

# ROLE OF RESEARCH & DEVELOPMENT IN INDIAN ECONOMIC GROWTH

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## Abstract

In recent years R&D are rapidly increasing in various areas like advancements in Healthcare, Technology, Communication, Transportation, Education, Agriculture, Business, Entertainment industries, etc. Innovation is one of a driving force for a long term economic growth of country. Indian economy is one of the fastest growing economies in world. Innovation is very important to achieve long-term sustainable growth. The main aim of this paper is to analysis the role of R&D in the economic growth of India. COVID -19 accelerated the R&D. Technological Innovations is nothing but turning challenges into opportunities. As we live in a changing world, where it is very essential to constantly adapt to new change or upgrade ourselves. Innovation is one of the most important factors for economic growth. Today developed countries spending on research and development is higher than the developing and underdeveloped countries. The GDP is the measurement of a countries economic growth. To increase the GDP, there are two ways: 1) Increase in investment on research and development 2) increase in patenting. The aim of the paper is to analysis the role of innovation (R&D) effects on economic growth in Indian.

**Keywords:** R&D, GDP, EY

## INTRODUCTION

This research paper aims to analyze the role of innovation in economic growth of India. To measure the innovations are not easy task but variables like patents, spending in R&D can consider in innovation. This research paper explains innovation by analyzing R&D spending and number of Patents.

First, let us understand where we currently. Indian economy is the fastest growing economies in world. The R&D is very important to achieve long term sustainable growth. India is about \$2.8 trillion economies as of 2019 estimates. India's GDP is growing in the range of 4 % to 7% in the last decade. According to EY reports, India needs to grow approximately by 9% on a year-on-year basis for the next 5 years and raise 38-39 percent of GDP to achieve the \$5 Trillion Economy. Innovation is one of a driving force for long term economic and sustainable growth of any country.

## RESOURCES AND RESEARCH METHODOLOGY

World Bank data as the primary source of this research paper. To measure the growth of India, primary variables are in this study are GDP growth rate and Per capita GDP growth rate. R&D spending and number of patents application filed and the effect of that on economic growth of India.

**Table No. 1: The variables used in Analysis**

| Variables             | Description   |
|-----------------------|---|
| Patents               | It provides protection for the invention to the owner of the patent for a limited period.(For 20 years) |
| R&D Expenditure:      | Expenditures for R&D are current and capital expenditures.  |
| GDP Per Capita Growth | Annual percentage growth rate of GDP per capita based on constant local currency.                       |
| GDP Growth            | Annual percentage growth rate of GDP based on constant local currency.                                  |

The GDP growth rate is dependent variable for this analysis whereas the others variables are independent variables. The descriptive statistics of these variables for India for the period 1996-2011 used in the Table 2. This table shows the descriptive statistics of the variables which are used to analyze the relationship between economic growth and R&D.

**Table No 2: Variables Descriptive Statistics**

| Descriptive Statistics | Variables   |
|------------------------|---|
|                        | GDP growth    R&D Expenditure    GDP per capita growth    No. Patent applications |

|                    |             |             |             |             |
|--------------------|-------------|-------------|-------------|-------------|
| Mean               | 7.031311011 | 0.750940625 | 5.301153507 | 0.123625907 |
| Standard Error     | 0.578757961 | 0.015466485 | 0.589911317 | 0.021526949 |
| Median             | 7.704951862 | 0.7439      | 5.809124278 | 0.145765337 |
| Standard Deviation | 2.315031843 | 0.061865939 | 2.359645268 | 0.086107795 |
| Sample Variance    | 5.359372434 | 0.003827394 | 5.567925791 | 0.007414552 |
| Range              | 6.455987668 | 0.21304     | 1.511380142 | 3.081484294 |
| Minimum            | 3.803975321 | 0.62804     | 2.82791     | 0.464498958 |
| Maximum            | 10.25996299 | 0.84108     | 4.339290142 | 3.545983252 |
| Sum                | 112.5009762 | 12.01505    | 55.89219997 | 21.72569752 |

Source : Data from database: World Development Indicators (World Bank). ref 3

## RESULTS

The results of analysis of Table No. 2 with reference of R&D in India where GDP growth rate are as follows:

**Table no 3 : Output**

| Regression Statistics | Result      |
|-----------------------|-------------|
| Multiple R            | 0.999894117 |
| R Square              | 0.999788245 |
| Observations          | 16          |

According to results, Multiple R and R square are the representation of the multiple correlation and coefficients of determination respectively. The R (0.99) explains that there is strong positive correlation between dependent variable (GDP growth rate).

With reference to Indian context some factors that affect Economic growth in India are as follows:

### 1. Population Growth :

Population growth is the major problem facing the world today. India is home to 1.3 billion people where the country accounts for a fifth of the world's youth population. Population growth is affected by decreasing the research productivity which directly related to income per capita and population growth.

### 2. Research and development (R&D):

R&D has played a significant role in the growth of developed countries. In India, R&D investment has been relatively low. In the year 2008-09 R&D investment in the country has declined from 0.8 percent of the GDP to 0.7 percent in 2017-18. This is lower than the other BRICS nations such as Brazil spends about 1.2 percent, with the world average being about 1.8 percent.

### 3. Demographic dividend:

India's biggest asset is its young population. Currently, more than 60 percent of India's population is in the working age group(18–60). Here is need to properly channelized this age group's energy and potential towards innovation. Indian youth migrate to other countries for better opportunities.

### 4. Size of Company :

In India companies are peculiarly structured, with either very small sized companies where employees are less than 50 or very large-sized companies where employees are more than 500. So middle sized companies are very less. This structure causes problem like difference in productivity, whereby the large-sized companies are 10 times more productive than the small-sized companies.

It is also reflects in innovation.

### 5. Labor market:

Sometimes adopting new and innovative technologies would displace labor from the market. India has massive labor force that affects the Innovation. Most of the time labor refuses to adopt innovation as they afraid of loss of jobs.

## CONCLUSION

The objective of this paper was to find relationship between R&D efforts and their innovation and between innovation and growth rate per capita income. Our results show that there is a strong positive relationship between innovation (R&D) and per capita in India.

The results shows that the average growth rates of per capita R&D and patents of India are positively associated with the growth rate of R&D expenditure and growth rate of patents. However, we still observe a positive relationship between the growth rates of per capita R&D and patents. Most of the developed countries spent

more than 2% of their Gross Domestic Product (GDP) on R&D. Results conclude that the effectiveness of innovation in the economic growth of India but there are some limitations of this study. The conclusion is that the R&D and economic growth are related to each other. Developing Countries like India, the reasons behind the low spending on R&D are bigger issues such as hunger, disease control, growing population and raising the quality of life. Due to these factors resources are often diverted towards tackling them.

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