Embracing FDI Flows: Crafting Strategies for India's Economic Growth

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Abstract

This research analyses the dynamics of foreign direct investment and its contribution to the economic growth of India. Using a multiple linear regression model with backward elimination technique, the study analyses sectoral FDI data from 2000 to 2024. Results show that technology-driven sectors, mainly Computer Software & Hardware ($\beta = 0.478$, $p = 0.001$), Automobile ($\beta = 0.389$, $p = 0.021$), and Power ($\beta = 0.374$, $p = 0.025$), contribute significantly to India's economic growth proxied as gross domestic product (GDP). Meanwhile, Telecommunications ($\beta = -0.222$, $p = 0.030$) and Construction (Infrastructure) ($\beta = -0.452$, $p = 0.006$) show negative correlations, probably due to regulatory hurdles or diminishing returns. Despite receiving the highest FDI ($119,093.37 million), the services sector shows meagre or no significant impact on GDP ($p = 0.516$), possibly due to profit repatriation to the home country or domestic competition. The econometric model (adjusted $R^2 = 0.933–0.936$) underscores the need for sector-specific FDI policies to maximize economic benefits. This research provides statistical evidence and recommendations for aligning FDI policies with India's development goals of becoming a developed country by 2047; targeted interventions are needed to enhance GDP growth and achieve competitiveness at the global level.

Keywords: *Foreign Direct Investment; Sectoral Analysis; Economic Growth; Multiple Linear Regression; GDP Impact*

JEL Codes: F21, O47, C3, L60, L80, R58

1. Introduction

A few macroeconomic variables have become more significant in the formulation of India's growth trajectory since the Indian economy has been liberalized after 1991. Foreign Direct Investment (FDI) is one of the variables that has become a fundamental force in bringing about structural change, technological progress, and economic development. An investment by an enterprise or person based in one nation in business interest in another nation, either by establishing business enterprises or acquiring business assets in the other country is called Foreign Direct Investment (OECD, 2023). Ingredients for sustained economic growth do not only include financial transfers but also technological know-how, managerial skills, and access to new markets across the globe.

The overall performance of a nation is affected by FDI in very significant ways, affecting its economy, society, and politics. While minimal foreign investment can ignite growth and enhance productivity, it is dangerous to over depend

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on foreign investment without complementing domestic capacity. The test is finding the sweet spot where foreign direct investment (FDI) and domestic development needs converge, such that both the economy of the country and the people benefit from economic growth.

The findings obtained through the research contradict long-held beliefs about how foreign direct investment (FDI) benefits economic conditions. The research shows why sector-specific constraints such as regulatory frameworks, decreased benefits and profit transfer play essential role. This research took several steps to extend the existing FDI and economic growth documentation by creating sector-specific policy recommendations based on factual data. Developing countries may achieve maximum economic gains from FDI through precise intervention strategies and regulatory reform.

2. Objectives

- To assess Sectoral Foreign Direct Investment (FDI) inflows impact on India's economic growth.

- To evaluate the importance of Sector with highest FDI Inflows.

3. Literature Review

Dunning's (1988) eclectic paradigm explains why some industries attract more foreign direct investment than other industries based on comparative advantage. The endogenous growth theory, which was developed by **Romer (1990) and Lucas (1988),** provides a theoretical model for understanding how foreign direct investment (FDI) leads to long term economic growth through knowledge transfer, technological innovation, and human capital improvement.

Chakraborty and Basu (2002) revealed a one-way causality from GDP to FDI, contradicting the conventional belief that FDI is growth-enhancing. **Agrawal (2005)** Panel data analysis revealed that FDI had a positive though not statistically significant effect on growth of South Asian economies. The author attributed this result to the relatively minimal amount of FDI compared to domestic investment and the fact that FDI remained concentrated in import-substituting sectors rather than export-promoting ones.

Pradhan (2009) utilized Granger causality tests in analyzing the correlation between foreign direct investment (FDI) and economic growth during the period between 1970 and 2007 in India. Evidence of bidirectional causality existed, which had foreign direct investment and economic growth reinforcing each other. Nevertheless, like many previous works, it did not separate FDI effects through different sectors.

Alfaro (2003) documented that the growth impact of services-focused foreign direct investment remained ambiguous because it depended on individual national elements. According to **Chakraborty and Nunnenkamp (2008)** foreign direct investment's effect on growth deepened after India's economic reforms in 1991, particularly in the manufacturing sector. They noted that the services sector was increasingly attracting increasing shares of FDI, which could have significant growth implications.

Singh (2019) emphasized the relevance of policy change, market size, and trained manpower in making the service sector attractive for foreign direct investment. **Thomas and Narayanan (2017)** highlighted the importance of Indian-foreign company joint ventures in technology transfer and enhancing global competitiveness using time-series analysis. **Ulla et al. (2023)** examined 85 developing countries (1996-2019) found that sectoral FDI composition significantly influences economic growth.

Behera and Yadav (2019) found that foreign direct investment in manufacturing sector had a positive effect on export performance, productivity, and employment generation, though its degree differed across sub-sectors.

Sahoo and Dash (2009) proved that infrastructure development had a tremendous impact on boosting FDI inflows and economic growth. However, they noted that foreign direct investment in infrastructure faced numerous challenges,

including regulatory challenges, problems of land acquisition, and financial constraints.

Gopal a et al. (2014) found that, despite policy liberalization, foreign direct investment in infrastructure was suboptimal because of institutional constraints, regulatory uncertainty, and project implementation lags.

4. Research Gap

In earlier studies the authors used only 10-15 years of data because of which exact correlation was overlooked whereas, this study used 25 years of data and undergone multiple linear regression model using backward elimination technique to get robust model and favorable outcomes.

5. Methodology

This research is based on secondary data sourced from the Department for Promotion of Industry and Internal Trade (DPIIT), Reserve Bank of India (RBI), United Nations Conference on Trade and Development (UNCTAD), World Bank and Confederation of Indian Industry (CII) websites. This Research used multiple linear Regression Model Using Backward Elimination technique in SPSS 25 software.

6. Data Overview

The dataset employed in this study spans a multi-decadal time frame from 2000 to 2024, monitoring the correlation between sectoral FDI inflows and GDP in India. The dependent variable is the economic growth proxied as Gross Domestic Product (GDP) of India, and the independent variables are FDI inflows (expressed in $ millions) in twelve prominent sectors: Services Sector (Financial, Banking, Insurance, Non-Financial Business, Outsourcing, R&D, Courier, Tech Testing and Analysis, Other), Computer Software & Hardware, Trading, Telecommunications, Automobile Industry, Construction (Infrastructure) Activities, Construction Development (Townships, housing, built-up infrastructure and construction-development projects), Drugs & Pharmaceuticals, Chemicals (Other than Fertilizers), Non-Conventional Energy, Power, Hotel & Tourism.

7. Cumulative Sectoral Distribution of FDI Inflows

Table 1 gives an overview of the Cumulative FDI inflows in each sector for the whole period (2000-2024) and shows the relative significance of various sectors in foreign investment attraction.

Table 1: Cumulative FDI Inflows by Sector (2000–2024)

Sector	Cumulative FDI ($ millions)
Services Sector	119,093.37
Computer Software & Hardware	110,240.72
Trading	47,071.54
Telecommunications	40,060.44
Automobile Industry	37,674.26
Construction (Infrastructure) Activities	36,161.74
Construction Development	26,900.26
Drugs & Pharmaceuticals	23,498.05

Chemicals (excluding Fertilizers)	23,558.53
Non-Conventional Energy	21,461.24
Power	19,835.96
Hotel & Tourism	18,683.03

Source: Department for Promotion of Industry and Internal Trade (2024)

The Services Sector is the biggest FDI recipient in this time frame, receiving about $119,093.37 million, followed by Computer Software & Hardware with $110,240.72 million. These two industries together have contributed to almost 37% of the total FDI inflows across the industries covered. The Trading industry comes in at number three with $47,071.54 million, and Hotel & Tourism had the lowest investment amounting to $18,683.03 million.
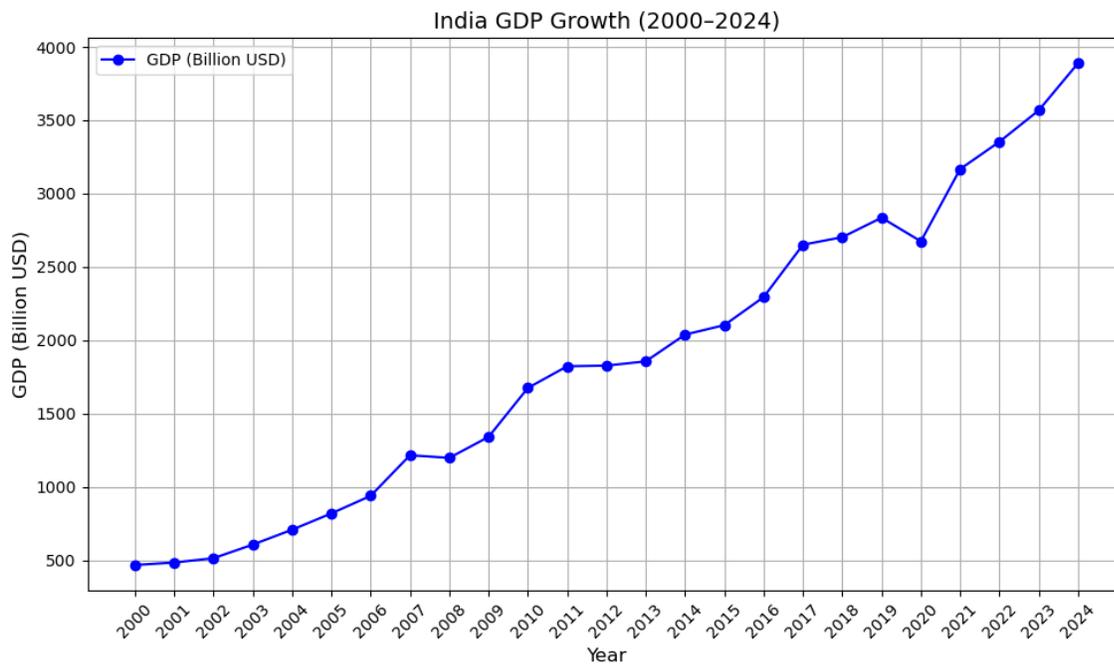
India's GDP has exhibited steady growth, increasing from about $468.40 billion in 2000 to $3,889.00 billion in 2024, and an increase of over an eight-fold magnitude. FDI inflow trends show significant variations among different sectors of investment. The Services Sector experienced significant growth periods both during 2006-2008 and again from 2014 to 2019.

Post-2014 Computer Software & Hardware demonstrated extraordinary growth contributing to substantial expansion during 2020 reaching $25,709.28 million that experts linked to digitalization during the worldwide COVID-19 pandemic. The Telecommunications sector undergone significant fluctuations during two specific time periods: 2007-2009 and 2014-2019.

The Construction (Infrastructure) Activities sector had higher growth in subsequent years, especially in 2015 and 2020, whereas the Automobile Industry continued to grow with significant growth rates following 2014. The Hotel & Tourism sector, with the lowest cumulative FDI, experienced high investments made in 2012 and 2015.

8. Econometric Model

The Multiple Linear Regression Model includes 12 Sectoral FDI Inflows as Independent Variables and Economic growth proxied as GDP as the dependent variable:

$$GDP = \beta_0 + \beta_1 \text{(Services)} + \beta_2 \text{(Computer Software \& Hardware)} + \beta_3 \text{(Trading)}$$

$$+ \beta_4 \text{(Telecommunications)} + \beta_5 \text{(Automobile Industry)}$$

$$+ \beta_6 \text{(Construction Infrastructure)} + \beta_7 \text{(Construction Development)}$$

$$+ \beta_8 \text{(Drugs \& Pharmaceuticals)} + \beta_9 \text{(Chemicals)}$$

$$+ \beta_{10} \text{(Non-Conventional Energy)} + \beta_{11} \text{(Power)}$$

$$+ \beta_{12} \text{(Hotel \& Tourism)} + \varepsilon$$

Where

- GDP is the dependent variable

- β_0 is the constant term

- β_1 to β_{12} are the regression coefficients for each sector

- ε is the error term

To determine the most significant sectors while ensuring model complexity, a backward elimination technique was used. This stepwise process starts with all candidate predictors progressively dropping variables with p-values higher than 0.25, re-evaluating the model at each iteration until all variables left in the model satisfy the significance criterion.

9. Model Development Process

Six models were run through the backward elimination procedure, with each model dropping variables based on their statistical significance:

- Model 1: included all twelve sectors as predictors.
- Model 2: Dropped Construction Development (p = 0.906).
- Model 3: Dropped Trading (p = 0.895).
- Model 4: Dropped Non-Conventional Energy (p = 0.712).
- Model 5: Dropped Drugs & Pharmaceuticals (p = 0.560).
- Model 6: Dropped Services Sector (p = 0.516). Table 2 shows us the backward elimination procedure, indicating the variables eliminated at each step and the respective p-values.

Table 2: Summary of Backward Elimination Process

Model	Variables Removed	p-value	Adjusted R²
1	None (all variables included)	--	0.905
2	Construction Development	0.906	0.915
3	Trading	0.895	0.924

4	Non-Conventional Energy	0.712	0.930
5	Drugs & Pharmaceuticals	0.560	0.933
6	Services Sector	0.516	0.936

The adjusted R^2 measures improve at each iteration, indicating that removing less useful predictors improved model fit. Models 5 and 6 exhibit great explanatory capability with adjusted R^2 values of 0.933 and 0.936, respectively.

Table 3: ANOVA Results for Model 5 & 6

Model	Source	Sum of Squares	df	Mean Square	F	Sig.
5	Regression	2.381	8	0.298	35.999	0.000
	Residual	0.099	12	0.008		
	Total	2.481	20			
6	Regression	2.378	7	0.340	42.897	0.000
	Residual	0.103	13	0.008		
	Total	2.481	20			

f. Predictors: (Constant), Hotel & Tourism, Chemicals (Other than Fertilizers), Computer Software & Hardware, Telecommunications, Construction (Infrastructure) Activities, Ser- vices Sector (Financial, Banking, Insurance, Non-Financial/Business, Outsourcing, R&D, Courier, Technical Testing and Analysis, Other), Automobile Industry, Power

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10. Results and Discussion

- **Model 5 Results**

Model 5, which has eight predictors, has a high explanatory power with an R^2 of 0.960, meaning that 96.0% of the GDP variation is explained by the included FDI factors. The adjusted R^2 of 0.933 is also high even after the inclusion of several factors in the model. The standard error of the estimate is 0.09093146; this reflects a high level of accuracy in the predictions of the model.

The ANOVA output ($F_{(8, 12)} = 35.999$, $p < 0.001$) confirms with the significance of the model overall, showing the combined effect of the predictor variables significantly explains variation in GDP. Table 4 presents regression coefficients for Model 5.

Table 4: Regression Coefficients for Model 5

Sector	Unstandardized Coefficient (Beta)	Std. Error	Standardized Coefficient (Beta)	t-value	p-value
(Constant)	9.312	0.255	--	36.491	0.000
Services Sector	0.088	0.131	0.100	0.670	0.516
Computer Software & Hardware	0.289	0.065	0.478	4.429	0.001
Telecommunications	-0.154	0.062	-0.222	-2.467	0.030
Automobile Industry	0.290	0.109	0.389	2.656	0.021
Construction (Infrastructure)	-0.171	0.052	-0.452	-3.302	0.006
Chemicals (excluding Fertilizers)	0.172	0.082	0.232	2.091	0.058
Power	0.290	0.113	0.374	2.561	0.025
Hotel & Tourism	0.132	0.084	0.181	1.568	0.143

11. Model 6 Results

In Model 6, after eliminating the Services Sector, there has been a slightly higher fit measure, with an R^2 of 0.959 and an adjusted R^2 of 0.936. The standard error of the estimate is 0.088982735, slightly less than Model 5. Table 5 shows the coefficients, standard errors, t-values, and significance levels for Model 6.

Table 5: Regression Coefficients for Model 6

Sector	Unstandardized Coefficient (Beta)	Std. Error	Standardized Coefficient (Beta)	t-value	p-value
(Constant)	9.403	0.211	--	44.571	0.000
Computer Software & Hardware	0.312	0.054	0.517	5.778	0.000
Telecommunications	-0.147	0.060	-0.212	-2.443	0.030
Automobile Industry	0.293	0.107	0.394	2.753	0.016
Construction (Infrastructure)	-0.170	0.051	-0.450	-3.361	0.005
Chemicals (excluding Fertilizers)	0.154	0.076	0.208	2.024	0.064
Power	0.328	0.095	0.424	3.449	0.004

Hotel & Tourism	0.153	0.077	0.210	1.999	0.067

The ANOVA result (F (7, 13) = 42.897, p < 0.001) supports the general applicability of this model.

12. Major Findings

12.1 Positive Contributors

- **Computer Software & Hardware** stand at the forefront of all the sectors with β = 0.478 in Model 5, β = 0.517 in Model 6, this reflects growing importance of the sector and emerging new trends are increasing the demand of this sector.

- **Automobile Industry** shows consistent positive contribution in both models with β = 0.389 in Model 5, β = 0.394 in Model 6, indicating sector's growth-promoting nature.

- **Power sector** shows subsistent positive contribution (β = 0.374 in Model 5, β = 0.424 in Model 6), highlighting the long-term benefits of construction (infrastructure) sector's.

12.2 Negative Contributors

The negative coefficients for Telecommunications (β = −0.222 in Model 5, β= -0.212 in Model 6) and Construction (Infrastructure) (β = −0.452 in Model 5, β= -0.450 in Model 6) are indicating some crucial aspects required to pay attention.

- **Regulatory Challenges:** These sectors may have regulatory hurdles in India that may hinder the effective utilization of foreign investment.

- **Delayed Impact:** Investment in infrastructure sector may yield some output but the contribution of the sector would be visible in the long run.

- **Leakages:** Foreign investment in these industries may result in substantial outflows through imported equipment or repatriation to home countries, thereby diminishing the net contribution to GDP.

13. Contribution of emerging sectors

Chemicals (excluding Fertilizers) (β = 0.172 in Model 5, β = 0.154 in Model 6); Hotel & Tourism (β = 0.132 in Model 5, β = 0.153 in Model 6): Shows marginal significance at the 10% level, implying future economic advantages that are less significant than those of the major industries.

14. Services Sector Paradox

Services Sector (β = 0.088, p = 0.516): Although it has received the biggest cumulative FDI (USD 1, 19,093.37 million), the Services Sector shows statistically insignificant correlation with GDP in Model 5 (p = 0.516). This unforeseen discovery may indicate:

- **Heterogeneity within the Sector:** The Services Sector comprises various sub-sectors with differing economic outputs, thereby hiding the overall correlation.

- **Domestic Competition:** Robust domestic entities within diverse service sectors might limit the further influence of foreign investment.

- **Profit Deportation:** Elevated levels of return of profits in this industry may diminish the net economic advantage.

15. Recommendations

To boost India's economic growth using FDI, precise strategies are required:

High-Impact Sectors (Computer Software & Hardware, Automobile, and Power): Require incentives for staying relevant, faster clearances for establishment, and robust infrastructure.

Underperforming Sectors (Telecommunications, Construction Infrastructure): By introducing regulatory reforms, improving governance, and ensuring efficient project execution & management it reduces negative impacts and turns it into positive contributions.

Energy Sector: The positive correlation of the energy sector ($\beta = 0.374$) can be improved by focusing on the promotion of investments in both conventional and renewable energy sources.

Enhancement of the Services Sector: Despite its meagre GDP impact ($p = 0.516$), the services sector, with $119,093.37 million in FDI inflows, can be enhanced through skill development, technology adoption and policies to retain economic benefits domestically.

Chemicals and Tourism: Should develop these sectors through sustainable and innovative initiatives, recognizing their potential for future growth.

Adopting FDI with popular global trends in renewable energy and digital infrastructure, alongside an accountable monitoring system to evaluate sectorial impacts, will ensure a smooth economic transition.

16. Limitations

- The regression equation does not include macro variables like repatriation, domestic investment, government spending, or international economic trends that can influence GDP alongside FDI.

- Relying on available FDI reports may overlook reinvested earnings or intra-company loans, and reporting inconsistencies among sources could introduce minor errors.

17. Conclusion

This research examined the correlations between sector-specific FDI inflows and GDP in India using a backward elimination technique in a multiple linear regression model. The research produced robust models (Model 5 & 6) with adjusted R^2 of 0.933-0.936, indicating that sectorial FDI inflows account for a significant percentage of the variance of India's GDP between 2000 and 2024.

The results of the regression identify the intricate relationship between foreign direct investment and economic development, as indicating that the sectorial composition of FDI is central to GDP outcomes. By focusing on high-impact sectors and addressing problems in weak sectors, India can maximize foreign investment's economic returns and sustain its growth path.

The Services sector paradox- the conventional belief that higher investment leads to higher returns is broken, so there is a need for diverting the profits of the sector to GDP i.e. it can be improvised through skill development and technology adoption. The low coefficients for infrastructure sectors call for regulatory reforms and improved governance to help increase the economic contribution of FDI in these sectors. The service sector which is attracting a lot of FDI, but its contribution remaining limited in GDP

A sector-specific strategy for FDI promotion is argued to be more effective than generic strategies, especially targeting technologically advanced sectors, manufacturing, and energy infrastructure. This study provides a fact-based foundation for the development of FDI policies that will align with India's economic development objectives,

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underscoring the need for sector-specific approaches to maximize the GDP impacts of foreign investment inflows.

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