TRENDS IN FOREIGN INVESTMENT IN HEALTHCARE SECTOR OF INDIA

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CONTENTS

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Reji K. Joseph & K.V.K. Ranganathan[*]

[***Abstract***: *The healthcare sector accounted for 8 per cent of the total FDI inflow into the country during 2004-05 to 2012-13. Most of the inflows into this sector were directed towards pharmaceutical manufacturing activities. A very high share of the investment into the manufacturing had the characteristics of FDI (realistic FDI or RFID), but the preferred route was acquisition of leading Indian firms resulting in transfer of ownership with no new addition to production capacities. As the global pharma majors were forced to get into the business of generic drugs, they targeted leading Indian generic firms, which were more export-oriented. With the exception of taken over Indian firms, the RFDI recipient firms in the drugs and medicines sector were found to be less export-oriented than the domestic firms. Further, while investment in R&D by RFDI firms was quite high in case of taken over companies, R&D intensity in terms of both capital and revenue expenditures of the latter companies declined after the takeover. Thus, FDI has not resulted in the percolation of widely acknowledged benefits of FDI – promotion of exports and transfer and development of new technologies. On the contrary, it was the Indian companies which were doing better in terms of exports and R&D that got converted into FDI companies.*]

JEL Classification: *F21, F23, I11, I18, O38*
Keywords: *Foreign Direct Investment, Healthcare Sector, Medicines, Hospitals, Research and Development, Exports.*

1. Introduction

The Indian pharmaceutical industry remained in focus ever since the debate on intellectual property rights broke out during the mid-1990s because of the key role played by the Indian Patent Act 1970 in its emergence.[1] Later, the amendment of the Patent Act in 2005 and the takeover of many home-grown companies by global pharma majors have intensified the debate further. Availability and affordability of medicines of medicines have been two major concerns. But medicines are only a part of the overall expenditure on

[*] Reji K. Joseph is Associate Professor and K.V.K. Ranganathan is Professor at ISID. The authors are very thankful to Professor K. S. Chalapati Rao (ISID) for his valuable comments and suggestions on an earlier draft of this paper. However, the authors are solely responsible for any errors in the paper.

[1] Biswajit Dhar and K.M. Gopakumar, "Post-2005 TRIPS scenario in Patent Protection in the Pharmaceutical Sector: The Case of the Generic Pharmaceutical Industry in India", a report prepared under the UNCTAD/ICTSD project on Intellectual Property Rights and Sustainable Development, November 2006.

healthcare. While individual cases of foreign acquisitions of manufacturing companies have attracted much attention, the extent of acquisition-related FDI has never been brought out in a systematic manner. The role of foreign capital in other segments of healthcare did not attract the attention it deserved. The vague sectoral classification of official statistics on FDI inflows and the clubbing of many types of foreign investors whose motives vary significantly have restricted the scope of analysis of the role of foreign capital in India's healthcare sector. The limited objective of this chapter is to provide broad indications of the different types of what are officially termed as FDI inflows into various segments of the healthcare sector and the entry routes followed by such investors. It is hoped that the study will help in a better appreciation of the role of foreign capital and the implications both for the sector and for public health.

2. Overview of FDI Policy in Healthcare Sector and Foreign Investment Inflow

The healthcare sector has been conceived of consisting of various subsectors – drugs and pharmaceuticals including traditional medicines, machineries and equipment used for diagnosis, treatment and production of medicines, hospitals, clinics, fitness centres, data processing and medical transcription, research and development, and trading in medicines and machineries and equipment. The detailed list of items included in our classification of healthcare sector is provided in *Table 1*. All these sectors have been broadly classified into categories based on the nature of their activities – manufacturing and services.

India has a liberal policy on foreign investment in healthcare sector. In drugs and pharmaceuticals, the major sector within the healthcare sector, 100 per cent FDI (greenfield) is allowed through automatic route. Brownfield investments (takeovers) investment requires the approval of the Government, but 100 per cent is permitted[2]. FDI in hospitals, clinics and diagnostic centres was allowed up to 100 per cent through automatic route from 2000 (Hooda 2015, Rupa[3]). Government approval is required only in those cases with prior technical collaboration, but 100 per cent is permitted[4]. In insurance, an emerging component of healthcare services, foreign investment is allowed up to 49 per cent: investments up to 26 per cent is placed under the automatic route investments beyond 26 per cent and up to 49 per cent require prior government approval[5]. Since it will not be possible to separate medical insurance from general insurance business we have excluded the same from this exercise. Medical devices had been considered as part of pharmaceuticals as far as foreign investment policy was concerned. However, in 2015 a

[2] See, Consolidated FDI Policy (effective from May 12, 2015), DIPP, Ministry of Commerce and Industry, Govt. of India.

[3] Chanda, Rupa, Foreign Investment in Hospitals in India: Status and Implications, paper available at http://www.researchgate.net/publication/228549719

[4] *Ibid.*

[5] See, Press Note No. 3 (2015 Series), DIPP, Ministry of Commerce and Industry, Govt. of India.

special carve out was created for medical devices within the pharmaceutical sector. Now FDI is allowed 100 per cent through automatic route in medical devices irrespective of greenfield or brownfield investment[6].

In order to understand the trends in the inflow of foreign investments in healthcare sector, we have compiled data for 376 companies from the inflows data released by the Ministry of Commerce and Industry, Government of India through its monthly *SIA Newsletter*. Only those cases each individually accounting for inflow of above $1mn. during the period between September 2004 and March 2013 are considered for our analysis. Details of inflow are given in *Table 1*.

There is an inflow of $13936.09 Mn. during the reference period, which accounts for 7.64 per cent of the total inflow into the country during 2004-05 to 2012-13. In terms of number of firms, the manufacturing and services sectors within healthcare sector have almost similar numbers. But in terms of volume of inflow, the manufacturing sector accounts for more than four-fifth share. The foreign investors were identified by their nature as (i) realistic FDI investors (RFDI), private equity/venture capital/hedge funds etc. were grouped under PEFI, all those broadly falling under the category of India diaspora are classified as India-related foreign investors (IRFI). The remaining portfolio investors are identified as OPFI.

In healthcare sector RFDI is the predominant type of foreign investment. It constitutes 80 per cent of the inflow. The other important form of investment, the PEFI, accounts for 15 per cent of the inflow (*Table 2*). Among the different entry routes, acquisition is the most preferred one accounting for about three-fourth share (73.5%). This is due to the high share of acquisition in RFDI. But in other types of investments (except RFDI) non-acquisition route is the prominent route of channelling capital inflow. A detailed analysis of trends of foreign investment inflow in to manufacturing and services is provided in the following two sections.

Table 1: Inflow of Foreign Investment into Healthcare Sector (Sept. 2004 to March 2013)

		No. of Companies	*Total inflow ($Mn.)*
MANUFACTURING			
MC	Manufacture of Chemical Substances Used in Manufacture of Pharmaceuticals/Chemical Products	10	179.88
MD	Manufacture of Drugs, Medicines (Allopathic)	133	10818.93
ME	Manufacture of Medical, Surgical, Scientific and Measuring Equipment/Optical Instruments	24	293.63
MP	Pharmaceutical Machinery	3	28.6
MS	Manufacture of Surgical Consumables/Optical Glass Products/Lenses	9	137.8
MT	Manufacture of Homeopathic/Ayurvedic/Unani/Traditional Medicines	6	16.84
	Total for manufacturing	**185**	**11475.68**

[6] See, Press Note No. 2 (2015 Series), DIPP, Ministry of Commerce and Industry, Govt. of India.

		No. of Companies	*Total inflow ($Mn.)*
SERVICES			
SF	Fitness centres/gyms	7	58.22
SH	Hospitals/Clinics/Medical Institutes.	72	1289.5
SL	Diagnostic Centres	10	190.57
SS	Other Health and Medical Services	9	51.26
ST	Information Technology/Software Development/BPO/Data Processing/Communication / Medical Transcription	12	133.53
Research within services			
SC	Clinical Research Organisation	23	149.03
SR	Research/Scientific Testing & Analysis/ Bio-tech	22	388.75
Trade within services			
SW	Wholesale Trade in Medicines and Chemicals/ Scientific, Medical and Surgical Instruments/Marketing	33	184.33
Others within services			
SO	Development & Management of Biotech Park/Real Estate Activities/Setting Up of Industrial Parks/ Infrastructure/Construction	3	15.22
	Total for Services	**191**	**2460.41**
	Total for Manufacturing and Services	**376**	**13936.09**

Note: Authors' own classification.

Source: Compiled by authors from SIA Newsletter (various issues), Ministry of Commerce and Industry, Govt. of India.

Table 2: Nature and Entry Route of FDI Equity Inflows into Healthcare Sector
(Sep. 2004 to March 2013)

Type of Investor	*Entry Route (US $ Mn.)*			
	Acquisition	*Other*	*Strategic*	*Total*
RFDI	9428.31	1442.51	272.84	11143.66
Private Equity	728.16	1437.55		2165.71
Indian Promoter	77.35	224.54		301.89
Portfolio	5.25	319.98		324.83
Grand Total	**10239.07**	**3424.18**	**272.84**	**13936.09**
	Percentage to Total			
RFDI	92.08	42.13	100.00	79.96
Private Equity	7.11	41.98		15.54
Indian Promoter	0.76	6.56		2.17
Portfolio	0.05	9.33		2.33
Grand Total	**100.00**	**100.00**	**100.00**	**100.00**

Source: Authors' calculations based on data compiled from SIA Newsletter (various issues), Ministry of Commerce and Industry, Govt. of India.

3. Foreign Investment Inflows in Manufacturing in Healthcare Sector

Although there are different subsectors in manufacturing, drugs and medicines (allopathic) (MD) receives almost entire (94.3%) inflow (*Table 3*). Since manufacturing has a

predominant share in terms of volume of inflow into the healthcare sector, drugs and medicines (allopathic) also has a very high share in the inflow into healthcare sector. More than three-fourth (77.6%) of inflow in to the healthcare sector is in to the manufacturing of drugs and medicines (allopathic).

As shown in the table below (*Table 3*), firms operating in the same filed is the most significant type of investor (RFDI) in the manufacturing sector as a whole, accounting for 89.1 per cent of the inflow. In all the subsectors of manufacturing, RFDI recorded the highest share. However, very significant proportion of this investment was through acquisition of shares. More than four-fifth (84.9%) of inflow into the manufacturing has been through acquisition of existing shares. This proportion varies across different subsectors. Acquisition has been the predominant route of inflow in manufacture of chemical substances used in pharmaceutical products (MC), drugs and medicines (MD), and surgical consumables, optical glass products and lenses (MS).

Table 3: Inflow of Foreign Investment in different Manufacturing Subsectors in Healthcare

Subsector	*Total Inflow ($mn)*	*Entry Route*			*Share of Acquisition in inflow (%)*	*Type of Investor*			
		Acquisition	*Non-Acquisition*	*Strategic*		*RFDI*	*PEFI*	*IRFI*	*OPFI*
MC	179.88	140.19	39.69	0.00	77.94	138.38	32.54	8.96	0.00
MD	10818.93	9442.15	1111.94	264.84	87.27	9739.06	725.31	104.15	250.41
ME	293.63	33.18	258.92	1.53	11.30	196.63	20.08	10.06	66.86
MP	28.6	6.63	21.97	0.00	23.18	28.6	0.00	0.00	0.00
MS	137.8	104.14	33.66	0.00	75.57	121.15	16.65	0.00	0.00
MT	16.84	3.03	13.81	0.00	17.99	5.28	10.45	1.11	0.00
Total	11475.68	9729.32	1479.99	266.37	84.78	10229.10	805.03	124.28	317.27
				Percentage to total					
MC	1.57	1.44	2.68	0.00		1.35	4.04	7.21	0.00
MD	94.28	97.05	75.13	99.43		95.21	90.10	83.80	78.93
ME	2.56	0.34	17.49	0.57		1.92	2.49	8.09	21.07
MP	0.25	0.07	1.48	0.00		0.28	0.00	0.00	0.00
MS	1.20	1.07	2.27	0.00		1.18	2.07	0.00	0.00
MT	0.15	0.03	0.93	0.00		0.05	1.30	0.89	0.00
Total	100.00	100.00	100.00	100.00		100.00	100.00	100.00	100.00

Note: Same as Table 1.
Source: Same as Table 2.

Acquisition of already existing companies or businesses through the purchase of shares and replacement of other existing shareholders would not directly benefit the host countries with the widely acknowledged benefits of FDI. Out of the total RFDI inflow in to the manufacturing (186 firms), more than four-fifth (82.5%) was on account of just four acquisition deals. Acquisition of Ranbaxy by Daiichi resulted in inflow of $4065.16 Mn. in 2008-09 Acquisition of the formulation business of Piramal Healthcare by Abbot Healthcare

led to inflow of US$3159.6 Mn. in two years period, i.e. $2397.02 Mn. in 2011-12 and $762.58 Mn. in 2012-13. The injectable business segment of Orchid Chemicals and Pharmaceuticals Ltd. was taken over by Hospira which saw an inflow of $484.83 Mn. in 2011-12. Although Orchid was taken over in December 2009, the financial transaction seems to have extended to 2011-12. Paras takeover by Reckitt Benckiser led to inflow of $730.13 Mn. in 2011-12. The moot question coming up is that how has the Indian healthcare manufacturing sector benefitted from liberalization of FDI, if three-fourth of the FDI (RFDI) has been accounted by acquisition of firms or businesses.

To bring more light into the discussion of takeover of Indian firms or businesses, understanding of the context in which these deals took place and the motives of acquiring firms is important. Globally, the R&D pipeline of new drugs are drying up and many of the blockbuster patented drugs are in the vicinity of patent expiry and this has put pressure on the profit margins of leading global pharma MNCs. Patent expiry results in significant decline in the market share of the originator's drug. When GlaxoSmithKline's patent over *Valtrex* expired in 2009, Ranbaxy which introduced the generic version of the drug under 180 day market exclusivity clause of Hatch-Waxman Act 1984 of United States, secured 74 per cent of the $1400 Mn. market of the drug in six months time (Joseph 2016). The patent expiry has had serious impact on the profits of leading pharma majors. The profit before tax of Bristol Myers Squibb declined by 66.5 per cent and that of AstraZeneca by 37.6 per cent in 2012 even after adoption of cost cutting measures. The profit after tax of leading 15 global pharma MNCs had declined by 3.5 per cent in 2015 (Pingle 2015). And in some advanced countries like Japan, emphasis has been placed on the use of generic drugs. Japan adopted measures to increase the share of generic drugs in public health system from 17 per cent to 30 per cent by 2012 (Joseph 2008). All these factors have forced a number of pharma MNCs to enter to the business of generic drugs. There are studies showing that foreign companies have acquired those companies which have been more export oriented.

In order to better understand the impact of RFDI in manufacturing in healthcare sector, a detailed analysis of 49 firms which have received RFDI is attempted for a period of four years from 2008-09 to 2011-12. The 49 firms are from MC, MD and ME subsectors. In the context of liberalization of FDI in 1991, it was expected that foreign investment would bring in advantages of technology transfer and promotion of exports. The industrial policy statement of 1991 (24 July, 1991) stated that "the relationship between domestic and foreign industry needs to be much more dynamic than it has been in the past in terms of both technology and investment. Foreign investment would bring attendant advantages of technology transfer, marketing expertise, introduction of modern managerial techniques and new possibilities for promotion of exports" (Para.24).

Table 4 gives the sales, exports and R&D details of the 49 firms for various years. The export intensity (export as percentage of sales) varies between the three subsectors. It is highest in the drugs and medicines. Though it may appear that the impressive export intensity of drugs and medicines subsector could have been contributed by the positive effects of RFDI, a closer look at the data shows a different picture. About four-fifth (72.5%) of the exports of

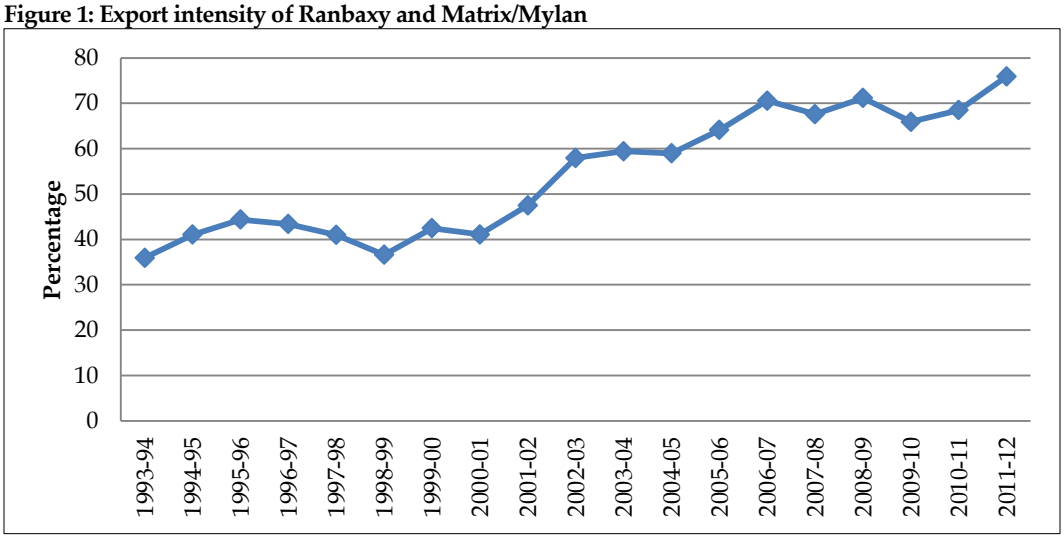
this subsector is contributed by just two firms - Ranbaxy and Mylan Laboratories Ltd, erstwhile Indian companies. Ranbaxy was taken over by Daiichi Sankyo in 2008 and Matrix Laboratories Ltd., which became Mylan after the takeover, was taken over by Mylan in 2006. *Figure 1* shows that both the companies had been increasingly becoming export

Table 4: Sales, Exports and R&D of firms receiving RFDI (Rs. Crore)

Year	*Sales*	*Exports*	*Exp/ Sales (%)*	*R&D*	*R&D/ Sales %*
Manufacture of Drugs and Medicines					
2008-09	10594.64	5312.22	50.14	715.89	6.76
2009-10	12510.89	6568.14	52.50	934.76	7.47
2010-11	16541.24	8351.22	50.49	1024.83	6.20
2011-12	22738.23	11127.49	48.94	1068.86	4.70
Total	**62385.00**	**31359.07**	**50.27**	**3744.34**	**6.00**
Manufacture of Medical Equipment					
2008-09	803.79	362.23	45.07	0.91	0.11
2009-10	1019.74	336.82	33.03	1.74	0.17
2010-11	1425.79	500.40	35.10	1.22	0.09
2011-12	1758.63	181.40	10.32	1.01	0.06
Total	**5007.94**	**1380.85**	**27.57**	**4.89**	**0.10**
Manufacture of Chemical Substances					
2008-09	252.53	7.52	2.98	0.00	0.00
2009-10	242.31	5.27	2.18	0.00	0.00
2010-11	239.04	8.16	3.41	0.00	0.00
2011-12	242.13	0.00	0.00	0.00	0.00
Total	**975.99**	**20.95**	**2.15**	**0.00**	**0.00**

Source: Authors' calculations based on data compiled from the Directors' Reports (various years) submitted by companies to Ministry of Corporate Affairs, Govt. of India.

Figure 1: Export intensity of Ranbaxy and Matrix/Mylan



Source: Computed by authors using data from Prowess, version 4.13, CMIE

oriented way before their takeovers. After the acquisitions, the export orientation maintained the pace. If these two firms are excluded from the sample, the export intensity of the drug and medicines manufacturing subsector falls to 28.3 per cent for the period of four years. To be brief, the high export intensity of RFDI firms is nothing but a transfer of high export orientation of leading firms in the domestic sector to the foreign sector. We do not find anything that suggests that RFDI has additionally contributed to the promotion of exports as far as the major recipients of RFDI are concerned.

When Ranbaxy and Mylan are excluded from the list of RFDI firms in drug and medicines and compare the export intensity of remaining RFDI firms with that of domestic firms (based on prowess data) we find that export intensity of the RFDI firms are lower than that of domestic firms. *Table 5* shows the export intensity of RFDI firms and domestic firms[7].

Table 5: Export as Percentage of Sales (%)

Year	*Domestic Firms*	*RFDI Firms in Medicines Manufacturing (Excluding Ranbaxy and Mylan)*
2008-09	38.68	27.48
2009-10	38.25	37.87
2010-11	39.29	32.24
2011-12	44.08	20.72

Source: Same as Figure 1.

The drugs and medicines sector was most attractive to foreign investors within the healthcare sector. Foreign investors used brownfield as the preferred route in this sector. Having faced with the problem of drying up of R&D pipeline and expiry of blockbuster patents, the global pharma majors who wanted to get into the business of generic drugs, found it easy to acquire already established generic firms. A very high share of the RFDI has been used only for acquiring established firms with high export intensity. In export front we do not find any indication of the drugs and medicines sector benefiting from liberalization of FDI.

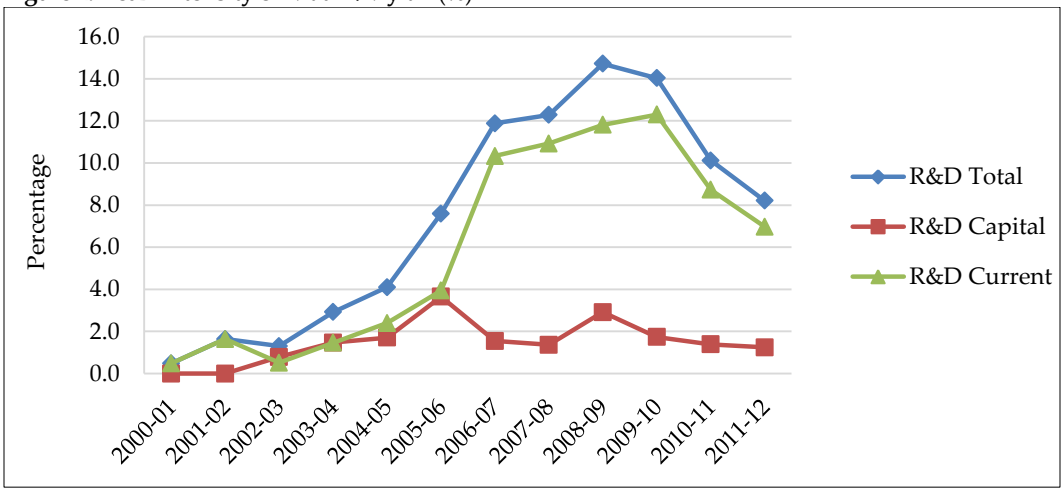
Even if the sector does not benefit in terms of promotion of exports, it is probable that foreign investors would invest more in R&D. R&D is required for the development of new technologies as well as adaptation of technologies already available in foreign countries to local requirements. Therefore, it is generally expected that the R&D expenditure would increase with more foreign investments coming in. It should be noted that R&D investments in the context of FDI depends on many other factors such as motive of the firm, patent rights, competition from local firms, etc. Analysis of the data shows that three-fourth (76.8%) of the R&D in drugs and medicines has been contributed by Ranbaxy and Mylan. However, during the four year peiod of our analysis the R&D intensity (R&D as

[7] Domestic firms do not include the taken over firms - Ranbaxy, Matrix, Dabur, Shanta Biotechnics and Paras, and the foreign firms.

percent of sales) of both the firms is found to have declined – from 11.8 per cent in 2008-09 to 6.4 per cent in 2011-12. In order to find out the trends in R&D after the acquisition, an analysis of the R&D current and capital expenditure of both the firms have been attempted.

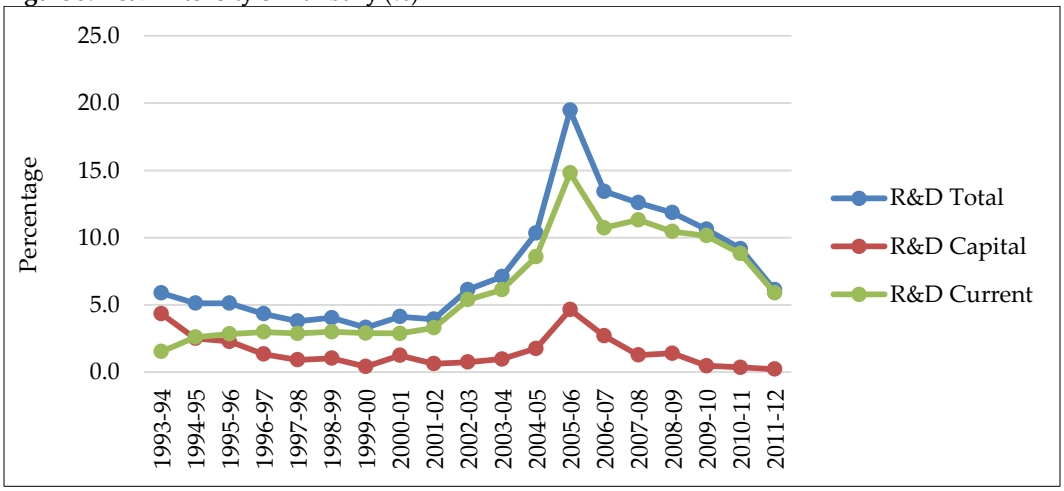
Quite different scenarios are found in the case of both the firms (*Figure 2 & 3*). The capital and current R&D spending of Matrix/Mylan has been on the rise before acquisition in 2006. While the current R&D expenditure continued to grow for a few more years after the acquisition, the capital R&D spending began to decline immediately after the takeover. This shows that creation of new R&D facilities was not the priority of the parent firm. Whereas in the case of Ranbaxy, both the current and capital expenditure had exhibited

Figure 2: R&D Intensity of Matrix/Mylan (%)



Source: Same as Figure 1.

Figure 3: R&D Intensity of Ranbaxy (%)



Source: Same as Figure 1.

declining trend even prior to the takeover. The company had invested more in R&D in the hope of bringing more new molecules into the market. But with the failure of a number of molecules it had developed at various stages of development, the company decided to rationalise its R&D investments (Chaudhuri, 2005; Joseph, 2016). After the acquisition, the current and capital expenditure continued to decline. It is possible that the R&D spending of the takenover firm would undergo a change in the process of synchronisation of the R&D activities of the parent firm. However, a decline in overall R&D spending would be an indication of lack of interest of the investor in the development of new technologies or transfer of technologies. Given the lower cost of R&D in India, one would expect foreign investors would invest for the creation of new R&D facilities. R&D activities in India are estimated to be 60–65 per cent cheaper as compared to the costs in the US. Labour cost in India is in the range of 10–15 per cent of similar costs in the US. There is 25–50 per cent reduction in the upfront capital requirements in setting up R&D projects in India due to locally fabricated equipment and high quality local technology/engineering skills (IBEF 2011). Despite these favourable conditions in India, declining R&D investments by the RFDI firms indicates that India may not be benefiting from transfer of better technologies and development of new technologies as was expected in the industrial policy statement of 1991. All these (49 firms) are integrated firms engaging in R&D and production and include pharma majors such as Abbot, Bayer, Fresenius Kabi, etc. and therefore the argument that R&D investment is low since their focus is on production may not be applicable in this context.

Medical Devices / Equipment

The medical devices/equipment (ME) industry can be broadly classified into four broad categories: (a) medical disposables and consumables, (b) medical electronics, hospital equipment and surgical instruments, (c) implants, and (d) diagnostic reagents (Dept. of Pharma 2015). This industry in India is largely import driven, meeting 65 per cent of the requirements through imports. In some important categories, import dependence is upto 80 per cent (Dept. of Pharma 2015). Efforts to develop indigenous industry have been hampered by lack of standardization, certification and quality approval mechanism (Dept. of Pharma 2015).

There are 24 firms in our sample in medical equipment (ME). Firms such as Samsung Medison (India) Pvt. Ltd. Have high imports to sales turn over ratio. Interestingly, there are also firms which are highly export oriented. Kob Medical Textiles Pvt. Ltd. earns 94 per cent of sales from exports. GE Medical Systems (India) Pvt. Ltd. has 68 per cent of sales turn over from exports. Kob Medical textiles (an EOU) explained that they use the "base in Coimbatore above all to make high-volume products the manufacturing of which would no longer be profitable in Germany."[8] On the other hand, a large part of the income of GE Medical Systems comes from Engineering and R&D services. During 2011-12 share of services was 42 per cent. Practically all it came from exports to related parties abroad with

[8] http://www.kob.de/en/company/internationally-linked-production-sites/kob-india.html

GE Medical Systems Inc., USA, accounting for a little more than half. There is every possibility that services accounted for more than half of the export earnings of the company. Incidentally, the company is located in Export Promotion Industrial Park which makes it obligatory for the company to export. There is, however, another possibility that what is exported from India may not be of high quality and high tech products (Deloitte and CII 2000). Overall, the 14 firms in our sample are less export oriented and R&D intensive as compared to drugs and medicines (MD).

The inverted tariff structure of medical devices industry is a major reason for import dependence. There is 5-7.5 per cent tariff on imported finished equipment and 10 per cent tariff on the import of inputs (USITC 2010). Import of inputs additionally attracts 4 per cent special additional duty[9]. Unless the inverted tariff structure in the medical devices sector change, we may not expect much RFDI in this sector: firms would prefer to import into India rather than undertaking FDI to produce within India.

In the manufacture of chemical substances (MC), the share of foreign investment inflow is very small (10 firms) – 1.5 per cent. There is only one firm - Avantor Performance Materials (I) Pvt Ltd – formerly Ranbaxy Fine Chemicals Pvt Ltd -- figuring in our sample of 49 firms. The company focuses in the production of performance materials that are used in the manufacture of pharmaceutical, biopharmaceutical and electronics products. Manufacture of chemical substances used in the production of pharmaceuticals, the bulk drugs, is the technology intensive phase of production of pharmaceuticals. Bulk drugs manufacture is more capital intensive as compared to formulations, the finished dosage forms. The Hathi Committee (1975), which looked into the measures to be adopted for the development of Indian pharmaceutical industry found that bulk drugs are more capital intensive and pointed out that foreign companies had resisted governmental suggestions to enter into the basic stage of drug production in a big way. The report of the Committee shows that while increasing the production of formulations by Rs. 330 crore would require an investment of Rs. 100 crore, increasing production of bulk drugs by Rs. 150 crore would require an investment of 125 crore. This means that capital requirement in the production of bulk drugs is four times as compared to formulations. In the light of the above discussions, it appears that in the manufacture of drugs and medicines (formulations) and related chemical substances (bulk drugs) the focus of foreign investment has been on formulations, which is less capital and technology intensive and more profitable. In the Indian pharmaceutical industry as a whole, the focus has been cantered on formulations in production as well as exports, after the economic reforms. The economic reforms have led to deindustrialization of bulk drug segment and had become majorly dependent on China for bulk drugs requirements. This has led to challenges in public health front as well as national security

[9] 'No FDI possible in medical devices unless inverted duty structure is rationalized: AIMED', *Economic Times*, 14 January 2015, http://articles.economictimes.indiatimes.com/2015-01-14/news/58066389_1_duty-structure-tax-structure-level-playing-field (accessed on 21 December 2015).

front[10]. The Government is in the process of re-energising the sector. Recently, Government of India declared its decision of establishing mega bulk drug manufacturing parks, based on the recommendations of Katoch Committee report, to attract producers.

4. Foreign Investment in Healthcare Services

The composition of inflows into healthcare services is quite different from that of healthcare manufacturing. Unlike manufacturing, investment by private equity type is the predominant investor and non-acquisition is the main route for the investment. Details of the inflow into the services sector are given in *Table 6*.

In healthcare services sector, more than half (52.41%) of the inflow is in hospitals and clinics (SH) – $1289.5 Mn. There are 72 hospitals and clinics in India which received foreign investment inflows during the period under study. The private investment is very critical in India's healthcare as the share of private sector in healthcare services has been on the rise. The share of private sector in hospitals has increased from 18.5 per cent in 1974 to 75 per cent in 2000 (Hooda 2015). It is estimated that 54.3 per cent of medical institutions, 75 per cent of hospitals, 51 per cent of hospital beds, 75 per cent of dispensaries and 80 per cent of qualified doctors are in the private sector (Hooda 2015). In order to understand the nature of foreign investment in hospitals and clinics in India, a detailed description of inflows into the top 10 recipients is given in *Table 7*.

Table 6: Inflow of Foreign Investment in different Service Subsectors in Healthcare

Sub-sector	*Inflow ($mn)*	*Entry route*			*Share of Non-acquisition*	*Type of investor*			
		Acquisition	*Non-Acquisition*	*Strategic*		*RFDI*	*PEFI*	*IRFI*	*OPFI*
SF	58.22	0.40	57.82	0.00	99.31	36.42	17.66	4.14	0.00
SH	1289.50	306.28	976.85	6.37	75.75	175.39	955.30	151.25	7.56
SL	190.57	101.19	89.38	0.00	46.90	41.02	141.92	7.63	0.00
SS	51.26	4.29	46.97	0.00	91.63	26.30	24.96	0.00	0.00
ST	133.53	12.62	120.91	0.00	90.55	64.49	65.90	3.14	0.00
SC	149.03	56.36	92.57	0.10	62.12	65.03	79.59	4.41	0.00
SR	388.75	15.28	373.47	0.00	96.07	356.77	29.58	2.40	0.00
SW	184.33	13.33	171.00	0.00	92.77	149.14	34.16	1.03	0.00
SO	15.22	0.00	15.22	0.00	100.00	0.00	11.61	3.61	0.00
Total	**2460.41**	**509.75**	**1944.19**	**6.47**	**79.02**	**914.56**	**1360.68**	**177.61**	**7.56**
				Percentage to total					
SF	2.37	0.08	2.97	0.00		3.98	1.30	2.33	0.00
SH	52.41	60.08	50.24	98.45		19.18	70.21	85.16	100.00

[10] Ajit Doval, the National Security Advisor of India, had expressed concern over the overdependence on China for bulk drugs. See, 'Overdependence on China for drug ingredients worries NSA', *The Times of India*, 26 November 2014, http://timesofindia.indiatimes.com/india/Overdependence-on-China-for-drug-ingredients-worries-NSA/articleshow/45278715.cms (accessed on 23 December 2015).

Sub-sector	*Inflow ($mn)*	*Entry route*			*Share of Non-acquisition*	*Type of investor*			
		Acquisition	*Non-Acquisition*	*Strategic*		*RFDI*	*PEFI*	*IRFI*	*OPFI*
SL	7.75	19.85	4.60	0.00		4.49	10.43	4.30	0.00
SS	2.08	0.84	2.42	0.00		2.88	1.83	0.00	0.00
ST	5.43	2.48	6.22	0.00		7.05	4.84	1.77	0.00
SC	6.06	11.06	4.76	1.55		7.11	5.85	2.48	0.00
SR	15.80	3.00	19.21	0.00		39.01	2.17	1.35	0.00
SW	7.49	2.62	8.80	0.00		16.31	2.51	0.58	0.00
SO	0.62	0.00	0.78	0.00		0.00	0.85	2.03	0.00
Total	**100.00**	**100.00**	**100.00**	**100.00**		**100.00**	**100.00**	**100.00**	**100.00**

Note: Same as Table 1.
Source: Same as Table 2.

Table 7: Top 10 Indian Hospitals and Clinics in terms of Inflow of Foreign Investment
(Sept. 2004 to March 2013)

Rank	*Indian Hospital/Clinic*	*Foreign Investment (US$Mn.)*	*Foreign Investor*	*Investment from*	*Nature*	*Route*
1	Aster DM Healthcare Pvt. Ltd.	99.87	Olympus Capital Asia Investments Ltd.	Mauritius	PEFI	Acquisition
		13.42	Union Investments Pvt. Ltd.	Mauritius and Malta	PEFI	Non-acquisition
2	Columbia Asia Hospital Pvt. Ltd.	52.01	International Asia Hospitals	Mauritius	RFDI	Non-acquisition
		59.02	International Columbia 2004	Mauritius	RFDI	Non-acquisition
		1.57	Columbia Asia Hospital Pvt. Ltd.	Mauritius	RFDI	Non-acquisition
3	Apollo Hospitals Enterprises Ltd.	111.21	Apax Mauritius FDI One Ltd.	Mauritius	PEFI	Non-acquisition
4	Max Healthcare Institute Ltd.	76.07	International Finance Corp.	USA	PEFI	Non-acquisition
		10	Madison Holdings Ltd.	Mauritius	PEFI	Non-acquisition
		16.14	Parkville Holdings Ltd./Warburg N Pincus	Mauritius	PEFI	Non-acquisition
5	Narayana Hrudayalaya Pvt. Ltd.	11.53	Ambadevi Mauritius Holdings Ltd.	Mauritius	PEFI	Non-acquisition
		38.44	Ashoka Investment Holdings Ltd.	Mauritius	PEFI	Non-acquisition
		49.97	JP Morgan Mauritius Holdings Ltd.	Mauritius	PEFI	Non-acquisition
6	Vasan Healthcare Pvt. Ltd.	4.03	EGCS Investment Holdings.	Mauritius	PEFI	Acquisition

Rank	Indian Hospital/Clinic	Foreign Investment (US$Mn.)	Foreign Investor	Investment from	Nature	Route
		45.07	Lathe Investment Pvt. Ltd.	Singapore	PEFI	Acquisition
		13.41	Sequoia Capital India Growth Investments	Mauritius	PEFI	Acquisition
		5.6	Sequoia Capital India II LLC	Mauritius	PEFI	Acquisition
		5.6	Sequoia Capital India Investments III	Mauritius	PEFI	Acquisition
7	Manipal Health Enterprises Pvt. Ltd.	11.01	Kotak India Pvt. Equity Fund	Mauritius	PEFI/ IRFI	Non-acquisition
		8.23	Manipal Health Systems International	Mauritius	IRFI	Non-acquisition
		47.34	MEMG International Ltd.	Mauritius	IRFI	Acquisition
8	Quality Care (India) Ltd.	41.15	Dexelco Ltd.	Cyprus	PEFI	Acquisition
		20.57	Yecla Ltd.	Cyprus	PEFI	Acquisition
9	Sevenhills Healthcare Ltd.	57.46	Airro (Mauritius) Holdings I /JP Morgan	Mauritius	PEFI	Non-acquisition
10	Global Health Pvt. Ltd.	56.96	GL Asia Mauritius Ltd.	Mauritius	PEFI	Non-acquisition

Source: Same as Table 2.

The top 10 recipients of inflows in the hospitals and clinics sector accounted for two-third (66.35%) of the inflows indicating huge concentration among the recipients. Out of the 10 hospitals and clinics, only Columbia Asia Hospitals received RFDI. In the other nine cases, the investments were made by private equity firms. In the case of Manipal Health Enterprises, the foreign investment inflow is nothing but Indian private investments routed through a tax haven. The investments by private equity investors, aimed only at profit making, constitutes 87 per cent of the inflows in to the top 10 hospitals and clinics. Similar is the trend in the nature of investment in the entire hospitals and clinics sector (all 72 hospitals and clinics) - only 14 per cent is RDFI. This raises major concerns for public health in countries like India where the out of pocket expenditure on healthcare has been pushing millions into poverty. The draft National Health Policy 2015 states that catastrophic health expenditure is a major factor contributing to poverty in India: every year, more than 63 million people are pushed into poverty due to health care expenditure. It is likely that these hospitals driven by the need of the private equity investors to create a ripple effect and set the pattern for other private hospital chains as well. Following table (*Table 8*) shows that there are many people who do not take treatment when they are ill for various reasons and financial constraints is the most significant among them.

Table 8: Percentage of Ailments not Treated for Their Reasons during Different Rounds of NSS on Morbidity and Healthcare

Reasons for not treating ailments	*2004 (60th Round)*		*1995-96 (52nd Round)*		*1986-87 (42nd Round)*	
	Rural	*Urban*	*Rural*	*Urban*	*Rural*	*Urban*
No medical facility available in the neighbourhood	12	1	9	1	3	0
Facility available, but lack of faith	3	2	4	5	2	2
Long waiting	1	2	1	1	0	1
Financial problem	28	20	24	21	15	10
Ailment not considered serious	32	50	52	60	75	81
Others (including not reported)	24	25	10	12	5	6
	100	100	100	100	100	100

Note: Data of NSS 42nd and 52nd rounds are accessed from report 441(52/25.0/1) and of 60th round from report 507 (60/25.0/1)
Source: Compiled by Authors.

Sixty per cent of health care expenses in India are out of pocket expenditure (WHO 2012). Given the very high share of out of pocket expenditure in healthcare, many people might opt not to take treatment when they are ill. The different rounds of National Sample Survey on morbidity and healthcare as shown in the above table shows that financial problem is the most important constraint preventing people with ailments from getting treated[11]. The percentage of sick people, who are not taking any treatment on account of financial reasons, especially in rural areas, is on the rise. With a very high share of out of pocket expenditure in health care, it is quite natural that the poor people will find it difficult to seek health care services when they are ill. Given the nature of public health financing in India, the contribution of foreign investment to the public at large may have serious adverse implications and thus demands careful scrutiny.

Research and Development

Another important area of healthcare services is R&D (SC and SR). It has been expected that there will be more inflow of foreign investment into R&D in healthcare sector as India has introduced a set of policy changes since the early 1990s to attract foreign investors in R&D. In order to attract foreign investment in high priority industries, requiring large investments and advanced technology, the Industrial Policy Statement of July 24, 1991, provided that automatic approval would be given for direct foreign investment up to 51 per cent foreign equity and automatic approval for all foreign technology collaborations. Investment above 51 per cent would be considered on a case by case approach. The FDI cap was raised to 74 per cent in 2000[12] and to 100 per cent in 2003. A few industrial sectors

[11] 'Ailment not considered serious' is not a constraint.

[12] Press note no 2 (2000 series) of Department of Industrial Promotion and Policy, Ministry of Commerce and Industry, Government of India.

relevant for healthcare sector have been placed under the category of high priority industries. X-ray equipments, scientific and electrometrical instruments, laboratory equipments and drugs and pharmaceuticals were listed under this category. However, in drugs and pharmaceuticals the application of liberalization of foreign investment and foreign technology collaboration rules were made subject to the Drug Policy. Modifications to the 'Drug Policy 1986' incorporated in September 1994 opened the door for the introduction of new rules on foreign investment and foreign technology collaboration into drugs and pharmaceuticals sector. The modifications to the Drug Policy also recognised the need of attracting greater investments in the sector "in order to update the existing technologies and for bringing into the country technologies which are not currently available".[13] In order to attract more investment (irrespective of foreign or domestic) into drugs and pharmaceuticals, the modified policy provided for exemption from drug price control system to those drugs which have not been produced anywhere else in the world but developed through indigenous R&D.[14]

Introduction of product patent rights in pharmaceuticals is another major change in policy which was expected to increase the foreign investments in R&D in healthcare sector. India introduced product patent rights along with process patent rights in pharmaceuticals with effect from January 2005 to meet its obligations under the Trade Related aspects of Intellectual Property Rights (TRIPS) Agreement of WTO. The main economic rationale for granting patents is that it will incentivize investment in innovation. It is argued that without patent protection, others who did not incur any R&D investment, may imitate new products thereby limiting the chances of innovator recouping the R&D investments. Studies have shown that patents are most significant for the protection of innovations in the pharmaceuticals industry (Levin et al., 1987). Their index of effectiveness of both the process patents and product patents shows that these are most effective in pharmaceuticals[15]. According to Mansfield (1986) around 65 per cent of pharmaceuticals innovations would not have happened without patent protection. Thus there are studies establishing a direct link between patent protection and innovation in pharmaceuticals industry. There are some other studies arguing that there exists a relationship between patent protection and FDI. They argue that strong patent rights would give an assurance to foreign investments that their technology will not be copied. Mansfield (1994) finds that

[13] Para. 7 of Modifications in Drug Policy 1986. The Policy is available at http://nppaindia.nic.in/

[14] The exemption was for a period of 10 years.

[15] The index of effectiveness of patent protection developed by the authors shows that patents, both product and process patents, are most effective in pharmaceuticals. Their index has seven points and there was a direct relationship between the progression in the index points and effectives of patent protection: i.e., patent protection would me most effective as an instrument for the protection of innovations in those industries raking top in the index. Those industries obtaining more than 5 points in the index, were treated as industries where patents are highly effective. In the case both process patents and product patents pharmaceuticals industry ranked the top in the index: process patents – 4.9 and product patents – 6.5.

MNCs based in US were sensitive to intellectual property rights (IPRs) in major developing countries while deciding on establishing new R&D facilities in foreign countries. Those MNCs were less likely to establish new R&D facilities in those countries where enforcement of IPRs is weak. Similar conclusions were reached by a few other scholars - Blyde and Acea (2002) and Yang and Maskus (2001). The response of Novartis when it lost the case in the Supreme Court of India over its claim for patent on *imatinib mesylate* molecule that it would not invest any further in R&D in India and would shift its already existing R&D facilities from India to a more favourable destination indicates that IPRs matters seriously for the investors.[16]

However, there are scholars arguing that there is no direct one to one relationship between strength of IPR protection inflow of foreign investment in R&D. If product patents itself was to result in more innovations, Indian pharmaceuticals market would have been flush with innovations after 1911, which is not the reality[17]. There are many factors influencing the relationship between IPRs and foreign investments. Maskus (2000) raises the question that why Sub-Saharan Africa and Eastern Europe have not become major destinations, among the developing countries, for FDI inflows if strong patents alone was sufficient to attract FDI? Apart from IPRs, FDI can also be dependent on other factors such as the science and technology (S&T) base of the host country, depending on the motive of the MNCs. According to Florida (1997) MNCs might invest in R&D abroad to gain access to local knowledge. In those investments aimed at augmenting the knowledge base of the MNC, the S&T base of the target country becomes crucial. For augmenting of the knowledge base, the FDI is directed to countries with relatively well developed science base (Walter 1998). Such FDI will have spillover effects for the local environment as the R&D facilities would provide employment and learning opportunities for the local researchers. But, the nature of the spillover would depend on the overall national innovation system, which includes factors such as higher education, public funding for R&D, IPRs, venture capital, etc. (Walter 1999). MNCs might also engage in FDI in R&D to adapt already available technology to the local markets (Hakanson and Nobel 1993). As the local demand gets more sophisticated, establishment of local R&D facilities would become more useful in helping a firm to adapt its products better to the local needs (Bartlett and Ghoshal 1990; Hakanson 1990; Vernon 1966)[18].

During the period under study, India received foreign investment inflow of $537.78 Mn. in R&D in healthcare sector from those investors investing above $1 Mn. There are 45 firms classified by us into this sector. Investments in R&D have been in the areas of clinical

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[16] 'Novartis says SC verdict a setback, won't invest in R&D in India', *The Times of India*, April 1, 2013, available at http://timesofindia.indiatimes.com/business/india-business/Novartis-says-SC-verdict-a-setback-wont-invest-in-RD-in-India/articleshow/19326368.cms (accessed on 17 Dec. 2015).

[17] The Indian Patents and Design Act of 1911 provided for product patents in pharmaceuticals. Product patents in pharmaceuticals was repealed by the Patents Act 1970.

[18] See, Dhar and Joseph (2012) for a detailed review of literature on FDI, IPR and technology transfer.

research (SC), scientific testing and analysis and biotechnology (SR). In R&D in healthcare services, unlike hospitals and clinics, RFDI accounts for more than three-fourth (86.6%) of the inflow. Investment through non-acquisition route constitutes a significant share - 71.5 per cent. Following *Table 9* gives the details of top 10 recipients of investments in R&D in healthcare services.

Table 9: Top 10 Recipients of Foreign Investment in R&D in Healthcare Services
(Sept. 2004 to March 2013)

Rank	*Company in India*	*Foreign Investor*	*Foreign Investment (US$Mn.)*	*Investment from*	*Nature*	*Acquisition [Y/N]*
1	Pfizer Pharmaceutical India Ltd.	PAH INDIA Holding 1 BV	137.86	Netherlands	RFDI	N
		Pfizer Luxembourg Sarl	109.7	Luxembourg	RFDI	N
		Warner Lambert Cc.	22.64	USA	RFDI	N
2	Avesthagen Ltd.	FID Funds (Mauritius) Ltd.	13.43	Mauritius	PEFI	N
		GLG Emerging Markets Special Situations	9.57	Cayman Islands	PEFI	Y
		Vilmorin & CIE	6.78	France	RFDI	N
		Lord Karan Bilimoria	0.37	U.K.	IRFI	Y
3	GVK Biosciences Pvt. Ltd.	Sequoia Capital India Growth Investments	25.40	Mauritius	PEFI	N
4	Bristol Myers Squibb (India) Pvt. Ltd.	Bristol Myers Squibb Pharmaceuticals Int.	9.55	Netherlands	RFDI	N
		Bristol Myers Squibb Pharmaceutical Hold	5.44	Netherlands	RFDI	N
		Bristol Myers Squibb Pharmaceutical Hold	5.19	Netherlands	RFDI	N
5	Veeda Clinical Research Pvt. Ltd.	Actis Pharma Research India Ltd. and Actis Pharma Research South Asia Ltd.	17.98	Mauritius	PEFI	N
6	Lotus Labs Pvt Ltd.	Actavis Group HP	17.74	Iceland	RFDI	Y
7	Siro Clinpharm Pvt. Ltd.	3I Research Mauritius Ltd.	9.37	Mauritius	PEFI	Y
		3I Research Mauritius Ltd.	0.33	Mauritius	PEFI	N
		Baring India Pvt. Equity Fund Ltd.	2.85	Mauritius	PEFI	N
		Manu Daftary	2.03	USA	IRFI	Y
8	Invitrogen Bioservices (India) Pvt. Ltd.	Life Technologies Corp.	10.32	USA	RFDI	N
		Invitrogen Corp.	1.87	USA	RFDI	N
9	Accutest Research Laboratories (India) Ltd.	GPC Mauritius Xi LLC	8.93	Mauritius	PEFI	Y
		Aureos Offshore (India) Opportunites Fund LLC	0.39	Mauritius	PEFI	Y
10	Evotec (India) Pvt. Ltd.	Evotec AG	7.48	Germany	RFDI	Y

Source: Same as Table 2.

Pfizer Pharmaceutical India Ltd. has received the largest amount of foreign investment in R&D. More than two-third (69.5%) of the investment in R&D has been accounted by this firm alone. It is a is subsidiary of Pfizer engaging in the R&D in "veterinary medicines on lab scale and pilot plant scale for Pfizer Inc., USA and its affiliates" and also in trading in exports and empty vegetable capsules (PPIPL 2011). Most probably, the cost advantages of conducting R&D in India might have encouraged Pfizer to make such a large investment in R&D. Whether the R&D activities of the Indian subsidiary caters only to the interests of its parent firm or it also caters to the Indian market is not clear.

Given the nature of activities, recipients of foreign investments in R&D can be broadly categorised into three types -- R&D for parent firms, joint ventures and contract research organizations. Firms such as Pfizer Pharmaceutical India Ltd., Evotec (India) Pvt. Ltd. and Invitrogen Bioservices (India) Pvt. Ltd. cater to the R&D requirements of their parent firms. Invitrogen Bioservices (India) Pvt. Ltd. is a subsidiary of Thermo Fisher Scientific Inc. and provides services that supports research in academic institutions and pharmaceuticals and biotech laboratories. It supplies reagents, kits, and benchtop devices in India and internationally. Its two major products/services are prepared culture media for development or maintenance of micro-organism (including viruses and the like) or of plant, human or animal cells and machinery, plant and laboratory equipment for the treatment of materials. Evotec (India) Pvt. Ltd. is a subsidiary of Evotec AG. The Indian subsidiary was undertaking the chemistry operations of its patent company. The parent company decided to exit its India operations by 2014[19].

There are subsidiaries of foreign firms such as Bristol Myers Squibb (India) Pvt. Ltd. (subsidiary of Bristol Myers Squibb based in the US) focusing on the development of new drugs on their own and in joint ventures with Indian firms. The company engages in the R&D for the development of new drugs (chemical entities and biologics). It has entered into a collaboration with Syngene, a contract research organization (CRO) of Biocon group, to establish a R&D unit in Bangalore - Biocon Bristol-Myers Squibb Research and Development Centre involved in target identification, lead discovery, lead optimization in the early stages of pharmaceutical development and clinical biomarkers R&D. Syngene has R&D collaboration with a few other foreign firms as well -- Abbot (nutrition R&D Centre) and Endo Pharmaceuticals USA (to develop new therapeutically molecules against cancer).

The Indian companies, other than the foreign subsidiaries in the list of top 10 recipients, are all CROs. The companies Avesthagen Ltd., GVK Biosciences Pvt. Ltd., Veeda Clinical Research Pvt. Ltd., Lotus Labs Pvt.Ltd., Siro Clinpharm Pvt. Ltd., and Accutest Research Laboratories (India) Pvt. Ltd. are CROs. Avesthagen has R&D in biopharma, bionutrition and bioagriculture. It has received RFDI from Vilmorin & CIE, major developer of seeds based in France. Accutest Research Laboratories (I) Pvt. Ltd. operates as a CRO having

[19] 'Evotec to realign Discovery Chemistry Operations', *News Release*, 8 July 2013, https://www.evotec.com/uploads/cms_article/2417/PR_2013-07-08_Thane_e.pdf (accessed on 20 Dec. 2015).

operations in other countries such as USA, Brazil, Netherlands, etc. that provides clinical research services for the pharmaceutical and drug development companies.

Contract research arrangements are for fixed periods on an identified therapeutic area. The service provider receives research funding and milestone payments. The low cost of conducting research in India is an important factor for the outsourcing of research to India. Lower costs appear to be the major reason for outsourcing R&D activities to CROs. Outsourcing of pharma R&D services to CROs is estimated to be 52 per cent of global pharma R&D in 2013 and this share is likely to go up to 65.7 per cent in 2015[20]. The cost advantage of conducting clinical trials in India is more than 50 per cent during phase I studies and more than 60 per cent during the phase II and phase III studies (ICRA 2011). More than half (52%) of the contract research in India takes place in clinical trials[21]. Abolition of restrictions on foreign technology collaboration agreements might have provided added advantages to foreign firms. The technology collaboration agreements are signed secretly and are is not available to the public. Through these agreements it is possible to prevent all possibilities of leakage of technologies. In contract research there would be upfront, milestone and royalty payments depending on the nature of collaboration. But the ownership of the technology developed will always be held by the foreign partners. The contract research arrangements taking place in India *per se* do not result in any technology transfer and in that sense do not amount to competence building. However, they provide an opportunity for firms to improve their skills in specialised areas of new drug discovery and development and to strengthen their finances.

In the case of subsidiaries of foreign firms, from among the list of top 10 recipients of foreign investment inflows, the entire inflow was RFDI. Whereas the Indian CROs receiving foreign investment was almost entirely PEFI. In a few cases, IRFI also was invested. The only exception is Vilmorin & CIE's investment in Avesthagen, which as RFDI. The collaboration of Avesthagen with Vilmorin & CIE is probably an indication that some of the Indian CROs are graduating into higher levels of R&D chain and are building up their own niche areas with collaboration of foreign firms. This, however, needs to be established with more case studies. Another example of CROs graduating the R&D chain is Suven Lifesciences[22]. Suven Lifesciences, which started off as a generic company and then moved on to contract research and manufacturing services and finally reached contract research projects (CRPs). CRPs are an advanced level of contract research in which the foreign and Indian partners jointly discover and develop and the risk is also shared proportionally. Whereas in lower levels of contract research, the risk is more with the foreign partner and the Indian partner would just get paid for the job they do. In CRPs

[20] Annual Report 2014-15, Syngene. http://www.syngeneintl.com/Media/Default/pdf/investor_relations/annual%20report%20-2015final%20version%20dec.pdf (accessed on 20 Dec. 2015).

[21] Pre-clinical trials constitute 30% and biology and chemistry research constitutes 18% of the business. For details see ICRA (2011).

[22] It does not figure in our sample of 49 firms.

Indian partner would get upfront payments and milestone and royalty payments depending on the progress and commercialisation of the product. However, the compound is owned by the MNC. Suven Lifesciences now focuses its research on central nervous system (CNS) disorders. Research in CNS disorder like Alzheimer's disease or depression is very difficult as quantitative measurements are not possible, unlike in the case of diseases like hypertension. This requires expertise and Suven has brought in Eli Lilly as its collaborator in CNS research. The company now has 13 molecules in various stages of pre-clinical development[23].

5. Conclusion

In healthcare sector, most of the inflow of foreign investment was directed towards the manufacturing sector. The drugs and medicines subsector of the manufacturing sector received bulk of the inflow into the healthcare sector. A very high share of the investment into the manufacturing was RFDI and the preferred route of investment was acquisition. However, most of the inflow into the healthcare manufacturing was for the acquisition of leading Indian firms in the drugs and medicines resulting in the transfer of ownership and not in new investments. As the global pharma majors were forced to get into the business of generic drugs, they targeted leading Indian generic firms which were more export oriented. With the exception of takenover Indian firms, the RFDI firms in the drugs and medicines sector which received most of the investment are found to be less export oriented than the domestic firms in drugs and medicines. The study of the 49 firms shows that the investment in R&D by RFDI firms is very low. In the case of taken over firms in drugs and medicines, it is found that the R&D intensity of both the capital and revenue spending declined after the takeover. In the healthcare manufacturing in India, it indicates that FDI has not resulted in the percolation of widely acknowledged benefits of FDI – promotion of exports and development of new technologies or transfer of new technologies.

In healthcare services, private equity is the dominant investor and non-acquisition is the preferred route of investment. More than half of the investments came into hospitals and clinics. Except for a few hospitals like Columbia Asia, most of the investment was from private equity type funds. This indicates that the hospitals and clinics in India have been using private equity investments which only look for substantial profits and have no long term commitment for their expansion. This raises serious concerns for public at large in a country like India where the public investment in healthcare is low and out of pocket spending on healthcare is pushing millions of people into poverty. R&D is another major sector for the foreign investment in healthcare services. Unlike in hospitals and clinics,

[23] 'Chairman's Speech' to Shareholders, Suven Life Sciences Ltd, March 2011, http://economictimes.indiatimes.com/suven-life-sciences-ltd/chairmanspeech/companyid-8221.cms (accessed on 27 September 2011).

more than four-fifth of the investment into R&D is RFDI. And more than 70 per cent of the investment was through non-acquisition. There are subsidiaries of foreign firms doing R&D in India for their parent firms. There are also subsidiaries doing R&D on their own and in collaboration with other Indian firms for the development of new drugs. Most of the investment flows into R&D was into the subsidiaries (RFDI) and was mostly through non-acquisition route. Indian CROs is another category of recipients of foreign investment into R&D. Their share in the total inflows is very low and is mostly from private equity. In some cases, Indian CROs seem to graduate from doing piecemeal jobs for the foreign partner and enter to long term collaboration with foreign firms in the same field in selected areas. From the overall analysis of the healthcare sector, it appears that R&D is the only sector where foreign investment is resulting in the development of the capabilities of the domestic sector.

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