

# An Assessment of FDI Flow into R&D Across the World and India

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**Abstract:-** The flow of FDI into R&D was significantly associated with innovations. Which can give positive strength in the economic growth by encouraging employment, production, inventions, etc. To account this study has taken secondary data set over 20 years from 2003 to 2022 in major countries across the World. Study has observed major flow of FDI into R&D have seen in India, China, US, England, and Spain. However, the flow is declining over a period in China than India and others have faced increasing trend. In India higher flow of capital observed in southern states, which is higher in Karnataka, Maharashtra, Telangana, Andhra Pradesh, and Tamilnadu. India has received massive expenditure of FDI into R&D in 2022 than US also. Along with that, India stands in the first place at exports with 26.6 percent but even not found under top importer of R&D products. From the estimation of India's Productive Capacity Index (PCI), FDI and R&D in India was focusing highly on structural change, institutional activities, private sector growth, energy sectors development.

**Keywords:-** Capital, FDI into R&D, Inventions, and PCI.

## I. INTRODUCTION

Foreign direct investment (FDI) contributes to economic development by committing money to businesses with headquarters in host nations. FDI fosters competitiveness, transfer of knowledge, expansion of industry, and jobs creation. FDI is a form of investment that involves loans, equity capital, and reinvested earnings. It is calculated as a net of capital account credits and debits between investors and overseas affiliates.

Research and development (R&D) are crucial for innovation, competitiveness in business, and long-term growth of productivity. Governments after find scientific research to expand their national capacities and provide availability of technology. India is attracting FDI in R&D-intensive, economic growth in acceleration and development. Foreign R&D centers are expanding in India, focusing near engineering centers, universities, and other institutions. High-tech industries leaders are focusing on developing Asian nations to create dedicated R&D centers.

Multinational companies (MNC) are choosing more infrastructure and skilled labour due to R&D in China and India. India has established R&D centers for major companies like Microsoft, Oracle, Motorola, Intel, IBM, and GE. Despite the global recession due to the COVID-19 pandemic, India is expected to have a positive growth rate, with one of the strongest growth rates ever. FDI inflows into R&D have increased due to better understanding of FDI policies and the introduction of new laws and programs by Prime Minister Narendra Modi. These initiatives aim to enhance India's output, innovation, research, and development.

According to the Press Information Bureau and Times of India, India got USD 343.64 million in FDI equity inflow in Research and Development (R&D) sector in the year 2021, it is more than 516 percent increased comparing to the previous year 2020 (USD 55.77 million). Karnataka is one of the FDI equity inflows in R&D receiving state in the year 2021 followed by Telangana and Haryana. Telangana, Karnataka, Haryana, Andhra Pradesh, and Tamil Nadu - these five states are shows more than 250 percent of growth in the year 2021 compared to the year 2020.

Singapore will be the top R&D investment country in the year 2021 with a 40 percent share of all FDI Equity in R&D, followed by Germany (35 percent) and the United States (11 percent). FDI equity inflows increased by more than 200 percent from a number of countries, including Germany, Mauritius, France, Singapore, Oman and the U.S.

The top FDI equity inflows in R&D receiving industry are Daimler Truck Innovation Centre in the year 2021 with 35 percent share of total FDI equity inflows in R&D. the following industries are Aragon Life Sciences Private Limited (34 percent) and Stelis Biopharma Private Limited (21 percent). These trends indicate increasing R&D sector benefits in the economy to highest economic growth, increasing in productivity and innovation.

### ➤ Background of the Study Area:

Foreign direct investments (FDI) have become increasingly crucial to India in the 1990s due to significant policy reforms and rapid economic growth. Although all of the main sectors have seen investments, some that are more

recent or modern have received more attention. Development and spread of new products and technology are other intended goals of FDIs, in addition to the establishment or expansion of production facilities and marketing infrastructure. One of the key components of low-cost innovation that is necessary for global competitiveness is the presence of a talent pool. Making foreign goods and technology appropriate for local conditions is also vital, given the size of the Indian consumer market. Investment in research and development (R&D) endeavours in India has thus grown highly appealing to outside investors.

## II. REVIEW OF LITERATURE

Review of literatures is connected with the problems, prospects, and its related works have been collected from various sources, journals, reports, relevant books, research projects, surveys, etc. in that some studies have been referred.

The Indian economy is a rapidly growing and emerging economy, which attracts significant foreign direct investment annually. However, recent reports show inconsistent flows and a downward GDP trend. This article examines FDI inflow patterns and sector distribution (Sai Rani and Sourav Ghosh, 2020). The study evaluates the impact of international R&D centers in India and production systems. It identifies companies attracting FDI to India and examines their R&D spending and activities. The second section focuses on understanding the effects of FDI on R&D systems in India (Mrinalini and Pradosh et al., 2011). The relationship between foreign direct investment (FDI) and domestic R&D in India's post-liberalization framework. It uses unbalanced panel data from 1,843 manufacturing companies from 1994 to 2005. Results show that when split based on equity ownership, FDI and R&D are complementary, with foreign-owned businesses in high-tech industries and minority-owned businesses encouraged (Subash and Vinish, 2011). Despite being a top destination for offshore corporate R&D, ICT, engineering, natural sciences, and pharmaceuticals receive the most FDI. Only a few 298 companies have internal DSIR recognition. However, the study focusing on identifying industries and investee companies benefits by evaluating innovation levels (Reji K. Joseph, et al., 2019). The research evaluates sustainable links between inward FDI (IFDI), outward FDI (OFDI), R&D expenditure ratio, shows a significant effects and positive correlation with CO2 emissions. Policy recommends to include reconsidering protectionism, developing eco-friendly investment programs, and easing green technologies (Han-Sol Lee and Yury N. Moseykin et al., 2021). The study concentrated on uneven

distribution of FDI in R&D throughout various industrial sectors and geographical areas. As a result, this article examines the patterns of FDI in R&D's sectoral mix and geographic dispersion among Indian cities (Renjith Ramachandran, 2022). The study explores the impact of FDI inflows on medium- and high-tech industry innovation strategies, focusing on real FDI inflows rather than approvals (Vinish Kathuria 2008).

The study attempted to investigate the FDI in R&D investment using the panel causality and cointegration methods in 10 developing countries; namely; India, the US, the UK, Spain, Poland, Canada, Germany, Ireland, Portugal, and China for the period of 2003–2022 (US\$ Billion). The study expected that FDI inflows would increase all countries R&D and innovation activities.

### ➤ Objectives:

- To investigate the FDI projects in R&D across the World.
- To identify the capital expenditure of FDI destinations by R&D activity in developed countries.

### ➤ Data and Methodology:

Study has accounted the FDI into R&D projects and its expenditure to analyse the productions. This study is based on secondary data, which is obtained from UNCTAD and fDi Markets, and the World Bank, etc. over 20 years from 2003-2022. Which has been analysed the data using the choropleth maps and drawing the different figures. Study estimated the Productive Capacity Index over 2005-2022, which is developed by UNCTAD.

The set of productive capacities and their specific combinations and multidimensional in its analytical abilities. The index will help to diagnose the areas where countries were may be leading or falling behind, spotlighting where policies are working and where corrective efforts are needed. It suggests a government for future policy actions and makes interventions under each every of its components such as human capital, transport, structural change, ICTs, natural capital, institutions and the private sector.

### ➤ Data Analysis:

FDI into R&D was significantly associated with the economic growth and innovations. Study is focused across the world and mainly in India to assess the FDI flow in R&D. is as follows:

Table 1 FDI Projects in Research and Development from 2003-2022\*(US \$Billion).

| Year | India | US | UK | Spain | Poland | Canada | Germany | Ireland | Portugal | China |
|------|-------|----|----|-------|--------|--------|---------|---------|----------|-------|
| 2003 | 116   | 42 | 24 | 14    | 3      | 15     | 23      | 10      | 1        | 101   |
| 2004 | 200   | 27 | 27 | 13    | 10     | 12     | 9       | 13      | 5        | 123   |
| 2005 | 149   | 35 | 41 | 10    | 9      | 19     | 20      | 14      | 9        | 128   |
| 2006 | 208   | 41 | 45 | 22    | 17     | 10     | 21      | 15      | 2        | 119   |
| 2007 | 126   | 59 | 49 | 24    | 13     | 17     | 29      | 19      | 5        | 97    |
| 2008 | 115   | 73 | 56 | 30    | 13     | 24     | 23      | 23      | 2        | 126   |
| 2009 | 94    | 59 | 56 | 20    | 11     | 21     | 32      | 25      | 1        | 92    |

|       |     |     |     |    |    |    |    |    |    |     |
|-------|-----|-----|-----|----|----|----|----|----|----|-----|
| 2010  | 90  | 68  | 66  | 11 | 11 | 21 | 32 | 18 | 1  | 114 |
| 2011  | 120 | 103 | 61  | 18 | 9  | 23 | 43 | 25 | 1  | 111 |
| 2012  | 79  | 103 | 60  | 31 | 21 | 25 | 41 | 28 | 2  | 70  |
| 2013  | 77  | 93  | 74  | 19 | 13 | 29 | 60 | 31 | 2  | 100 |
| 2014  | 96  | 116 | 67  | 23 | 17 | 30 | 46 | 21 | 1  | 102 |
| 2015  | 142 | 108 | 97  | 21 | 24 | 25 | 54 | 25 | 3  | 82  |
| 2016  | 139 | 134 | 96  | 29 | 23 | 43 | 65 | 29 | 6  | 86  |
| 2017  | 111 | 154 | 85  | 43 | 43 | 43 | 49 | 24 | 12 | 76  |
| 2018  | 141 | 147 | 126 | 69 | 69 | 41 | 64 | 25 | 7  | 87  |
| 2019  | 145 | 124 | 114 | 62 | 26 | 61 | 61 | 28 | 23 | 96  |
| 2020  | 53  | 85  | 99  | 35 | 20 | 45 | 49 | 39 | 12 | 34  |
| 2021  | 89  | 93  | 82  | 77 | 49 | 59 | 72 | 39 | 28 | 46  |
| 2022* | 225 | 101 | 93  | 72 | 65 | 59 | 40 | 39 | 37 | 33  |

Source: FDI Markets \*2022 data is up to October 31

The above table 1 shows major countries of FDI projects in Research and Development over 20 years from 2003-22. The countries are ranked by the number of R&D projects they attracted in this period. The top 3 countries are India, the US, and the UK, followed by Spain, Poland, Canada, Germany, Ireland, Portugal, and China.

India has a significant increase in FDI in R&D in recent years, becoming the top destination for R&D projects in 2022. This is likely due to a number of factors, including India's large and increasing pool of talented engineers and

scientists, it's also favourable due to government policies, and its growing economy. The US and the UK are also major destinations for FDI in R&D, due to their strong economies, their world-class universities, and their innovative business sectors.

Portugal, China, and the other countries on the list are also important destinations for FDI in R&D. These countries offer a variety of advantages to businesses, including skilled workforces, strong research infrastructure, and supportive government policies.

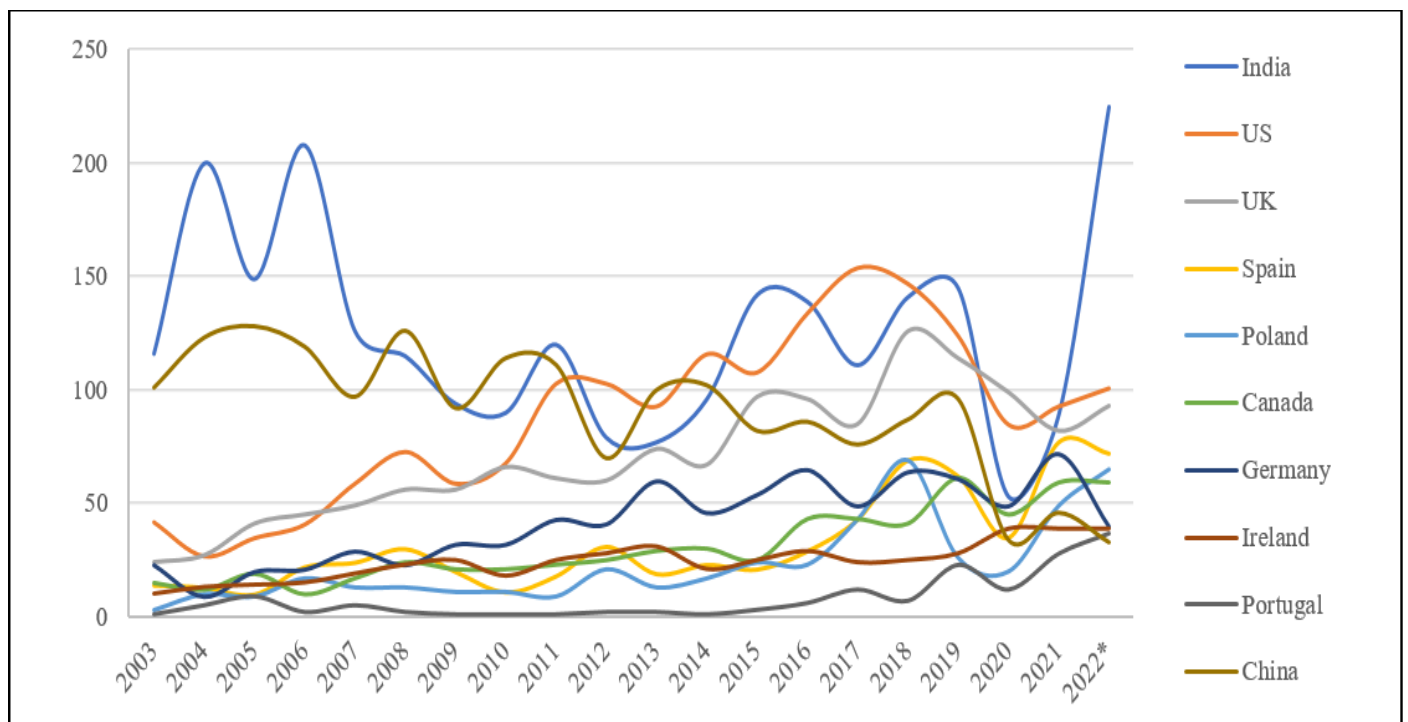


Fig 1 Countries FDI Projects in Research and Development.

The above table and figure 1 show the top 10 countries for FDI projects into research and development (R&D) from 2003 - 2022. The top 10 countries are: India, United States, United Kingdom, Spain, Poland, Canada, Germany, Ireland, Portugal, and China. India is the top destination for FDI projects into research and development in 2022, with 225 projects. This is followed by the United States with 101

projects, the United Kingdom with 93 projects, and Spain with 72 projects, and Poland with 65 projects. There is a concentration of FDI projects into research and development in developed and developing countries. The top 10 countries in the figure are all developed and developing countries except for India.

The above table analyse that, the global R&D landscape is becoming increasingly diversified and globalized. In the past, the US and UK were the dominant destinations for FDI in R&D. However, in recent years, countries such as India, Spain, and Portugal have become increasingly attractive to businesses looking to invest in R&D. This trend is likely to continue in the coming years, as businesses look for new ways to reduce costs and access new talent. It is also likely to be driven by the growing importance of emerging technologies such as artificial intelligence and machine learning, which require significant investment in R&D.

Businesses are no longer limited to investing in R&D in their own countries. Instead, they are looking to invest in R&D wherever they can find the best talent and the most supportive environment. This trend is likely to have a positive impact on the global economy. By investing in R&D in countries around the world, businesses are helping to create new jobs and drive economic growth.

India is a major emerging market with a growing economy and a large population. This makes it an attractive destination for foreign companies looking to invest in research and development. The United States is the world's largest economy and has a long history of innovation. This makes it a natural leader in FDI projects into research and development. The United Kingdom and Spain are also major economies with strong innovation. These countries are also attractive destinations for foreign companies looking to invest in research and development. Poland, Canada, Germany, and Ireland are all smaller developed countries with strong economies and growing R&D sectors. These countries are also attractive destinations for foreign companies looking to invest in research and development. Portugal and China are the two least developed countries in the top 10. Portugal is a small developed country with a growing R&D sector. China is a major emerging market with a large economy and a growing R&D sector.

Table 2 FDI Destinations by R&D Activity Capital Expenditure 2010-2022 (US \$Billion).

| Year | India | US   | Canada | China | UK   |
|------|-------|------|--------|-------|------|
| 2010 | 2502  | 4637 | 1483   | 4610  | 1456 |
| 2011 | 3438  | 7303 | 1727   | 4185  | 1529 |
| 2012 | 2493  | 8008 | 2047   | 3179  | 1429 |
| 2013 | 2698  | 8436 | 6856   | 4111  | 1693 |
| 2014 | 2390  | 7453 | 2416   | 4431  | 1308 |
| 2015 | 4365  | 7502 | 1161   | 3246  | 1144 |
| 2016 | 4446  | 7007 | 3284   | 3143  | 826  |
| 2017 | 3680  | 8706 | 4041   | 4183  | 3365 |
| 2018 | 5473  | 7747 | 4892   | 4574  | 1907 |
| 2019 | 3797  | 9406 | 3786   | 4190  | 3838 |
| 2020 | 1357  | 6050 | 4601   | 1377  | 1601 |
| 2021 | 2548  | 9284 | 4632   | 1821  | 1932 |
| 2022 | 12892 | 9824 | 6701   | 2459  | 1259 |

Sources: FDI Market.

The table 2 shows the top five FDI destinations by R&D activity capital expenditure from 2010 to 2022. The top 5 destination countries are: India, the US, Canada, China, and the UK. According to fDi Markets, India recorded the highest amount of R&D estimated capital expenditure (\$12.9 billion) in 2022. It was more than 400 percent (\$2.5 billion) in the previous year, 2021. India has also seen its share of global R&D activity and capital expenditure grow in recent years, from 3.1 percent in 2010 to 8.1 percent in 2022. This growth is likely due to a number of factors, including India's large and growing pool of skilled workers, its cost-competitiveness, and its government's supportive policies. According to a Deloitte survey of 99 companies in 2022, India continues not only to be a destination of choice for research and development (R&D) operations and multinationals' engineering but is also expected to keep growing.

The United States has consistently been the top destination for R&D activity capital expenditure, accounting for an average of 28.4 percent of the global total over the 13-year period. Canada has also been a major player, accounting for an average of 10.8 percent of the global total. China has seen its share of global R&D activity capital expenditure grow significantly in recent years, from 5.7 percent in 2010 to 15.4 percent in 2022. R&D activity capital expenditure in China has also grown significantly in recent years, from \$4.6 billion in 2010 to \$15.4 billion in 2022. The United Kingdom is the Fifth largest FDI destinations by R&D activity capital Expenditure country. Overall, the table shows that the India, United States, Canada, China, and UK are the top five destinations for R&D activity capital expenditure. These five countries account for over half of the global total.

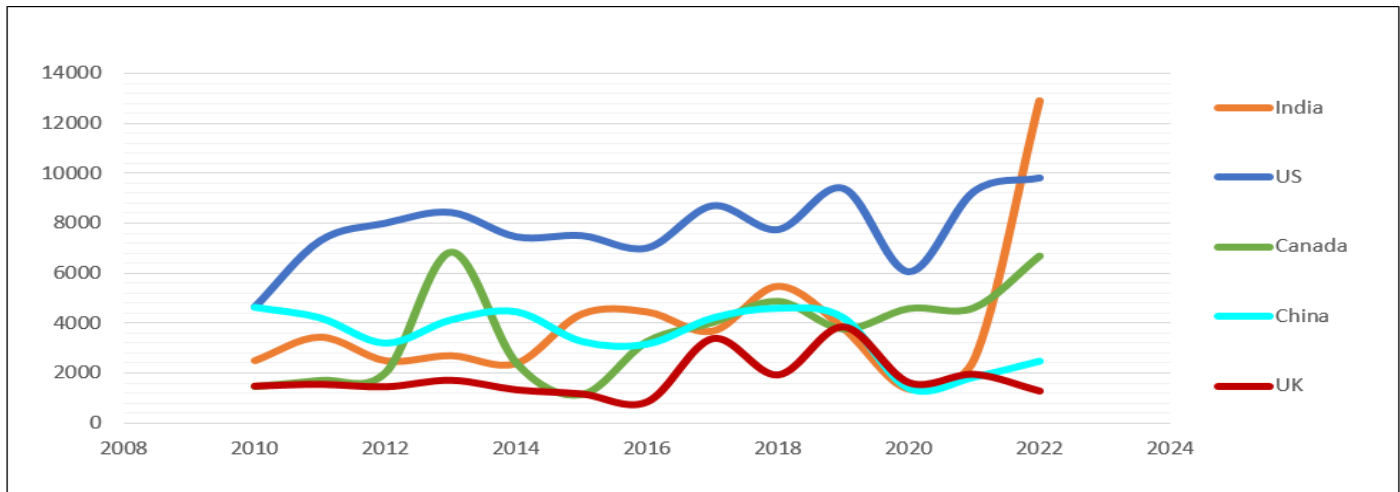


Fig 2 FDI Destinations by R&D Activity Capital Expenditure 2010-2022 (US \$Billion)

The figure 2 shows the number of FDI destinations by R&D activity capital expenditure from 2010 to 2022, in billions of US dollars. The top five FDI destination for R&D activity capital expenditure countries are India, the US, Canada, China, and the UK. Spain, Ireland, Singapore, Mexico, and France and other countries are involved in this FDI destinations by R&D activity capital expenditure from 2010 to 2022, in billions of US dollars.

In 2022, India recorded an estimated US\$12.9 billion in FDI in R&D, is more than 400 percent from US\$2.5 billion in 2010. This is the highest level of FDI in R&D ever recorded in India, and it surpasses the United States, which has been the top FDI in R&D destination for the past decade. The United States remains a major FDI destination for R&D activity. In 2022, the US attracted an estimated US\$9.8 billion in FDI in R&D, down slightly from US\$9.2 billion in 2021. However, the US still accounts for a significant share of the global FDI in R&D market. Canada, China, and the United Kingdom are also major FDI destinations for R&D activity. In 2022, Canada attracted an estimated US\$6.7 billion in FDI in R&D, China attracted an estimated US\$2.4 billion in FDI in R&D, and the UK attracted an estimated US\$1.2 billion in FDI in R&D. The number of FDI

destinations for R&D activity in capital expenditure will be increased over time. In 2010, there were an estimated 50 FDI destinations for R&D activity in capital expenditure. By 2022, this number had increased to an estimated 75 FDI destinations for R&D activity in capital expenditure.

India is becoming increasingly attractive to MNCs that are looking to invest in research and development. This is likely due to a number of factors, including India's large pool of skilled workers, its growing economy, and its government's support for R&D investment. The US remains home to some of the world's leading R&D universities and companies. It also has a well-developed innovation ecosystem. The growth in the number of FDI destinations for R&D activity is a positive sign. It suggests that MNCs are increasingly looking to invest in R&D in a variety of countries.

The figure 3 shows the percentage of R&D exports by country. The top five exporters of R&D are India, the Netherlands, Switzerland, the USA, and Japan. These countries together account for over 70 percent of global R&D exports.

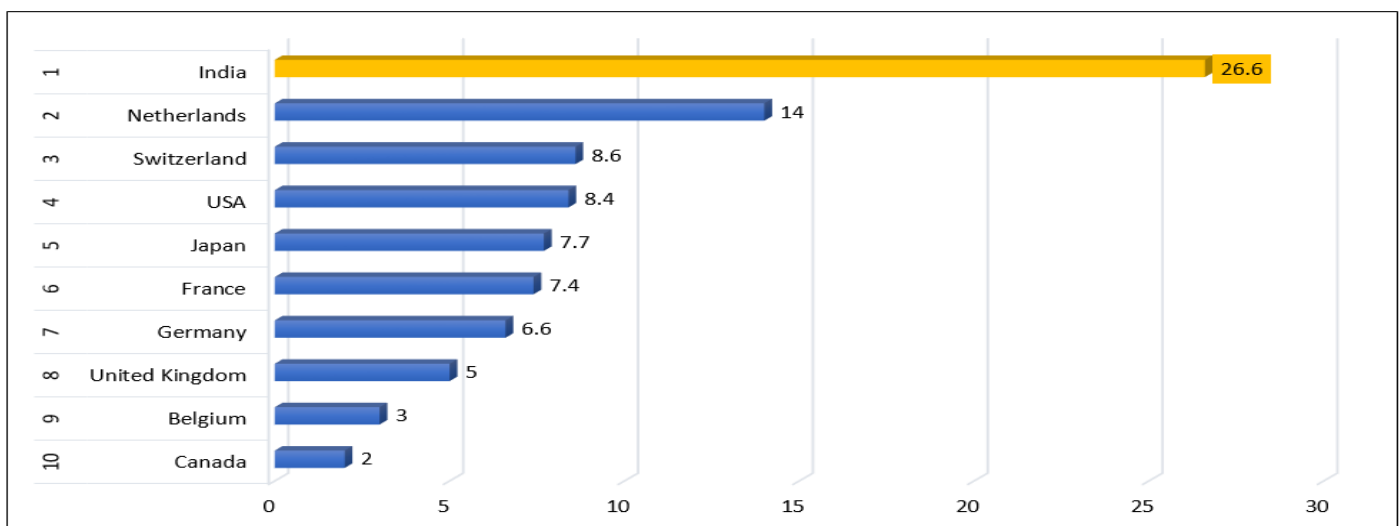


Fig 3 Exports of Research and Development Products.



India is the world's leading exporter of R&D services, with a share of over 26 percent of the global market. The Netherlands is the second largest exporter of R&D services, with a share of over 14 percent. Switzerland is the third largest exporter of R&D services, with a share of over 8 percent. The USA is the fourth largest exporter of R&D services, with a share of over 8 percent. Japan is the fifth largest exporter of R&D services, with a share of over 7 percent. The country's R&D exports are driven by its large and growing pool of skilled workers, its competitive costs, and its strong focus on innovation. The remaining countries in the figure account for less than 30 percent of global R&D exports. These countries include France, Germany, the United Kingdom, Belgium, and Canada.

The global R&D export market is highly concentrated, with a small number of countries accounting for the majority of exports. This is because R&D is a complex and expensive process, and only a few countries have the resources and capabilities to invest heavily in R&D. The concentration of the global R&D export market has a number of implications. It means a small number of countries are able to benefit from the economic gains associated with R&D, other countries are reliant on importing R&D services, which can make them less competitive in the global economy, and the global R&D

landscape is less diverse, which can limit the range of technological innovations that are developed.

The table 3 shows the FDI in R&D investment and projects in India by state from 2003 to 2022. The top five states are Karnataka, Maharashtra, Tamil Nadu, Andhra Pradesh, and Telangana. According to fDi Markets, the highest number of foreign R&D investments are attracted by western Indian states with well-established technical hubs. The western states of India have historically attracted more foreign R&D investment and projects. This is likely due to a number of factors, including the presence of major cities like Mumbai, Bangalore, and Pune, which have a strong infrastructure and a large pool of skilled workers. Additionally, these states have favourable government policies that support R&D investment. Karnataka is the leading state to attract 55 R&D projects (Bangalore) worth an estimated \$2 billion in 2022. These states account for over 70 percent of the total foreign R&D investment in India.

In recent years, there has been a growing trend of foreign R&D investment in southern states like Andhra Pradesh and Telangana. This is likely due to the fact that these states have been investing heavily in infrastructure and education, and they are offering attractive incentives to foreign investors.

Table 3 State wise Projects of FDI in R&D Investment from 2003–2022\*

| SL. No. | Destination State | Foreign R&D projects | Foreign R&D capital expenditure (US \$Mn) |
|---------|-------------------|----------------------|-------------------------------------------|
| 1       | Karnataka         | 807                  | 27,081.00                                 |
| 2       | Maharashtra       | 423                  | 12,400.00                                 |
| 3       | Tamil Nadu        | 246                  | 5,879.00                                  |
| 4       | Andhra Pradesh    | 225                  | 6,849.00                                  |
| 5       | Telangana         | 177                  | 9,429.00                                  |
| 6       | Haryana           | 93                   | 3,661.00                                  |
| 7       | Uttar Pradesh     | 70                   | 2,721.00                                  |
| 8       | Gujarat           | 61                   | 1,266.00                                  |
| 9       | Kerala            | 47                   | 1,097.00                                  |
| 10      | West Bengal       | 26                   | 762.00                                    |
| 11      | Rajasthan         | 14                   | 257.00                                    |
| 12      | Madhya Pradesh    | 6                    | 127                                       |
| 13      | Uttarakhand       | 3                    | 69                                        |
| 14      | Jharkhand         | 2                    | 52                                        |
| 15      | Punjab            | 2                    | 22                                        |
| 16      | Bihar             | 1                    | 20                                        |
| 17      | Chhattisgarh      | 1                    | 17                                        |

Sources: FDI Markets, \*January to October 2022.

The Indian government has set a target of increasing India's R&D spending to 3 percent of GDP by 2030. To achieve this target, the government is taking a number of steps to attract more foreign R&D investment, including: Simplifying the regulatory framework for foreign investment in R&D, offering tax incentives to foreign investors and investing in infrastructure and education to create a more conducive environment for R&D. The increasing trend of foreign R&D investment in India is a positive development. It will help to boost India's innovation capacity and create new jobs. Additionally, it will help to bridge the gap between India's R&D spending and other developed countries.

The India map (see Figure 4) showing the distribution of foreign R&D projects across states. The map shows that the top five states for foreign R&D projects and Foreign R&D capital expenditure (US\$ Mn). Karnataka is the top Foreign R&D capital expenditure state in FDI in R&D investment with US\$ 27081.00 million (807 projects) in the year of 2003 to 2022, followed by Maharashtra with US\$12400.00 million (423 projects), Tamil Nadu with US\$5879.00 million (246 projects), Andhra Pradesh with US\$6849.00 million investment (225 projects), and Telangana received US\$9426.00 million investment in 177 projects. These five

states accounts over 90 percent of all foreign R&D projects in India.

The figure also shows that foreign R&D projects are concentrated in the southern and western states of India. The top 10 states for foreign R&D projects are all located in these two regions. There are a number of reasons why foreign companies are attracted to these states for R&D. These states have a number of advantages, including a skilled labour, strong infrastructure, government supportive environment, and major markets proximity.

The concentration of foreign R&D projects in a few states is a positive development for India, as it suggests that the country is becoming a major destination for foreign investment in R&D. This is likely to lead to a number of benefits for the Indian economy and the future.

➤ *Western States in India have Historically Attracted more Foreign R&D Investment*

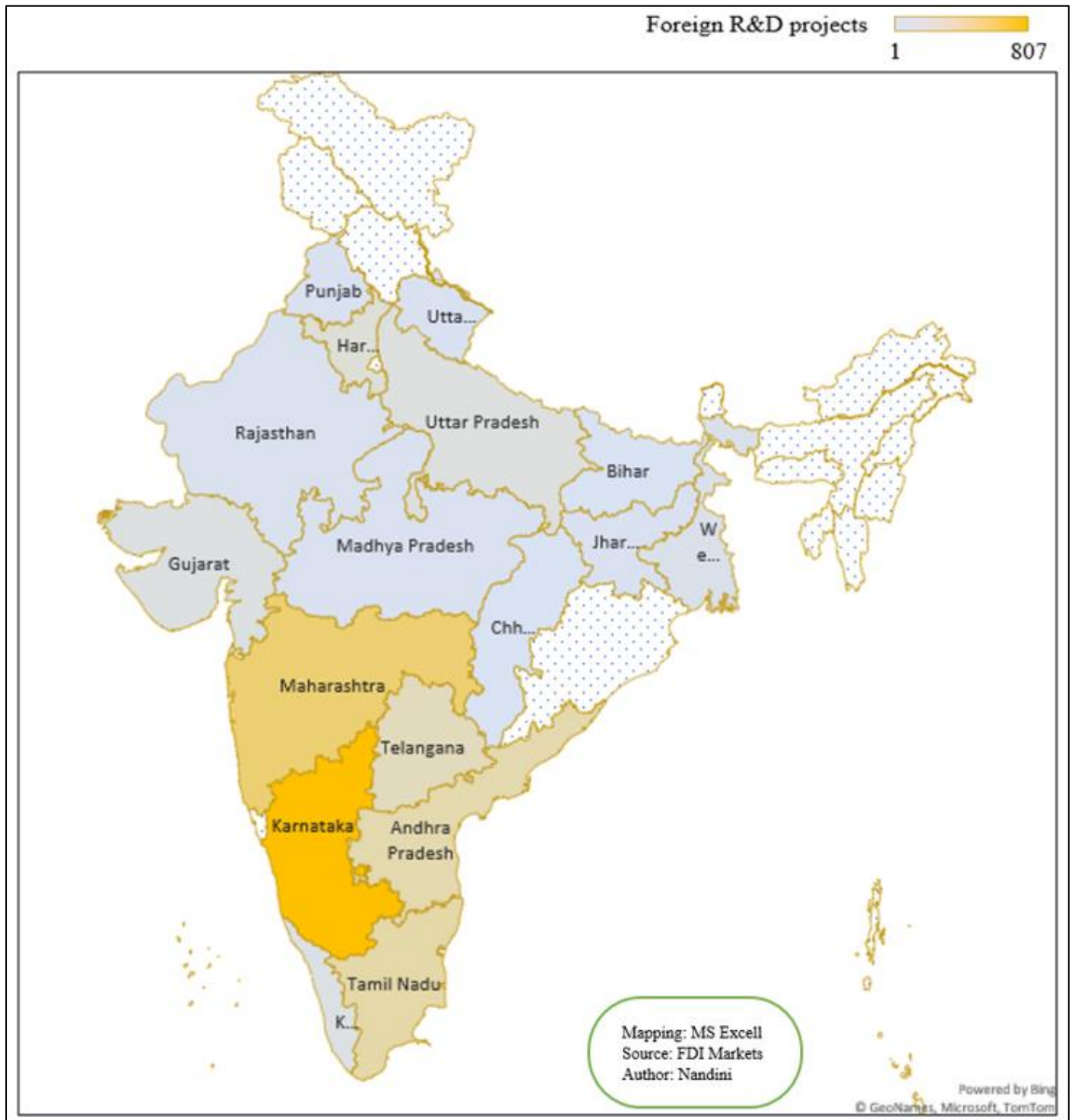


Fig 4 FDI Projects in Research and Development, 2003-2022\*

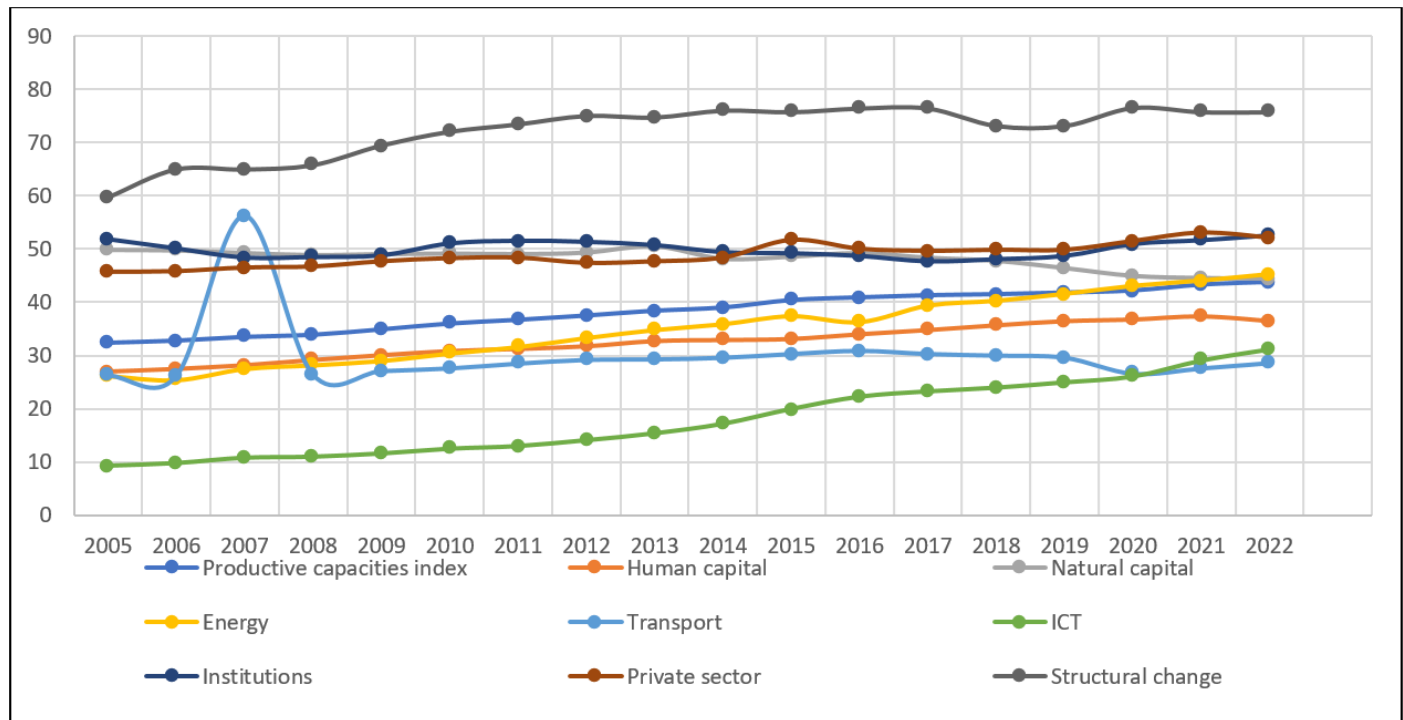


Fig 5 India's Productive Capacity Index Over 2005-2022.

The line graph 5 shows India's Productive Capacity Index (PCI) from 2005 to 2022. The PCI is a composite index that measures a country's ability to produce goods and services. It is based on eight components: human capital, natural capital, energy, ICTs, structural change, transport, institutions, and the private sector. It has increased steadily over time, from a score of 38.2 in 2005 to a score of 62.8 in 2022. This represents an increase of 64.4 percent over the period. India's PCI growth have been the growth of its human capital and its private sector. The country has invested heavily in education and training, which has resulted in a more skilled workforce. The private sector has also grown rapidly in recent years, and has played a key role in driving economic growth. Other components of the PCI, such as energy, ICTs, and transport, have also improved over the period. However, there is still room for improvement in these areas. For example, India's energy infrastructure is still relatively underdeveloped, and its transportation network is congested.

The country has made significant progress in developing its productive capacities over the past decade. However, there is still space for improvement in some areas, such as energy and transportation infrastructure.

Human capital has improved significantly over the past decade. The country has made significant progress in increasing literacy rates and educational attainment levels. The labour force is also becoming more skilled and productive. Natural capital is abundant, but it is also under pressure from factors such as population growth and urbanization. The country needs to invest in sustainable management of its natural resources to ensure that they continue to support economic growth. Energy infrastructure is still relatively underdeveloped. The country needs to invest in expanding its energy capacity and improving its energy

efficiency. India has made significant progress in developing its ICT infrastructure. The country has a large and growing base of internet users and mobile phone subscribers. However, there is still room for improvement in terms of broadband penetration and rural connectivity. India's economy is undergoing structural change, with the manufacturing and services sectors becoming more important. This is a positive development, as it will lead to higher productivity and economic growth. India's transportation network is congested and inefficient. The country needs to invest in improving its road, rail, and air transportation infrastructure. India's institutional environment has improved over the past decade. However, there is still room for improvement in terms of transparency, accountability, and efficiency. India's private sector has grown rapidly in recent years. The private sector has played a key role in driving economic growth. However, the government needs to create a more conducive environment for the private sector to thrive.

### III. CONCLUSION

FDI into R&D was significantly associated with the economic growth and innovations. Study is focused across the world to assess the FDI flow in R&D. Which is highly flowing in the India, China, US, and European countries, respectively. Other than that, in India southern states are more likely receiving the FDI into R&D, such as Karnataka, Maharashtra, Telangana, Andhra Pradesh, and Tamilnadu are stands at front. Indian R&D sector focusing on structural change, institutional activities, private sector growth, energy sectors highly developing over 2003-2022. For that study has accounted the India's Productive Capacity Index (PCI) according to the UNCTAD.



➤ *Conflict of Interest:*

There is no conflict of interest to be declared and the study specially thanks to NFST for funding the research work

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