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INDIAN RESEARCH SCENARIO: PROBLEMS FACED BY YOUNG RESEARCHERS

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ABSTRACT　Even though India has a large number of universities and a higher gross enrolment rates in colleges, India is still lagging behind in research. India's research output is significantly lower than the world average. This paper looks at the current Indian research scenario in a global perspective and points out various problems faced by young researchers. It also discussed on various innovative methods to tackle these issues and suggests a case study as a solution for solving the existing problem in Indian research arena.

INTRODUCTION
With over 700 universities and 35,000 colleges, India has more than 20 million students enrolled in a bachelor's degree or other programs. Despite these large numbers, India has only a tiny number of researchers and most of the budding researchers have the tendency to move abroad and never return back [1]. Poor quality of education at most universities, insufficient funds, lack of industry – university interaction, are the main reasons for the hindered research scenario in India.
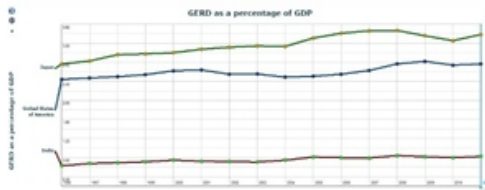
CURRENT SCENARIO

Figure 1: R&D expenditure in % of GDP
Source: www.data.worldbank.org/

Gross domestic spending on R&D is an important indicator of the efforts of government and other private sectors to improve research and development scenario in a country. Even though successive governments have pledged to increase India's GDP on research and development, it has remained merely 0.82% of the GDP in 2011. In countries like USA and Japan, the research expenditure was 2.76% and 3.38% of GDP respectively in 2011.
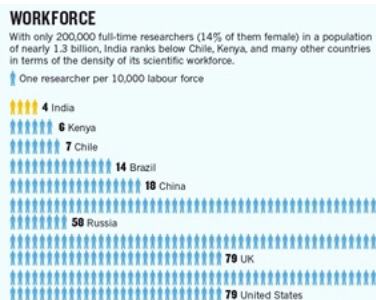

Figure 2: Density of scientific workforce
Source: www.nature.com

When it comes to scientific workforce density, even with a population of nearly 1.3 billion, with just 200,000 full-time researchers, India is ranked below Chile, Kenya and many other countries [2]. Even though India's spending per researcher is same as many countries, the scholarly output rate is way below when compared to GDP and population. In 2013, India's scholarly impact was found to be less than 30% of world's average.

REASONS
Lack of funding, Industry-Academia Gap, and lack of adequate manpower are some of the problems faced by Indian researchers. Out of these reasons, lack of funding and industry-academia gap needs to be resolved soon, if India wants to improve its position in the Global Innovation Index (India was ranked 81 out of 144 countries in Global Innovation Index 2015).

•　**Industry-academia gap**
In India, the contribution of industry to research development activities is very less, whereas in other parts of the world, nearly 2% of industrial turn over goes into research field. Most of the research work in India is carried out in government laboratories or government funded institutions and this is often not sustainable.
"India's education system kills any spirit of innovation by failing to close the gap between industry and academia. Very few PhD theses in technical institutes are linked to industry and innovations, and the bulk of academics even at the prestigious IITs are not industry-savvy because their promotions are only linked to publications in peer reviewed journals", says S. Srinavasa Murthy, Professor, IIT Delhi. For fostering the current research trend, more contribution is required from the industry. [3]

•　**Reasons for lack of industry-academia gap**
Presently in most of the Indian universities industry interaction is limited to placements. Due to lack of proper forums and research data, industry is often reluctant to contribute to the research work at the university. Industry-university collaborations return over a long time, whereas industry seeks faster results and beneficial contributions to their business. Also contributing firms are always interested in how quickly new products can be delivered and often wants to delay early publications or disclosures to stay ahead in the market among its competitors.   In contrast to that, university researchers often tend to publish their research results at the earliest and this often ends in a disagreement between the researcher and funding firm. Lack of information about projects, difficulties in finding the contact person, transaction costs, difficulties in negotiations and secrecy of intellectual property are few other reasons for the industry being reluctant to contribute to research work at Indian universities.

•　**Why industry should fund for research in India?**
India is the first country in the world to make Corporate Social Responsibility (CSR) spending mandatory. In accordance with Companies Act, businesses with annual revenue more than 10 billion rupees must spend 2% of their net profit towards CSR initiatives. CSR funding a research can often fulfil the statutory requirements. Also, the research outcomes can be useful for the company if the research falls in their area of interest. CSR initiatives in the form of crowdfunding can also lead to a positive public image for the investing industry.

Industry can also collaborate with the university in collaborative partnership research, transfer of university-generated IP, research services on contract and also by academic entrepreneurship. Often this research work is far cheaper than investing in a R&D department of the company.

• **Lack of Funding**

Even though government has taken various measures to encourage scientific research in the country like consecutive increase in plan allocations for research developments, setting up of new institutions for science and research, creation of centers of excellence and facilities in emerging and frontline fields in academic and national institutes, introduction of new and attractive fellowships and strengthening R&D infrastructure in universities, the lack of funds really affect young innovators in India [4].

Apart from this, the complex application process for government grants, biases within government agencies, slow processing times and inexperience in filling out government applications discourage researchers for availing government grants. Also, there is no centralized platform for researchers to stay updated on various grants and schemes offered by the government. Most of the government grants are scattered over various departments or institutions and researchers find it really difficult to identify suitable schemes.

SOLUTION

To solve these challenges, a national level platform which facilitates funding for research work, as well as technology commercialization, is required. Crowdfunding and Easy Access I/P can be incorporated in the area of research for facilitating funds and commercialization respectively.

• **Easy Access IP**

Many research technologies available within the university are partially developed or not suitable for commercialization. Purchasing IP of such research work or technology is not viable for the industry as further investment is required to commercialize the product even after IP acquisition. Easy Access IP is an innovative way of sharing intellectual property and adopting new approaches for easy collaboration between university and industry. In easy access IP model, the industry usually is required to propose an innovative business model to commercialize the innovation. Often the innovator is provided with a job within the industry for research work and IP is easily acquired by the industry.

• **Crowdfunding**

Crowdfunding is the process of raising funds for a project or venture by contributions from a large number of people [5]. Crowdfunding for research represents an innovative model for funding research projects, especially for scholars and junior scientists or in the absence of governmental aid. In western countries, the number of successful science-related crowdfunding campaigns is growing, which shows the public's readiness to support and participate in research projects. In classic crowdfunding, supporters often receive gifts or perks for their support. In crowdfunding for research, this is not possible. If donations are made in accordance with Income tax laws, tax deductions are an attractive feature of scientific crowdfunding.

CASE STUDY: INDOVATOR AWARDS

Indovator Awards (http://indovator.com) is a unique people's choice awards programme launched by International Centre for Technological Innovations for identifying the best innovations as well as innovators in the area of sustainable development. It is a first-of-its-kind online initiative where people choose the awardees by supporting them with crowdfunding and supports any solution that has potential to address India's development problem more sustainable than existing approaches [6]. Applications for the programme undergo initial screening and selected ones are put for crowdfunding for a period. All donations towards projects are tax deductible u/s 80G. Innovations achieving crowdfunding goals are provided with matching grants for further testing, refining, or scaling their solutions. All Innovators achieving crowdfunding goals receive access to labs, facilities and consultants to pilot, test or scale-up their project. Indovator will also act as a centralized platform in which industry can search and adopt technologies by Indian innovators working on sustainable developmental projects of India.

CONCLUSION

Even with a whopping population and developing economy, the contribution of India to science and research is very small. The government and universities should collaborate together and implement various policies and reforms to improve the scientific personnel work density as well as scholarly output. Moreover, the government should reform the companies act so that more CSR funding can be routed towards university research. An education system, which nurtures open innovation; an R&D culture and value system that supports fundamental research, applied research, and technology development; an industry culture that is keen to absorb inputs from universities; a government that is supportive; a policy framework that encourages young generation to pursue scientific careers are some of the changes needed to be implemented in the near future to foster research culture in India [7].

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