

## **A STUDY ON IMPACT OF FOREIGN INVESTMENT ON TECHNICAL EFFICIENCY OF FDI BASED COMPANIES IN INDIA**

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### **ABSTRACT**

*Foreign investment play very important role for the economic development of any country. India is being a developing economy, having potential to grow but facing problem of shortage of capital in growing sectors. There are many policies framed by the Government of India in order to attract the foreign investment in form of FDI and FII in different routes in the country. Many research studies revealed the fact that there is a significant impact of foreign investment on technological efficiency of India sectors. This paper made an attempt to assess the impact of foreign investment on technological efficiency of sectors like Food and Agriculture Sector, Textile Sector, Pharmaceutical Sector, Construction Sector and Metal Sector in India with the help of the necessary statistical technique such as OLS in the study from 2007 to 2016. The study concluded that all sectors Food and Agriculture Sector, Textile Sector, Pharmaceutical Sector, Construction Sector and Metal Sector in India are shown statistically significant impact of foreign investment on technological efficiency.*

**KEYWORDS:** MNEs, Foreign Direct Investment, OLS, Technological Efficiency.

### **Introduction**

Foreign Investment is playing a very important role for the growth and development of any developing countries. It is considered as one of the major sources of economic change irrespective of its growth status in the globalised world. FDI contributes to international trade, technology spillover, human capital formation, creating competitive business environment, employment opportunity etc which will helps in development of enterprise and in long run it will helps in developing countries to grow. According to (Blomstrom, 1996) Multinational enterprise (MNEs) will help the host economy by providing capital, technology, knowledge and boost its export. Hence FDI contributes to overall economic development by various channels (Seethapathi, 2006). FDI is defined as financial stake a foreign company acquires in a domestic company. To qualify to be FDI companies in China, the foreign company must have a financial stake 25% and above. According to the definition give by IMF and OECD 2000, FDI is defined as an investment made by an investor of one country to acquire an asset in another country with the objective to manage that asset. There are many studies which examine the impact of foreign study. The present paper focuses to analyze the impact of FDI on technological efficiency of selected sector in India.

### **Literature Review**

**Lall and Mohammad (1983)** studied the impact of foreign ownership on export performance of 24 industries containing largest private sector companies in India by using econometric model. The study concluded that there is strong and positive relationship between foreign ownership and export performance. Firm with high foreign shareholding perform much better than those domestic firms. Secondly it was also found that capital intensity has negative effect on export performance of firm in India.

**Mello (1999)** this paper focus to estimate the impact of Foreign Direct on Capital Accumulation, Output and total factor of production growth in recipient economy from 1970 to 1990. Statistical tools

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used were time series and panel data analysis. The study concluded that the recipient country of FDI have positive impact on its economy by way of technological upgrading and knowledge spillovers.

**Parker, Vaiyada & Wei (2000)** focused to examine the impact of FDI on Chinese electronic industry with special reference to labor productivity form 1996 -1997. The study is carried on by using panel data for 41 sub sectors in Chinese electronic industry. The study concluded that FDI has a positive impact of labor productivity in Chinese electronic industry.

**Azzam, Fouad, & Ghosh (2013)** aim is to examine the relationship between the degree of foreign ownership and financial performance of 8,185 companies in Egypt from 2006 to 2010 by using panel data analysis. The study concluded that firm's return on assets (ROA), return on equity (ROE), debt ratio (DR) was positively related to foreign ownership. It also concluded that with increase in foreign ownership the financial performance of companies will increase which is depend on sector specification.

**Bishwanath (2015)** made an attempt is to assess the impact of FDI in Indian manufacturing firms on their performance. The study was done by using panel data set (unbalanced panel) on 775 manufacturing companies in India for the period of 2000-01 to 2011-12. Variables of the study are Growth, profitability and export intensity were used as performance indicators for the analysis. To make an assessment of impact of ownership change on the firm performance the difference in difference (DID) estimators was used. The study concluded that FDI tend to raise profitability of Indian manufacturing firms where as for the growth and export performance FDI does not show significant effect.

### Objectives

- To study the impact of foreign Investment on Technological efficiency of FDI based companies in Food and Agriculture Sector.
- To study the impact of foreign Investment on Technological efficiency of FDI based companies in Textile Sector.
- To study the impact of foreign Investment on Technological efficiency of FDI based companies in Pharmaceutical Sector.
- To study the impact of foreign Investment on Technological efficiency of FDI based companies in Construction Sector.
- To study the impact of foreign Investment on Technological efficiency of FDI based companies in Metal Sector.

### Hypothesis

- H<sub>01</sub>** : Foreign Investment does not have a statically significant impact on Technological efficiency of FDI based Companies in Food & Agriculture Sector.
- H<sub>02</sub>** : Foreign Investment does not have a statically significant impact on Technological efficiency of FDI based Companies in Textile Sector.
- H<sub>03</sub>** : Foreign Investment does not have a statically significant impact on Technological efficiency of FDI based Companies in Pharmaceutical Sector.
- H<sub>04</sub>** : Foreign Investment does not have a statically significant impact on Technological efficiency of FDI based Companies in Constriction Sector.
- H<sub>05</sub>** : Foreign Investment does not have a statically significant impact on Technological efficiency of FDI based Companies in Metal Sector.

### Research Methodology

The data is collected from CMIE Prowess IQ data base from 2007 to 2016 (10 years) as per review of literature and companies consistently listed at BSE for 10 years. The sample size in selected on the bases of FDI definition given by IMF i.e. if foreign shareholding is 10% or more then 10% in the company that company will be considered as FDI based companies and less than 10% Non- FDI based companies.

**Table 1: List of FDI based companies in selected sectors**

S. No.	Sectors	Total number of companies in CMIE Prowess	Total number of FDI based Companies
1	Food & Agriculture Sector	2399	23
2	Textile Sector	1775	18
3	Pharmaceutical Sector	2676	29
4	Construction Sector	647	16
5	Metal Sector	1924	22

(Source: CMIE-Prowess)

In Oder to study the impact of foreign investment on selected sectors of Indian economy regression analysis has been done and find at how many companies are affect at 1%, 5% and 10% significance level. The foreign investment and technology helps in growth and development of firms which is explore by some of the studies. In the developing countries it has been noticed that foreign investment helps in developing technology and provide support at companies level. To examine the impact of foreign investment on technological efficiency, amount spend by FDI based companies on their Research and Development expenditure will be considered in the chosen sector in India. The quantitative data has been collected form Prowess IQ data base. The Research and Development (R&D) is regressed on foreign shareholding time series data for ten years with all FDI based companies in selected sectors under the study. The regression model sets like:

$$R\&D = \alpha + \beta FI + \mu$$

Where, R&D = Research and development (R&D) as dependent variable,  $\alpha$  is a constant, FI= Foreign shareholding and  $\mu$ = Error term

### Analysis and Interpretation

- Technological Efficiency in Food and Agriculture Sector**

Table 2 shows the result of regression analysis of all individual FDI based companies in Food & Agriculture Sector for the study period to examine the impact of Foreign Investment on Research & Development of 22 FDI based companies in Food & Agriculture Sector along with constant and coefficient P-Value. Out of 22 FDI based companies 11 companies spend amount on Research & Development expenditure. Research & Development expenditure is considered as indicator which will explain Technological efficiency of FDI based companies in Food & Agriculture Sector in India.

**Table 2: Technological Efficiency of FDI based Companies in Food and Agriculture Sector**

S. No.	Company	Research and Development					
		con	Std err	t-stat	coef	Std err	t-stat
1	Agro Tech Foods Ltd.	-192.	62.35	-3.8**	4.27	1.24	0.08***
2	Britannia Industries Ltd.	768	219	0.35	-148.7	430	-0.34
3	Glaxosmithkline Consumer	-305	139.2	-2.19*	10.31	2.45	4.20***
4	Godfrey Phillips India Ltd.	203.	24.78	8.1***	-4.20	0.86	-4.8***
5	Goodricke Group Ltd.	8.45	1.81	4.6***	-	-	-
6	Lotte India Corpn. Ltd.	0.41	0.14	2.93**	0.02	0.03	0.07
7	Mcleod Russel India Ltd.	40.4	18.68	2.16*	-1.20	0.74	-1.60
8	Monsanto India Ltd.	1.05	146	7.1***	-146	203.3	-7.19***
9	Nestle India Ltd.	-3.17	18.46	2.8**	53.19	18.46	2.88**
10	Shree Renuka Sugars Ltd.	14.3	5.62	2.55**	-0.36	0.45	-0.81
11	United Spirits Ltd.	37.9	5.06	7.4***	1.09	0.18	6.0***

(Source: Author Compilation)

The summery of regression results of foreign investment on Research & Development shown in table 2 represent that 9 out of 11 FDI based companies in Food & Agriculture Sector, Agro Tech Foods Ltd. GlaxoSmithKline Consumer, Godfrey Phillips India Ltd. Goodricke Group Ltd. United Spirits Ltd. are significant at 1% level of significance where as companies. Lotte India Corpn. Ltd, Nestle India Ltd is significant at 5% level of significance. Mcleod Russel India Ltd. Shree Renuka Sugars Ltd. is significant at 10% level of significance. Britannia Industries Ltd. companies do not show significant impact of foreign investment. Overall out of 11 FDI based companies, only 9 companies shows statically significant impact of foreign investment on their Technological efficiency Hence null hypothesis is rejected i.e. Foreign Investment does not have a statistically significant impact on Technological Efficiency of FDI based companies in Food & Agriculture Sector.

- Technological Efficiency in Textile Sector**

Table 3 shows the result of regression analysis of all individual FDI based companies in Textile Sector for the study period to examine the impact of Foreign Investment on Research & Development of 18 FDI based companies in Textile Sector along with constant and coefficient P-Value. Out of 18 FDI based companies only 5 companies spend amount on Research & Development expenditure. Research

& Development expenditure is considered as indicator which will explain Technological efficiency of FDI based companies in Textile Sector in India. The summary of regression results of foreign investment on Research & Development shown in table 3 represent that 5 out of 5 FDI based companies in Textile Sector, Indian Card Clothing Co. Rainbow Denim Ltd are significant at 1% level of significance where as companies. Polygenta Technologies Ltd R S W M Ltd.is significant at 5% level of significance. Pearl Global Inds. Ltd.is significant at 10% level of significance. Britannia Industries Ltd. companies do not show significant impact of foreign investment. Overall out of FDI based companies, 5 companies are shows statically significant impact of foreign investment on their Technological efficiency Hence null hypothesis is rejected i.e. Foreign Investment does not have a statistically significant impact on Technological Efficiency of FDI based companies in Textile Sector.

**Table 3: Technological Efficiency of FDI based Companies in Textile Sector**

S. No.	Company	Research and Development					
		con	Std err	t-stat	coef	Std err	t-stat
1	Indian Card Clothing Co.	5.6	0.56	9.86***	-	-	-
2	Pearl Global Inds. Ltd.	39.	17.19	2.30*	-0.7	0.69	-1.08
3	Polygenta Technologies Ltd.	1.6	0.63	2.63**	0.03	0.01	0.3
4	R S W M Ltd.	1.6	0.63	2.63**	0.03	0.01	0.3
5	Rainbow Denim Ltd	44	10.84	4.1***	-	-	-

(Source: Author Compilation)

• **Technological Efficiency in Pharmaceutical Sector**

Table 4 shows the result of regression analysis of all individual FDI based companies in Pharmaceutical Sector for the study period to examine the impact of Foreign Investment on Research & Development of 26 FDI based companies in Pharmaceutical Sector along with constant and coefficient P-Value. Out of 26 FDI based companies 12 companies spend amount on Research & Development expenditure. It is considered as indicator which will explain Technological efficiency of FDI based companies in Pharmaceutical Sector in India. The summary of regression results of foreign investment on Research & Development shown in table-4 represent that 7 out of 12 FDI based companies in Pharmaceutical Sector, Cirex Pharmaceuticals, Elantas Beck India Ltd. Foseco India Ltd. Rubber Products Ltd. are significant at 1% level of significance where as companies. Abbott India Ltd. Elantas Beck India Ltd. Kerala Ayurveda Ltd. is significant at 10% level of significance. Astrazeneca Pharma India, Biofil Chemicals & Pharmace, Dharamsi Morarji, Essel Propack Ltd, Kingfa Science & Technology, Lincoln Pharmaceuticals companies does not show significant impact of foreign investment.

**Table 4: Technological Efficiency of FDI based Companies in Pharmaceutical Sector**

S. No	Company	Research and Development					
		con	Std err	t-stat	coef	Std err	t-stat
1	Abbott India Ltd.	128.4	55.4	2.32*	-1.54	0.78	-1.99**
2	Astrazeneca Pharma India	3.92	1.11	3.53	-0.09	0.06	-1.54
3	Biofil Chemicals & Pharmace	-4403	153	-2.88	2184	745.	2.93
4	Cirex Pharmaceuticals	68.71	13.5	5.09***	-3.11	0.63	-4.9***
5	Dharamsi Morarji	4.93	3.54	1.39	-0.06	0.13	-0.47
6	Elantas Beck India Ltd.	111.5	38.2	2.92**	-0.99	0.46	-2.16*
7	Essel Propack Ltd	-22.80	7.43	-3.07	-22.8	7.43	-3.07
8	Foseco India Ltd.	6.47	0.73	8.81***	-0.05	0.03	-1.60
9	Kerala Ayurveda Ltd.	12.24	4.19	2.92**	-	-	-
10	Kingfa Science & Technology	0.17	0.04	4.64	0.13	0.03	5.26
11	Lincoln Pharmaceuticals	8.14	49.1	0.17	0.20	0.61	0.34
12	Rubber Products Ltd.	0.46	0.09	5.20***	-	-	-

(Source: Author Compilation)

Overall out of FDI based companies, 7 companies are shows statically significant impact of foreign investment on their Technological efficiency Hence null hypothesis is rejected i.e. Foreign Investment does not have a statistically significant impact on Technological Efficiency of FDI based companies in Pharmaceutical Sector.

- **Technological Efficiency in Construction Sector**

Table 5 shows the result of regression analysis of all individual FDI based companies in Construction Sector for the study period to examine the impact of Foreign Investment on Research & Development of 15 FDI based companies in Construction Sector along with constant and coefficient P-Value. It is considered as indicator which will explain Technological efficiency of FDI based companies in Construction Sector in India. The summary of regression results of foreign investment on Research & Development shown in table 5 represent that 12 out of 15 FDI based companies in Construction Sector, Akzo Nobel India Ltd, Ambuja Cements Ltd, Grindwell Norton Ltd, Gujarat Sidhee Cement H E G Ltd, Morganite Crucible (India), Shalimar Paints Ltd Vesuvius India Ltd, are significant at 1% level of significance where as companies, Berger Paints India Ltd, Heidelberg Cement India, I F G L Refractories Ltd, Kachchh Minerals Ltd is significant at 5% level of significance. Kansai Nerolac Paints Ltd, Orient Refractories Ltd, Shree Digvijay Cement companies does not show significant impact of foreign investment.

**Table 5: Technological Efficiency of FDI based Companies in Construction Sector**

S. No.	Company	Research and Development					
		con	Std err	t-stat	coef	Std err	t-stat
1	Akzo Nobel India Ltd	-174	2811.	-6.1***	557.91	44.6	12.5***
2	Ambuja Cements Ltd	-7006	4340	-1.61	3439.	928.1	3.71***
3	Berger Paints India Ltd.	-7625.	9367.	-0.81	2112.2	729.9	2.89**
4	Grindwell Norton Ltd.	7231.	685.4	10.***	-	-	-
5	Gujarat Sidhee Cement	3586.0	137.3	261***	-	-	-
6	H E G Ltd.	-1428	7062.	-2.02*	2550.3	587.2	4.34***
7	Heidelberg Cement India	-5623	3078	-1.83	2521.	1071	2.35**
8	I F G L Refractories Ltd	-2619	1952.	-1.34	74.75	29.44	2.54**
9	Kachchh Minerals Ltd.	13.85	4.68	2.96**	0.42	0.59	0.71
10	Kansai Nerolac Paints Ltd	66578.	3636	1.83	-2730.	2137.	-1.28
11	Morganite Crucible (India)	-5552.	1848.	-3.00**	89.21	26.82	3.33**
12	Orient Refractories Ltd.	1411	9549	1.48	-185	1269.	-1.46
13	Shalimar Paints Ltd	2939.1	246.2	11.***	24.64	6.46	3.82***
14	Shree Digvijay Cement	2052.	608.8	3.37	16.68	8.64	1.93
15	Vesuvius India Ltd.	4770.1	554.2	8.6***	-	-	-

(Source: Author Compilation)

Overall out of FDI based companies, 12 companies are shows statically significant impact of foreign investment on their Technological efficiency Hence null hypothesis is rejected i.e. Foreign Investment does not have a statistically significant impact on Technological Efficiency of FDI based companies in Construction Sector.

- **Technological Efficiency in Metal Sector**

Table 6 shows the result of regression analysis of all individual FDI based companies in Metal Sector for the study period to examine the impact of Foreign Investment on Research & Development of 21 FDI based companies in Metal Sector along with constant and coefficient P-Value. Out of 21 FDI based companies 5 companies spend amount on Research & Development expenditure. It is considered as indicator which will explain Technological efficiency of FDI based companies in Metal Sector in India.

**Table 6: Technological Efficiency of FDI based Companies in Metal Sector**

S. No.	Company	Research and Development					
		con	Std err	t-stat	coef	Std err	t-stat
1	Gontermann-Peipers	12.0	6.85	1.76	-0.51	0.39	-1.30
2	Jindal Stainless (Hisar)	3.47	2.29	1.51	0.17	0.21	0.78
3	Jindal Stainless Ltd.	14.1	1.91	7.40***	-0.42	0.09	-4.55***
4	Tayo Rolls Ltd	-1.41	6.31	-0.22	0.23	0.37	0.63
5	Usha Martin Ltd.	-13.0	8.90	-1.47	2.43	0.77	3.18**

(Source: Author Compilation)

The summary of regression results of foreign investment on Research & Development shown in table 6 represent that 2 out of 5 FDI based companies in Metal Sector, Jindal Stainless Ltd. are significant at 1% level of significance where as companies. An Usha Martin Ltd. company does not show significant impact of foreign investment.

Overall out of FDI based companies, 2 companies are shows statically significant impact of foreign investment on their Technological efficiency Hence null hypothesis is rejected i.e. Foreign Investment does not have a statistically significant impact on Technological Efficiency of FDI based companies in Metal Sector.

### Conclusion

The objective of this paper is to study the impact of foreign Investment on Technological efficiency of FDI based companies in selected sectors under the study. To represent Technological efficiency Research and Development (R&D) have been taken for the period of 10 years. The results shows the impact of foreign investment on Research and Development (R&D) which is indicator of Technological efficiency are as follows:

- **Food & Agriculture Sector** shows that out of 22 FDI based companies in Agriculture sector only 11 companies are spending on Research and Development (R&D) expenditure and 9 companies are showing statistically significant impact of foreign investment on Technological efficiency of FDI based companies.
- **Textile Sector** shows that out of 18 FDI based companies in Textile sector only 5 companies are spending on Research and Development (R&D) expenditure and all these companies are showing statistically significant impact of foreign investment on Technological efficiency of FDI based companies.
- **Pharmaceutical Sector** shows that out of 26 FDI based companies in Pharmaceutical sector only 12 companies are spending on Research and Development (R&D) expenditure and 7 companies are showing statistically significant impact of foreign investment on Technological efficiency of FDI based companies.
- **Constriction Sector** shows that out of 15 FDI based companies in Constriction sector all 15 companies are spending on Research and Development (R&D) expenditure and 12 companies are showing statistically significant impact of foreign investment on Technological efficiency of FDI based companies.
- **Metal Sector** shows that out of 21 FDI based companies in Metal sector only 5 companies are spending on Research and Development (R&D) expenditure and 2 companies are showing statistically significant impact of foreign investment on Technological efficiency of FDI based companies.

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