

Innovations, R&D Expenditure and Technological Development

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Abstract

In the context of present time of global competitiveness, technological development and innovations are as important as any other factor for withstanding of business and economy. To enhance these activities, sufficient investment in research and development activities is required. This paper conducts a comparative review about the current situation regarding financial provisions and other facilities which can boost above mentioned factors in Indian economy.

Keywords: Innovations, R&D, Indian Economy, Scientific research, research budget, business and economy.

I. INTRODUCTION

Scientific research and inventions play a pivotal role in development of an economy. An invention, which is the result of dedicated investment of time and money in scientific research and technological development, is the first phase of an innovation. Innovations, in the context of modern time of global competitiveness, are as important as any other factor for withstanding of business and economy¹. This point is further strengthened after the complete implication of WTO agreement because of two main factors; first, the competition has become harsher after the implementation of this agreement as the trade barriers are almost done away with within the signatories of WTO. Other, the legal protection system for intellectual property rights got strengthened by provisions of the agreement, making it hard for the companies to produce world class products without having patents. Therefore, to produce a product which can compete at international level and cope with latest technology, a firm must develop the production process and technology itself and secure its intellectual rights. This requires sufficient investment in research and development activities.

As the above discussion suggests, it is really significant for India to concentrate on R&D if the ambition to become one of the world's leading economies is to be realized. But if the news reports can be considered as authentic resources, we are moving at a much slower speed than required. Many reports suggest that India is lagging much behind china and other Brics countries in the field of R&D. A report by Times of India² explains that India's spending stood at 3 percent of total global gross expenditure on research and development in PPP (purchasing power parity), which is five times lower than that of china. India's innovations capacity was also lower than other Brics nations except Russia. The reason behind this poor performance, inspite of India having better quality scientific research institutions, is that research being undertaken in these institutions not being taken for commercial use. There is lack of coordination between these research institutes and commercial

ventures, which result in production of commercial unviable inventions, and therefore innovations. This reason even nullifies the fact that India has better availability of scientists and engineers³.

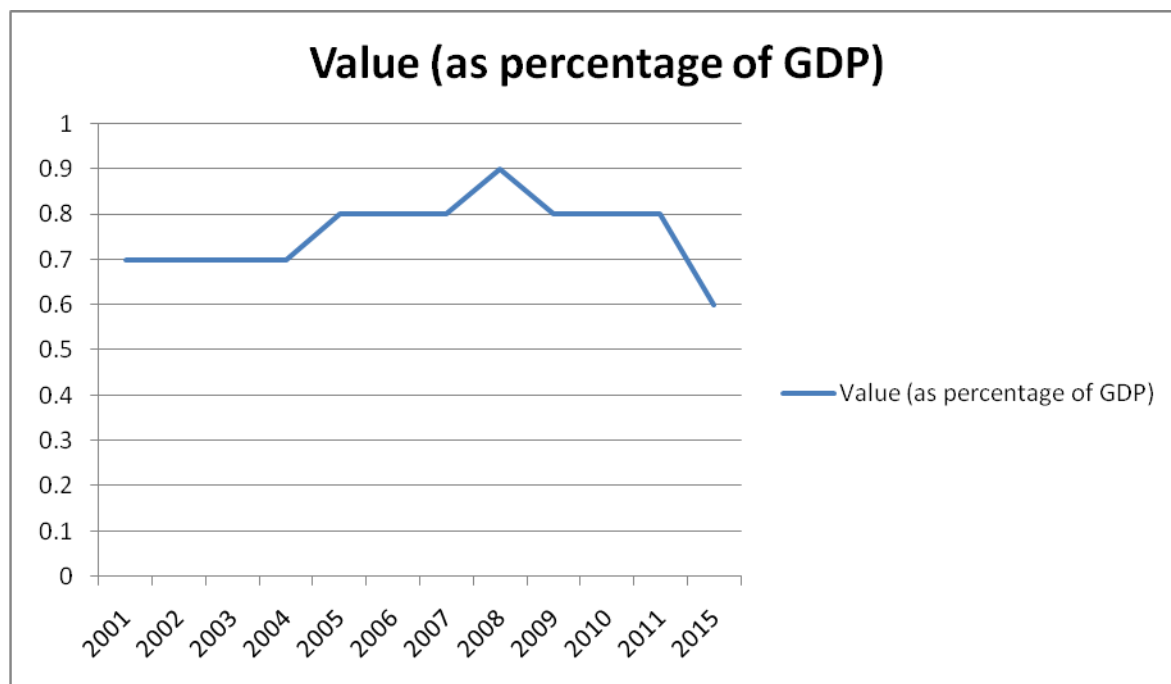
In order to compete at global level expenditure of R&D is important. India's expenditure is less than sufficient in this respect. Table: 1 and Figure: 1 shows expenditure on R&D as percentage of GDP from 2001 to 2015.

Table: 1 India's Expenditure on R&D from 2001 to 2015

Year	Value (as percentage of GDP)	Percentage Change
2001	0.7	
2002	0.7	-1.36
2003	0.7	-0.68
2004	0.7	5.24
2005	0.8	8.98
2006	0.8	-1.61
2007	0.8	2.10
2008	0.9	6.44
2009	0.8	-2.61
2010	0.8	-2.69
2011	0.8	1.10
2015	0.6	-24.4

Source: Indian Economic Survey (Various)

Figure: 1 India's Expenditure on R&D from 2001 to 2015



Source: Indian Economic Survey (Various)

Above table and figure reveals that in India spending on R&D has not improved at all in last one and half decade. Moreover, the change is negative during most of years. Years 2001, 2003, 2006, 2009, 2009, 2010 and 2015 have seen negative growth. If seen as a whole, the share has dropped from 0.7 percent to 0.6 percent of GDP. Looking at the urgent need to spend more and more on R&D facilities, this scene is discouraging.

Table: 2 and Figure: 2 compare India's expenditure on R&D with rival China. It also compares it with world average expenditure as percentage of GDP. The table shows that India's expenditure was lower than that of China even in 2001. But the difference has widened drastically in one and half decade after the implementation of WTO agreement. China has enhanced its spending and nearly doubled it (as percentage of GDP) during these years whereas that of India has declined. China's expenditure never changed in negative. On the other hand India's expenditure has grown negatively for most of the years⁴.

World average is again much higher than India's expenditure. It was three times India's expenditure in 2001 and gone up to be more than three and half times in 2015. Through all the years the growth is positive for the world and gone higher in 15 years (from 2.083 in 2001 to 2.203 in 2015) whereas it was negative for India (from 0.7percent to 0.6 percent).

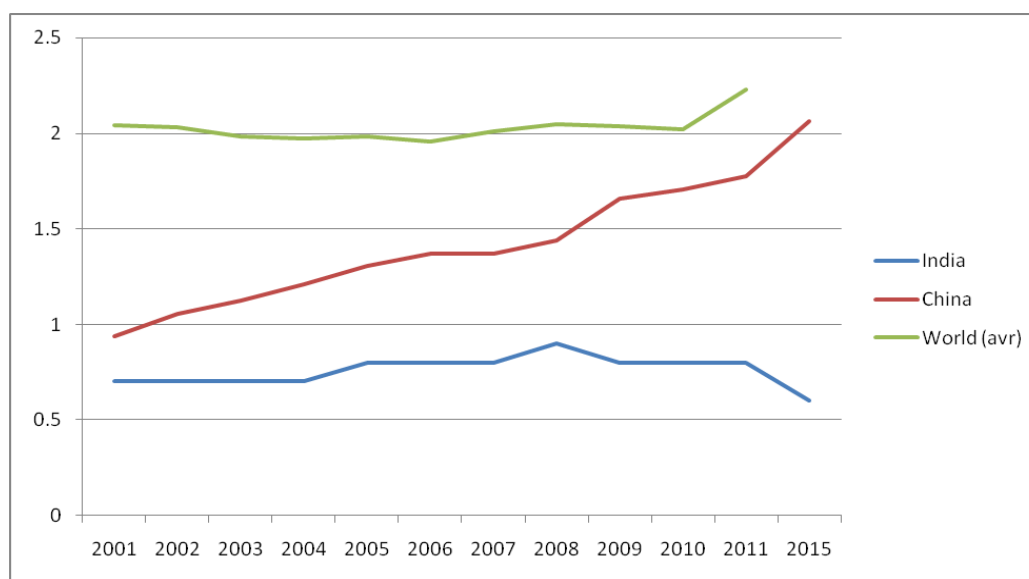
Table: 2 Comparison of Expenditure on R&D

Year	Value (as percentage of GDP)		
	India	China	World (average)
2001	0.7	0.939	2.083
2002	0.7	1.055	2.043
2003	0.7	1.124	2.033
2004	0.7	1.214	1.983
2005	0.8	1.31	1.973
2006	0.8	1.371	1.981

2007	0.8	1.374	1.956
2008	0.9	1.443	2.01
2009	0.8	1.662	2.05
2010	0.8	1.71	2.036
2011	0.8	1.776	2.023
2015	0.6	2.066	2.23

Source: UNESCO Institute of Statistics

Figure: 2 Comparison of Expenditure on R&D



Source: UNESCO Institute of Statistics

Government budget for research also has a significant impact on R&D activities in an economy. It not only boosts research culture in a country but also works as an incentive for private R&D related activities. Realizing this, the prime minister of India vowed at the Indian Science Congress at Tirupati that India would be a major global scientific power by 2022⁵. But this resolution required some empirical support if to be realized. Growth of Fund allocation for government sponsored R&D activities through union budget is the most important indicator. But these funds are stagnant for over a decade.

The key ministries and departments engaged in scientific research – the Ministry of Science and Technology, the Department of Atomic Energy (DAE), the Department of Space and the Department of Earth Sciences together, in union budget of this financial year, received Rs 34,759.77 crore, or only an 11 percent increase. After factoring an inflation rate of 5.6 percent, the hike is effectively worth only 6 percent.

The Ministry of Science and Technology has three component departments: the Department of Science & Technology (DST), the Department of Biotechnology (DBT) and the Department of Scientific and Industrial Research. The DBT received Rs 2,222.11 crore, a relatively decent hike of 22 percent that will help it continue with its ambitious national biotech strategy, announced on December 31, 2015, which aims to replicate the country's success in the IT sector in the biotech sector, and increase turnover from the sector to \$100 billion by 2025 from \$7 billion in 2016.

The space department, which will aim for the Moon for a second time in 2018, got Rs 9,093.71, a 21 percent hike. But the Ministry of Earth Sciences, which is engaged in climate-change research, received only Rs 9,093.71 crore, a paltry hike of 2.8 percent. The DAE received Rs 12,461.2 crores, a hike of 6.6 percent; and the DST, Rs 4,817.27 crore, a hike of 7.7 percent⁶.

II. CONCLUSION

World economic and business activities are moving at a fast speed. We have to, at least, keep pace with if we cannot go faster in order to survive in changing world economic scenario after WTO implication. Foremost priority must be scientific research, innovations, patents and technological development. Allocating more and more budget for these activities, giving incentives to private R&D facilities, removing organizational barriers from these activities and making better coordination between universities and commercial ventures are a few steps which can provide desirable results in this regard.

REFERENCES

- [1.] Urbancová Hana, "*Competitive Advantage Achievement through Innovation and Knowledge.*" Journal of Competitiveness, Vol. 5, Issue 1, pp. 82-96, March 2013 ISSN 1804-171X (Print), ISSN 1804-1728.
- [2.] timesofindia.indiatimes.com/budget-2015/economic-survey-2015
- [3.] Pluvia Zuniga and Paulo Correa, "*Technology Transfer from Public Research Organizations: Concepts, Markets, and Institutional Failures.*" World Bank, 2013.
- [4.] Analysis Report: UNESCO Institute of Statistics, 2015.
- [5.] thewire.in/105887/research-budget-biotech-iiser
- [6.] thewire.in/105887/research-budget-biotech-iiser