CHAPTER 4

INDUSTRY PROFILE

4.1 Pharmaceutical Industry

4.2 Pune: A New Metropolitan City

4.3 Conclusion

CHAPTER 4

INDUSTRY PROFILE

4.1 Pharmaceutical Industry

4.1.1 Introduction

Pharmaceutical industry is a branch of chemical industry. It is involved in discovering, developing, producing and marketing of drugs licensed for medical use.[1]

The Indian pharmaceutical industry ranks among the top five countries by volume (production) and accounts for about 10% of global production. The industry's turnover has grown from a mere US$ 0.3 bn in 1980 to about US$ 21.73 bn in 2009-10. Low cost of skilled manpower and innovation are some of the main factors supporting this growth. According to the Department of Pharmaceuticals, the Indian pharmaceutical industry employs about 340,000 people, an estimated 400,000 doctors, and 300,000 chemists.[2]

4.1.2 History of Pharmaceutical Industry

Humankind has been subjected to disease, illness, and accidents since the beginning of human life. In antiquity, pharmacy and the practice of medicine were often combined, sometimes under the direction of priests. Many people of the world continue the close association of drugs, medicine, and religion or faith.[3] By trial, error and careful observations people understood the value of the plants growing around them. In most of primitive societies practice of treating symptoms resulted in emergence of specialists. These specialists were called as witch doctor, wise women, medicine man, priest, hakim or physician. Plants, some minerals and animal products had been used in early folk medicines.

The Sumerians (3000-2400 BC), inhabited Lower Mesopotamia (the area between the rivers Tigris and Euphrates in modern Iraq), are known to have used plant drugs, wound washing, plasters and bandaging. During the reign of King Hammurabi (6th king of Babylon 1792 -1750 BC, also won Mesopotamia) diagnosis and treatment separated from

[1] Encyclopedia Britannica
[2] http://www.dnb.co.in/SME_cluster_series2012_Indore/PDF/IndustryOverview.pdf, accessed on 20/10/2012
[3] Funk & Wagnall, New Encyclopedia, vol. 20, p323

the preparations of medicines, which was carried out by assistants called apothecaries (historical name for today's Pharmacist or Chemist). Druggists' stall or shops or drug stores were known to be operating in about 1900 BC, in Sippara (a town on the Euphrates River).

Egyptians documented their practice of medicine and surgery in inscriptions on tombs, ceramics and papyri (a form of paper produced by pressing together stems of *Cyperus papyrus)* The discovered papyrus was written in 1500 BC, it records about 875 prescriptions and some 700 drugs derived from vegetables, animal and mineral sources.

For medicine, undoubtedly the most revered Greek philosopher was Hippocrates. Hippocratic medicine used some 300-400 drugs, fewer than employed by Egyptians.

Two great Roman medical men dominate Roman medicine. The first Pedianius Dioscorides (50 – 100 AD), a surgeon, produced a famous *Materia Medica* (a list of materials of animals, vegetable and mineral origin having medicinal use). The second great Roman medical man was Galen (100-129AD), a physician and surgeon. He described some 473 vegetable, animal and mineral drugs. His best formulations were cold creams and ointments.

The shops of drug sellers in Persia about 750 AD and apothecary shops latter appeared, around 850 AD. These had following characteristics

1. Separation of medicine from pharmacy
2. Shops run by educated men with a high code of ethics
3. A precise education was established for apothecaries
4. They prepared a wide range of medicines including classical, Persian and Indian drugs and chemicals[4]

Specialization occurred in the 9th century in the civilized world around Baghdad. It gradually spread to Europe. Physician often both prepared and prescribed medicines; individual pharmacists not only compounded prescriptions but manufactured medicaments

[4] Stuart Anderson, "Making Medicines – A brief history of pharmacy and pharmaceuticals", Pharmaceutical Press, 2005, ISBN 0853695970

in bulk lots for general sale. Till into the 19th century the distinction between the pharmacist as a compounder of medicines and physician as a therapist was not generally accepted.[5]

In the 18th century a man practising pharmacy, whether apothecary or chemist and druggist, made his 'back shop', - the centre of his small scale manufacturing activities. Many pharmaceutical manufacturers of today are able to trace their origins to a small shop. New dosage forms, new processes, new equipment, new chemicals and new products began to arrive in the 1820s, and rapidly increased in number as the decades went by.[6] By 19th century many drug stores in Europe and North America developed into larger pharmaceutical companies.

4.1.3 Pharmaceutical Industry in India

From ancient time Indian people were practicing two systems of medicine. One was Ayurvedic medicine, which depends on the combination of various herbs, minerals like gold, copper, etc.. Second, Arabian system of medicine. This was same period when Allopathic and Homeopathic medicine were evolving in Western countries.

It was the British who first brought allopathic medicine to India for their personal use. Initially the medicines were imported mainly from Germany & UK. The 1st indigenous production was begun with the establishment of "Bengal Chemical & Pharmaceutical Works" in 1901.[7] Until 1970, Indian pharmaceutical industry remained as small scale, from late 80s it has ventured into bulk drug production, and later on expanded rapidly. It has grown from mere Rs. 237 Cr turnover in 1980, to approximately Rs. 1,04,209 Cr in 2009-10. India is ranked 3rd and 14th in terms of volume and value respectively.[8]

---

[5] Funk & Wagnall, New Encyclopedia, vol. 20, p223

[6] Lesley Richmond, Julie Stevenson, Alison Turton, 'The pharmaceutical industry – a guide to historical records", Ashgate Publishing Limited (25 Jun 2003), p1

[7] Subba Rao Chaganti, 2005,"Pharmaceutical Marketing In India", Excel Books pvt ltd., 1e, p3,

[8] Annual Report 2010-11, Govt of India, Ministry of Chemicals & Fertilizers, Department of Pharmaceuticals, p12

4.1.4 Financial performance of the Drugs and Pharmaceutical Industry

The financial performance of the Drugs and Pharmaceutical industry for the year 2009-10, 2010-11 and the forecast for the year 2011-12 are given in Table below:-

Table 4.1: Drugs and Pharmaceuticals: Growth and Profitability in the year 2010-11 (%age Change over year ago)

Sr. No.	Particulars	Quarterly				Annual		
		June 2011	Sept. 2011	Dec. 2011	Mar 2012	2009-10	2010-11	2011-12
			Estimates	Forecast				Forecast
1	Income	10.9	10	17.9	17.4	15	10.9	14.1
2	Net sales	9.2	11	17.1	16.3	11.9	12.4	13.5
3	Total expenses	11.6	-1.8	18.8	14.8	3.1	19.2	10.3
4	Raw materials	13.6	14	19	16.8	8	14.8	15.9
5	Salaries & wages	15.5	13	13.3	13.6	18.2	21.1	13.8
6	Power & fuel	10.2	24	24	10	2.5	20.1	17.1
7	Selling & marketing	9	15.1	10	9	0.1	11.9	10.7
8	Other expenses	2.8	28	11.1	12.1	-19.3	15.9	13.7
9	Depreciation	9.1	13	11.5	12	14.3	12.4	11.4
10	Interest expenses	15.6	20	25	18	-0.3	6.6	19.4
11	Tax provision	37.5	-78.6	90.6	75.9	108.8	73.6	-37.2
12	PBDIT	17.3	-4.3	19.9	18.9	105.7	-1.1	12.6
13	PAT	15.7	-	7.1	25.8	210.8	-31.6	55.6
14	PBDIT/Net Sales (%)	18.8	17.2	21.5	17.1	21.4	19	18.7
15	PBDIT/Income (%)	22.8	20.8	24.9	20.9	25.4	22.7	22.4
16	PAT/Income (%)	13.7	11.4	14.5	10.9	15	9.2	12.6

(Source: Annual Report 2011-12, Department of Pharmaceuticals, Govt. of India)

Net sales of the Drugs & Pharmaceuticals sector are expected to grow by 17.1 percent y-o-y in the December 2011 quarter as against an estimated 11 per cent growth in the September 2011 quarter. The improvement in sales growth will be largely driven by higher realization of export oriented Pharma companies. The sector generates around 40 percent of its sales from exports. A sharp depreciation in the rupees is expected to result in higher export realisations, which will enhance the overall growth of the sector.

The sector's profitability is expected to remain under pressure. A sharp rise in expenses like raw materials, power & fuel and interest cost is expected to restrict the growth in profits. Raw material expenses are expected to rise by 19 percent in the

December 2011 quarter. The Pharma sector imports raw materials like chemicals intermediates and active pharmaceuticals ingredients (APIs). Imports accounts for 38 percent of the overall raw material cost. A weak rupee will make imports costlier, resulting in a higher rise in raw material cost. Power & fuel cost is expected to increase by 24 percent. With this the PBDIT margin is expected to remain flats at 24.9 percent y-o-y. The net profit of the sector is expected to grow by a mode seven percent as interest cost is expected to rise by 25 percent & the net profit margin is expected to be around 14.5 percent in the December 2011 quarter.

4.1.5 Imports

As per the Directorate General of Commercial Intelligence and Statistics (D.G.C.I.S.) Kolkata, value of imports of "Medicinal and Pharmaceuticals Products" for the period, 2002-03 to 2010-11 is as under:

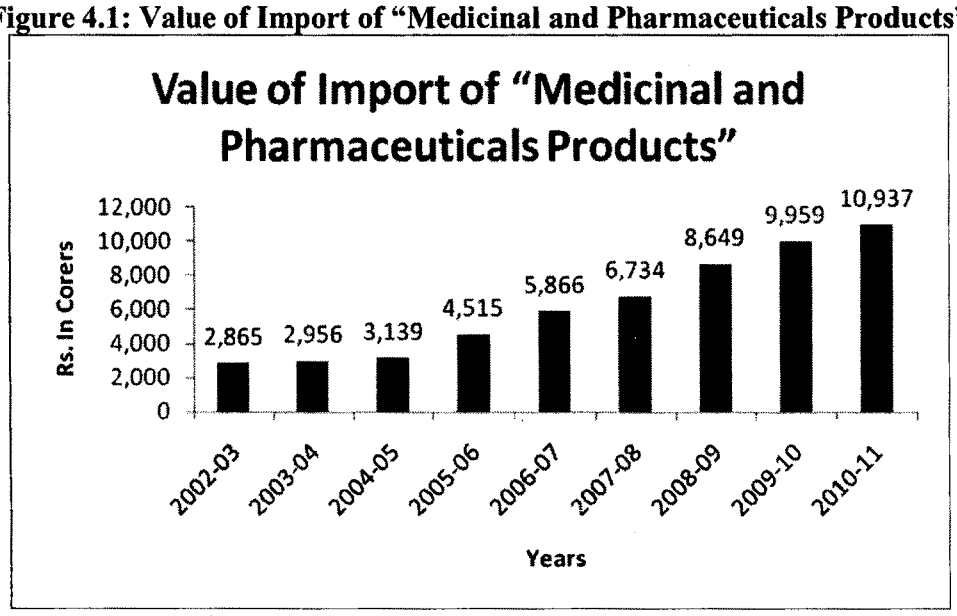
Table 4.2: Value of Import of "Medicinal and Pharmaceuticals Products"

(Rs. in Crore)

Year	Value of Import of "Medicinal and Pharmaceuticals Products"	Growth (%)
2002-03	2,865	-
2003-04	2,956	3.18
2004-05	3,139	6.19
2005-06	4,515	43.84
2006-07	5,866	29.92
2007-08	6,734	14.79
2008-09	8,649	28.43
2009-10	9,959	15.15
2010-11	10,937	9.82

(Source: Annual Report 2011-12, Department of Pharmaceuticals, Govt. of India)

Figure 4.1: Value of Import of "Medicinal and Pharmaceuticals Products"



(Source: Annual Report 2011-12, Department of Pharmaceuticals, Govt. of India)

It may be observed that the imports shown declined in growth in the year 2010-11 compared to previous year. The country is almost self-sufficient in production of most of formulations/ pharmaceuticals products. As such imports are being resorted to on quality & economic considerations and not necessarily due to non-availability from domestic sources. Manufacturers of Drugs & Pharmaceuticals are free to produce any drugs approved by the Drug control authorities.

Import of Drugs & Pharmaceuticals is regulated as per the Foreign Trade Policy of Government of India. Import of some drugs and drug intermediates are restricted under current Foreign Trade Policy. These restrictions are basically due to common HS codes assigned to some narcotic substances or similarity to some Ozone Depleting Substances (ODS) with pharmaceutical products.

4.1.6 Exports

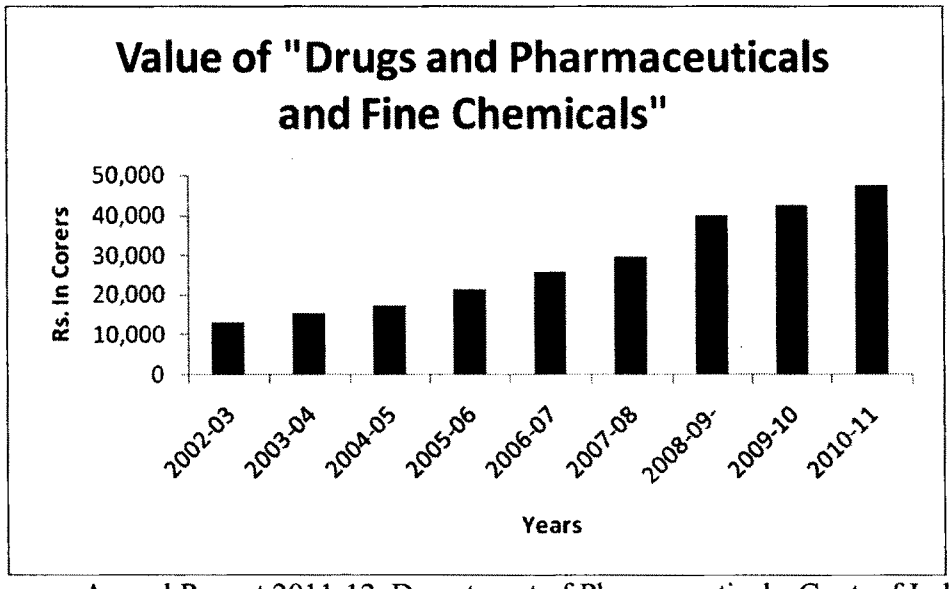
As Per DGCIS, Kolkata Exports of "Drugs and Pharmaceuticals and Fine Chemicals" for the period 2002-03 to 2010-11 are below:-

Table 4.3: Value of "Drugs and Pharmaceuticals and Fine Chemicals" (Rs. in crore)

Year	Value of "Drugs and Pharmaceuticals and Fine Chemicals"	Growth (%)
2002-03	12,826	-
2003-04	15,213	18.61
2004-05	17,228	13.25
2005-06	21,230	23.23
2006-07	25,666	20.89
2007-08	29,354	14.37
2008-09-	39,821	35.66
2009-10	42,456	6.62
2010-11	47,551	12

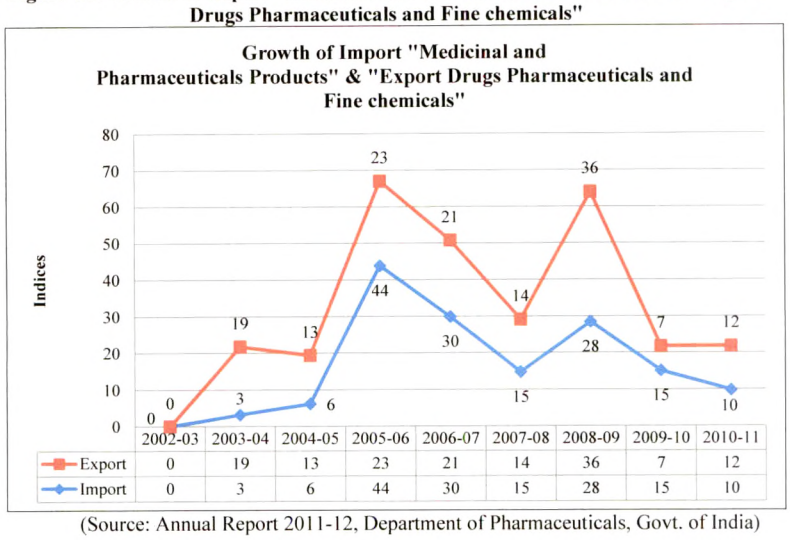
(Source: Annual Report 2011-12, Department of Pharmaceuticals, Govt. of India)

Figure 4.2: Value of "Drugs and Pharmaceuticals and Fine Chemicals"



(Source: Annual Report 2011-12, Department of Pharmaceuticals, Govt. of India)

Figure 4.3: Growth of Import "Medicinal and Pharmaceuticals Products" & "Export Drugs Pharmaceuticals and Fine chemicals"



(Source: Annual Report 2011-12, Department of Pharmaceuticals, Govt. of India)

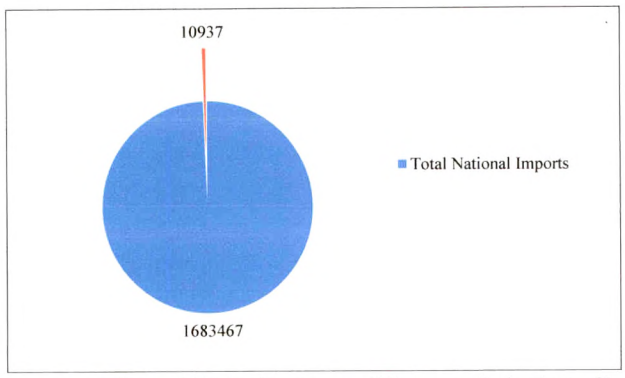
4.1.7 Share in National Trade

Table 4.4: Share in National Trade (Rs. in Crore)

Items/Years	2006-07	2007-08	2008-09	2009-10	2010-11
A: Total National Exports	571779	655864	840755	845534	1142649
(a) Drugs Pharmaceuticals and Fine chemicals	25666	29354	39821	42456	47551
Share in Total Export %	4.5	4.5	4.7	5	4.2
B: Total National Imports	840506	1012312	1374436	1363736	1683467
(b) Medicinal and Pharmaceuticals Products	5866	6734	8649	9959	10937
Share in Total Import %	0.7	0.7	0.6	0.7	0.6
(c) Trade Balance (a)-(b)	19800	22620	31172	32497	36614

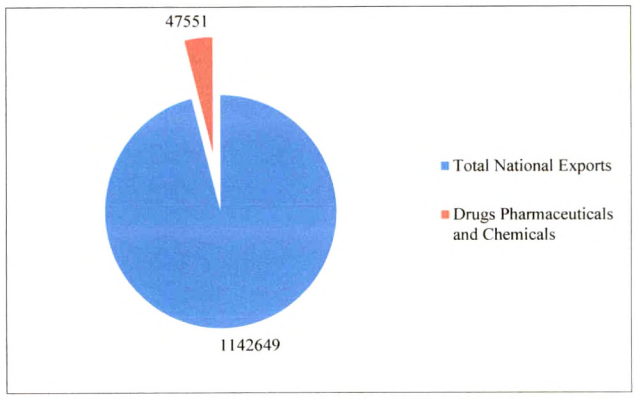
(Source: Annual Report 2011-12, Department of Pharmaceuticals, Govt. of India)

Figure 4.4: Contribution of Medicinal and Pharmaceutical products in National Imports



(Source: Annual Report 2011-12, Department of Pharmaceuticals, Govt. of India)

Figure 4.5: Contribution of Drugs Pharmaceuticals and Chemicals in National Exports



(Source: Annual Report 2011-12, Department of Pharmaceuticals, Govt. of India)

The share of Exports of the "Drugs Pharmaceuticals and Fine Chemicals" in the total National Exports declined from 4.50% to 4.20% during the period 2006-07 to 2010-

11, However in the absolute terms there is growth in Exports. The share of imports is declined 0.7% to 0.6% in the corresponding period.

4.1.8 Growth in Indian Pharmaceutical Industry

Table 4.5: Export and Domestic Growth (Rs. in crore)

Year	Exports	Growth%	Domestic	Growth%	Total	Growth%%
Mar 2006	21230	23.23	39989	17.17	61219	19.21
Mar 2007	25666	20.89	45367	13.45	71033	16.03
Mar 2008	29354	14.37	50946	12.3	80300	13.04
Mar 2009	39821	35.66	55454	8.85	95275	18.65
Mar 2010	42154*	5.86	62055	11.9	104209	9.38

(Source: Annual Report 2011-12, Department of Pharmaceuticals, Govt. of India)

Table 4.6: International sales on consolidated basis

Company	Consolidated net sales	International sales	Exports as % of net sales 2011
Ranbaxy Labs	8960.77	6771.74	75.60
Dr Reddy's Labs	7236.80	5940.70	82.10
Lupin	5706.82	3983.08	69.80
Cipla	6130.31	3361.49	54.80
Sun Pharma	5721.43	2898.20	50.70
Wockhardt	3751.24	2709.91	72.20
Jubilant Lifescience	3433.40	2369.11	69.00
Cadila Healthcare	4464.70	2288.70	51.30
Biocon	2300.52	1956.79	85.10
Glenmark Pharma	3089.59	1955.83	63.30
Stride Arcolab	1695.84	1637.67	96.60
Plethico Pharma	1535.20	1367.22	89.10
Piramal Healthcare	2509.86	1280.58	51.00
Divi's Labs	1307.11	1204.95	92.20
Aurobindo Pharma	4381.48	1112.06	25.40
Torrent Pharma	2121.97	1101.57	51.90
Ipca Laboratories	1882.54	1025.18	54.50
Dishman Pharma	990.84	911.56	92.00
Orchid Chemicals	1781.79	725.85	40.70
Shasun Chemicals	799.42	676.78	84.70
Panacea Biotec	1143.78	610.44	53.40

(Source: Annual Report 2011-12, Department of Pharmaceuticals, Govt. of India)

Table 4.7: Geographical Distribution of Pharma Companies

Sr. No.	State	Number of Manufacturing Units		Total
		Formulation	Bulk Drugs	
1	Maharashtra	1928	1211	3139
2	Gujarat	1129	397	1526
3	West Bengal	694	62	756
4	Andhra Pradesh	528	199	727
5	Tamil Nadu	472	98	570
6	Others	3423	422	3845
	Total	**8174**	**2389**	**10563**

(Source: Annual Report 2011-12, Department of Pharmaceuticals, Govt. of India)

Table 4.8: Market Turnover of Major Therapeutic Segments

Major Therapies	MAT DEC'05 (Val in Crs)	% Contribution	MAT DEC'10 (Val in Crs)	% Contribution
Anti-infectives	4,056	17.6	8,060	17.2
Cardiac Intestinal	2,378	10.3	5,318	11.4
Gastro	2,537	11	5,099	10.9
Respiratory	2,170	9.4	4,080	8.7
Pain/Analgesics	2,059	8.9	4,038	8.6
Vitamins/Minerals/Nutrients	2,105	9.1	3,625	7.7
Anti Diabetic	998	4.3	2,743	5.9
Gynecology	1,261	5.5	2,658	5.7
Neuro/CNS	1,231	5.3	2,633	5.6
Derma	1,255	5.4	2,554	5.5

Table 4.9: Bulk Industry Growth (Rs. in Crores)

2007-08	2008-09	2009-10	CAGR
12,647.51	16,360.71	17,307.02	16.98%

(Source: Annual Report 2011-12, Department of Pharmaceuticals, Govt. of India)

Table 4.10: Export Growth

	Year	Exports (Rs. Crores)	Growth %
Mar 2007	2007	25666	20.89
Mar 2008	2008	29354	14.37
Mar 2009	2009	39821	35.66
Mar 2010	2010	42154	6.60
Mar 2011	2011	45745	7.70

(Source: Annual Report 2011-12, Department of Pharmaceuticals, Govt. of India)

Table 4.11: Human resource position in India

Sl	Item	Total numbers
1	No. of Universities	409
2	No. of Colleges	25990
3	No. of Science Colleges	4696
4	Annual student output at Degree level in science	2000374
5	Annual student output at Degree level in engineering	1663619
6	Total no of Pharmacy Colleges	1162
7	Number of B.Pharm Colleges	848
8	Number of Masters in Pharmaceutical area and Ph.D offereing Colleges	191
9	No. of B. Pharm students in Pharma	51716
10	No. of Masters and Ph.D students out in Pharma	5648

(Source: Annual Report 2011-12, Department of Pharmaceuticals, Govt. of India)

Table 4.12: Global Phama market growth rate

Year	Market in Billion US$	% growth rate
2004	620	7.9
2005	664	7.2
2006	710	6.9
2007	756	6.4
2008	801	4.9

(Source: Annual Report 2011-12, Department of Pharmaceuticals, Govt. of India)

Table 4.13: Projected Growth (Value in Rs crs / Growth in %)

Year	Domestic		Exports			Total Growth
	Value	Growth	Value	Growth	Value	
2016-17	130,000	21%	158,000	16%	288,000	18%
2019-20	233,000	22%	248,000	17%	481,000	19%

(Source: Annual Report 2011-12, Department of Pharmaceuticals, Govt. of India)

Table 4.14: Employment Data for Pharmaceutical Sector

Year	No. of Employees
Mar 1995	1,81,497
Mar 1996	2,04,609
Mar 1997	2,11,614
Mar 1998	1,89,295
Mar 1999	2,13,999
Mar 2000	2,43,410
Mar 2001	2,33,704
Mar 2002	2,26,416
Mar 2003	2,23,556
Mar 2004	2,40,791
Mar 2005	2,65,396
Mar 2006	2,90,021
Mar 2007	3,36,211
Mar 2008	3,53,692

(Source: Annual Report 2011-12, Department of Pharmaceuticals, Govt. of India)

Table 4.15: Percentage distribution of Manpower in Pharma Industry

Function	Distribution
Production & Quality Control	50%
Research/Lab/Testing	20%
Sales, Marketing, Medical assistance	5-10%
Purchase, Logistics, Supply Chain	5-10%
Support functions (HR, Finance, etc.)	10-12%

(Source: Annual Report 2011-12, Department of Pharmaceuticals, Govt. of India)

Table 4.16: Qualifications of personnel employed in the Chemicals and Pharmaceuticals Segment

Qualification	Distribution
Ph. D/MTech / MSc etc.	5-8%
Graduate Engineers	15-25%
Diploma Engineers	10%
ITI and other vocational courses	15-20%
Graduates (BA/BSc/BCom/others)	15-25%
12th standard or below	20-25%

(Source: Annual Report 2011-12, Department of Pharmaceuticals, Govt. of India)

The annual turnover of the Indian Pharmaceutical Industry is estimated to be about Rs. 1,04,944.35 (Source CMIE) crores during the year 2010-11. The share of export of Drugs, Pharmaceuticals and Fine Chemicals is more than Rs. 47551.26 crore. This segment of Industry has shown tremendous progress in terms of infrastructure development, technology base and wide range of products. The industry has developed excellent GMP (Good Manufacturing Practices) compliant facilities for the production of different dosage forms. The strength of the industry is in developing cost effective technologies in the shortest possible time for drug intermediates and bulk activities without compromising on

quality. This is realized through the country's strengths in organic chemicals' synthesis and process engineering.

The domestic Pharma Industry has recently achieved some historic milestones through a leadership position and global presence as a world class cost effective generic drugs' manufacturer of AIDS medicines. Many Indian companies are part of an agreement where major AIDS drugs based on Lamivudine, Stavudine, Zidovudine, Nevirapine are supplied to Mozambique, Rwanda, South Africa and Tanzania which have about 33% of all people living with AIDS in Africa. Many US Schemes are sourcing Anti Retrovirals from Indian companies whose products are already US FDA approved.

Many Indian companies maintain highest standards in Purity, Stability and International Safety, Health and Environmental(SHE) protection in production and supply of bulk drugs even to some innovator companies. This speaks of the high quality standards maintained by a large number of Indian Pharma companies as these bulk actives are used by the buyer companies in manufacture of dosage forms which are again subjected to stringent assessment by various regulatory authorities in the importing countries. More of Indian companies are now seeking regulatory approvals in USA in specialized segments like Anti-infectives, Cardiovasculars, CNS group. Along with Brazil & PR China, India has carved a niche for itself by being a top generic Pharma player.

Many Indian companies have got various international regulatory approvals for their plants, from agencies like USFDA, MHRA-UK, TGA-Australia, MCC-South Africa etc. Outside USA India is the only country having the highest number of USFDA approved plants for generic drugs' manufacture outside USA. Major share of Indian Pharma exports is going to developed western countries and it speaks not only about excellent quality of Indian pharmaceuticals but also about the reasonableness of the prices. Some of the leading Indian Pharma companies derive 50% of their turnover from International business.[9]

[9] Annual Report 2011-12, Department of Pharmaceuticals Govt. of India.

4.2 Pune: A new Metropolitan city

4.2.1 Geographical Location

Pune city lies between 18° 25' to 18° 37' N latitude and 73° 44' to 73° 57' E longitude . Pune is one of the outstanding cities of India situated at an altitude of 570 m on the Sahyadri hills in Western Maharashtra. Pune city has been established on the banks of rivers Mula and Mula. The Municipal Corporation of Pune (PMC) is spread over an area of 237.04 sq, km, which includes the recently added 23villages (PMC was having only 141.11 Sq. km before addition of 23 villages).[10]

Pune has emerged as new metro city in India. According to census 2011 provisional data Pune's population is 55.18 lakh with 8.4% growth rate. It is ranked 8th among the most populated cities in India. Pune has 3rd highest population density i.e. 603, in Maharashtra. The inflation in city population has been putting pressure on infrastructure of Pune. It also has effect on socio-economic sector. Some experts say that as population density increases, the stress on humans will also increase.[11]

4.2.2 Major problem areas in Pune:

a) High Air Pollution:

A Central Pollution Control Board study has indicted Pune as the #2 polluted city after Delhi. The Union Ministry of Environment conducted a study to access air pollution level in 6 major cities in India (Delhi, Mumbai, Kanpur, Chennai, Bangalore and Pune). Ministry published report titled 'Study for Indian cities: Air quality monitoring, emission inventory and source apportionment'. It provides data for pollution level in these cities in terms of Suspended Particulate Matter (SPM) and Nitrogen Oxide levels till 2009. The report blames the poor condition of city roads for the escalating pollution. Pune has exceeded standard level of SPM by 100%.

According to the report, the PM2.5 standards in Pune are exceeded 100 per cent of the time at the kerb. SPM and PM10 levels were found exceeding even in 'background

10 http://www.ssmrae.com/admin/images/365c1fbe892d5f99f07e497e47b91485.pdf, accessed on August 31, 2012

11 http://www.punemirror.in/article/2/20110703201107030215049589623e6cc/Pune%E2%80%99s-a-crowdpuller.html?pageno=1, accessed on 6th Sept, 2011

areas' (where human activity is supposed to be limited). PM10 are particles of 10 micrometers or less and PM2.5 are particles less than 2.5 micrometers.[12]

A six-city study titled 'Urban air pollution analysis in India' undertaken by Delhi-based air pollution research agency Urban Emissions Info, has revealed that over 4,000 premature deaths are likely to occur in Pune by the year 2020 due to severe respiratory disorders caused by rising air pollution. Pune would account for 4,300 premature deaths, with 12,900 adult chronic bronchitis patients, 94,500 child acute bronchitis patients and 1.4 million asthma attacks.[13]

One of the major sources of air pollution is number of vehicles on roads. Following table shows the details of number of vehicles crossing major roads per day.[14]

Table 4.17: Number of Vehicles on Roads in Pune

Sr. No.	Road/locality in Pune	Number of Total vehicles crossing per day in one direction. (in Lakh)	Number of 2 wheelers per day crossing per day in one direction. (in Lakh)
1	University Chowk	2.96	1.80
2	Pune-Solapur road	1.50	0.91
3	Karve Road	1.48	0.90
4	Pimpri Chowk	1.35	0.82
5	Mundhawa Road	0.40	0.24
6	Laxmi Road	0.31	0.19
7	Handewadi Road	0.14	0.08
	Total	**8.14**	**4.94**

(Source: Indian Institute of Tropical Meteorology, compiled by researcher)

Medical representatives' job is a field job, under the prevailing air pollution; perhaps he is the most exposed to air pollution, which might affect his health. Researcher wants to confirm whether respiratory tract infections are common among medical representatives.

[12] http://www.punemirror.in/index.aspx?page=article&sectid=62&contentid=20110120201101200219541 06afe4701d, accessed on August 27, 2012

[13] http://www.sakaaltimes.com/20120515/4767133761915976757.htm accessed on August 31, 2012

[14] http://articles.timesofindia.indiatimes.com/2012-06-05/pune/32057143_1_heavy-vehicles-air-quality-forecasting-pune

b) Poor Public Transport:

Pune Mahanagar Parivahan Mahamandal Ltd (PMPML) is the only public bus transport service available to 55 lakh population of Pune. The company has been facing many problems. Company has 1777 buses out of which almost 610 are off road owing to shortages of drivers, conductors and workshop employees. Commuters face severe hardships due to the poor, unreliable, unsafe and inefficient bus service, which is also among the costliest. Despite of government aid and many corrective (?) measures implementations, the problems are aggravating. Due to poor and unreliable service, population is compelled to opt for personal vehicles for commuting. This is evident from decreasing numbers of citizens travelling by bus. The number has reduced to 9.67 lakh in May 2012, from 12 lakh in March 2010. Whereas number of vehicles increased from 9 lakh in March 2001 to 23 lakh in March 2012. Notably, two-wheelers acquire the maximum share in the vehicle population with a figure of 16.99 lakh.[15]

According to Housing Census Data released by the Directorate of Census Operations of Maharashtra, Pune has the highest number of households (48.8%) in the state using two-wheelers, which is significantly high as compare to 15.3% in Mumbai. Furthermore total number of vehicles are also high in Pune (23 lakh) as compared to Mumbai (21 lakh).[16]

In the light of above facts it is not surprising that all the medical representatives working in Pune, use bike for working. (Refer table No. 5.28)

15 http://www.punemirror.in/article/2/20120731201207310823526853536da6c/Vehicles-outnumbering-trees.html?pageno=2, accessed on August 27, 2012

16 http://www.dnaindia.com/mumbai/report_pune-overtakes-maximum-city-in-vehicle-population_1667537, accessed on August 27, 2012

c) Traffic Congestion

Traffic congestion is a major problem in Pune city. During the peak hours of any day, roads in the Pune city experience heavy congestion. Between 9.00 am to 12.00 pm & 5.00 pm to 8 pm, there is traffic congestion on major roads in city like Jangli Maharaj road, Karve road, Paud road, University road, Shivaji road, Bajirao road, Fergusson College road, Dhole Patil road, Tilak road, Lal Bahaddur Shastri road, Kumtekar road, Laxmi Road, Senapati Bapat road, Katraj road, Pune-Solapur road, Mundhawa road, Pune nagar road, Pune Mumbai old highway, roads near Pune Station, etc. Tabel No. 4.17 shows number of vehicles crossing through some major roads in Pune.

Medical representatives face this problem regularly, which forces him to remain on field for longer time to accomplish his daily coverage target.

d) Parking Problems

Increasing number of vehicles has been putting pressure on infrastructure of city, narrow roads; encroachment by hawkers, and roadside retailers, further aggravates the problem. There is general indiscipline while parking the vehicle. Commuters struggle to get parking space. Commuter standing with his vehicle hunting for parking space is very common not only on major roads but also on small off roads.

Medical representatives have to park his vehicle distant from his call, which also adds to extension of work hours.

4.3 Conclusion

In this chapter facts of pharmaceutical industry and problems of Pune has discussed. In next chapter data analysis and interpretation has presented.