R&D tax credits. Hence for small and medium enterprises empirical research suggests that subsidy and loans are better policy instruments than tax credits. Literature suggest that firms that have previous experience in R&D are more inclined to use tax credits, while firms without any R&D experience are more likely to use

subsidies (Huergo & Trenado, 2013). This finding suggests that subsidy as a policy tool is able to induce new firms to undertake R&D. The reason why small and medium firms prefer subsidies is that, subsidies provide up-front fund. While in order to claim tax credits firms must be in a position to finance the R&D project with own fund or borrow from external sources first and later have positive taxable income.

Although subsidies reduce the private costs of the firms investing in R&D, but it imposes high information cost for the public agency awarding them. Direct public support also has a negative impact. Often support receiving firms reduce their own R&D investment that they would have otherwise invested if the direct support was not there. Firms tend to prefer grants than loans because R&D projects are considerably risky. In case the project fails they would face problem in paying back the principal.

R&D loan has a positive aspect. It imposes relatively more discipline on the recipient firms. Because monitoring of the project is done by the agency at regular intervals. Hence, low interest loans are expected to generate higher efficiency than subsidy in terms of generation of innovation output of firms.

India's R&D policy

After independence India was striving to achieve economic growth along with technological self-reliance. India's industrial and innovation policies were accordingly oriented to achieve this objective. Till early 1990s the state tried to achieve this directly through state-owned enterprises and public sector research institutes. After economic liberalization in the early 1990s, state replaced this policy and started giving incentives to the private sector R&D to sustain and improve the innovation ecosystem of the country.

India has been mainly using tax credits to incentivize the domestic private enterprises to allocate more funds to R&D. The policy of R&D tax credit has evolved over time in India. India's industrial transformation is not possible without increased expenditure on R&D to build technological capacity. For this the industry in-house R&D has to play a key role. Many countries like Japan in the 1950s and 1960s, South Korea in the 1960s and China until 1990s have experienced high growth and industrial prosperity without significant investment in in-house R&D. So the question arises, why is it so important for India to significantly increase R&D at this time? India's industrial structure is more advanced than the industrial structure of countries which have the same per capita income levels. For a lower middle income country like India, it is expected that the industry will be dominated by labour-intensive sectors like leather goods, textiles, and food and beverages. But the leading sectors of the Indian economy are automotives and auto components,

chemicals and pharmaceuticals, engineering and capital goods which are all classified as skill and capital-intensive sectors. India's industrial structure is more similar to that of developed countries. With such an industrial structure, industrial growth requires large investment in R&D.

Global R&D spending is around two trillion dollar. This is about two per cent of global GDP. United States, China, Japan, Germany and South Korea account for around seventy-five per cent of global R&D expenditure. India's annual R&D spending is around \$17-18 billion. In the financial year 2022-23 India's R&D spending as a percentage of gross domestic product (GDP) is only 0.4 per cent. This figure is very small in comparison to countries like United States and China. United States spends around \$800 billion and China around \$600 billion on R&D annually. In terms of GDP, India ranks fifth globally. But in terms of expenditure on R&D, India's rank is 20. The main reason for this low R&D expenditure is the low spending by industry on R&D. Globally, on an average, industry spends around 70 per cent of total R&D. But in India, industry spends less than 40 per cent of total R&D. *(All figures as per, Annual Report 2022-23, Department of Scientific and Industrial Research, Ministry of Science and Technology, Government of India).*

Two common things can be noted in the growth experience of South Korea between the period 1970 and 1990 and China between the late 1990s and now. Both have experienced high growth rate and a constantly increasing share of R&D in GDP. For both these countries the share of industry in R&D expenditure has also increased during the same period.

Since 2009-10, the union government has provided a weighted tax deduction of 200 per cent for any expenditure incurred on in-house R&D by an enterprise. However the union budget for 2016-17 had reduced this incentive from 200 per cent to 150 per cent. This has continued till 2019-20. From 2020-21 tax incentive was further reduced to just 100 per cent of R&D expenditure by an enterprise. *(All figures as per, Annual Report 2022-23, Department of Scientific and Industrial Research, Ministry of Science and Technology, Government of India).*

Implication of the new R&D loan scheme

The Rs 1 lakh-crore corpus for low-interest loan to finance R&D projects of private enterprises signifies a shift in the strategy of the government. Till now the government was primarily using tax incentives to promote industrial R&D. Many industry experts have welcomed the move on the ground that it will give necessary boost to the in-house R&D of the private sector. They have argued that often start-ups and small and medium enterprises can't commercialize their innovations due to lack of fund. This giant corpus will make funds available for them. However as already mentioned the source of this huge fund is not clear from the budget speech. Hence

the academia and the scientific circle are apprehensive whether this huge allocation for the private sector implies a cut in the government budget for the research in basic sciences in public funded institutes.

Low-interest credit that is announced implies a hidden subsidy. But the effects of this low-interest credit on firms' decisions will not be the same as that of the effects of subsidies. The liability to pay back the principal amount of the credit will impose discipline on the recipient firms. Such liabilities do not exist with other type of aids like R&D tax credit or R&D subsidy. Hence small and medium enterprises are less likely to apply for this loan. Investment in R&D is risky because there is no guarantee that the investment will lead to innovation. Also investment in R&D has long gestation lag. Hence, start-up firms and firms who are beginning to do R&D are less likely to apply for this loan. For such firms R&D subsidy are generally a preferred option. Hence this new R&D loan scheme will fail to stimulate new firms to undertake R&D activity. It is apprehended that the new R&D low-interest loan scheme will favour the already dynamic, fast-expanding and innovative firms. Firms which are young, have export orientation, belong to high-tech or medium-tech industry and with previous experience in R&D are more likely to apply for this new loan scheme.

It is not clear if this corpus is targeted at a specific Ministry or intended as a more broad-based encouragement to research. Who will be the beneficiaries? Further from the budget speech it is not clear how the policy will be implemented. Because often due to lackadaisical implementation of a policy, the intended results are not achieved. Also the policy implementation should be subject to continuous evaluation.

As regard to the loan award process, agency generally tries to select the projects on the basis of the technological and economic potential of the proposal. Such loan award process will impose a cost on the agency for screening the projects and also monitoring them after the initiation of the projects. This cost will add to the government's R&D budget. Also different interest groups may allocate loans in a way to benefit themselves. This may lead to selection bias. This aspect of the problem did not exist with the previous policy of tax credit scheme.

Conclusion

The Rs 1 lakh-crore corpus for low-interest loan to the sunrise sector to boost private in-house R&D signifies a shift in the strategy of the government. Many industry experts have welcomed this announcement as it will encourage in-house R&D investment of the private sector. On the other hand many aspects of this public programme remain unanswered. Where will the corpus money come from? Who will be the beneficiaries? What are the criteria for screening of the firms that apply for this low-interest loan?

It is apprehended that this scheme will not benefit the medium and small-scale industry. Since loan-scheme has the liability of paying back the principal, medium and small-scale industries do not prefer loan. They prefer direct subsidy. Hence, this loan-scheme is expected to benefit the dynamic and growing firms which already have previous R&D experience. Hence, this scheme will be able to increase the R&D intensity but will not be able to bring new firms into R&D activity.

While the announcement made by the finance minister is a welcome development, it remains to be seen how the policy will be implemented. How this new scheme is designed will determine how much incremental R&D investment it will be able to generate in the economy.

JEL Classification: A1, H2, H3

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