CHAPTER I

INDIAN PHARMACEUTICAL INDUSTRY AND THE POST INDEPENDENCE DEVELOPMENT

1.1 INTRODUCTION

The term "pharmaceuticals" denotes medicinally effective chemical substances, converted to dosage forms to be administered in the treatment of various human diseases. These may be produced out of substances of plant origin (phytochemicals), animal origin (organic), or processed chemicals (synthetic). The term pharmaceutical industry then refers to industrial scale manufacture of drugs based on substances of vegetable, organic or synthetic origin. The basic chemical form of pharmaceuticals is known as bulk drugs, which may be likened to raw materials, in other industries. Similarly, final dosage forms, which are in ready state for consumption by the patients, are known as formulations, which may be compared to the finished products, in other industries. The examples of bulk drugs are antibiotics like penicillins, cephalosporins (phytochemicals), insulin (organic), and steroids and calcium channel blockers (synthetic). Formulations prepared out of the bulk drugs described above may assume different dosage forms like tablets, capsules, liquid syrups (to be taken orally), drops (administrable in liquid form) or directly injectibles.
Bulk drug discovery requires intensive and expensive research involving qualified scientists working in well-equipped laboratories for long periods of time. The general trend in the pharmaceutical industry the world over, as the documented evidence shows, is that most of the new drugs are peripheral manipulation of chemical molecules, resulting in new chemical entities (NCES).\(^1\) The new drugs are patented by the innovator to ensure commercial returns on his R&D investment. When a drug goes off patent, it becomes a generic. A patent provides exclusivity of manufacture to the discoverer (innovator), i.e., patent holder for a stipulated time period.

### 1.1.1 UNIQUE FEATURES OF PHARMACEUTICAL INDUSTRY

There are certain distinguishing features of the pharmaceutical industry, which makes it unique, that are not commonly found in other manufacturing industries.

First, the demand for pharmaceutical products, is continuous and perennial. Since, the industry concerns itself with the treatment of human diseases, the demand for its products always exists, as long as the human population survives on the planet earth, and until such time as humanity becomes completely disease-free.

Second, the consumers of this industry, being patients, cannot choose their products directly, since they have to be medically diagnosed by a qualified doctor, for determining the disease. Post-diagnosis the

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doctor prescribes the required drugs. All those pharmaceutical products, which are sold through a proper prescription by the doctor, are known as "ethical pharmaceuticals". However, there are certain pharmaceuticals, such as cough lozenges, pills for cold and head-ache, pain balms, health tonics etc., which can be purchased directly without doctor's prescription; these are called over-the-counter (OTC) drugs.

The third important feature of the pharmaceutical industry is that the demand is driven by product-competition rather than by price-competition as experienced in other manufacturing industries. Being a research based industry; the pharmaceutical industry derives its strength mainly through 'patented' and 'branded' drugs. While the success of 'patented' drugs depends on effective implementation of intellectual property rights (IPRs) by the national governments across the world, the success of 'branded' drugs depends on the promotional, and marketing strengths of individual firms. In general, the world pharmaceutical firms are observed to indulge in aggressive promotional sales strategies, at times, involving immoral practices.²

² A Survey in the Annals of Internal Medicine found that 62% of pharmaceutical advertisements in medical journals were either grossly misleading or downright inaccurate. A vast amount of literature is available immoral and unethical sales practices of the world pharmaceutical firms. See for example, Ken Silverstein, "Millions for Viagra, Pennies for Diseases of the Poor," The Nation, July, 19, 1999; Isabel Hilton, "A Bitter Pill For The World's Poor," The Guardian, January 5, 2000. Also see, John Madeley, Big Business, Poor Peoples: The Impact of Transnational Corporations on The World's Poor, Zed Books, 1999. pp. 146-147.
I.2 WORLD PHARMACEUTICAL INDUSTRY: ORIGIN AND CHARACTERISTIC FEATURES

The modern pharmaceutical industry has an interesting historical past. Before the seventeenth century drugs were administered by individual doctors, quacks, faith healers on a trial-and-error basis, which was not based on any established, uniform scientific practices.

Seventeenth and eighteenth centuries saw some rapid progress in medical science, which resulted in a wide use of drugs essentially through drug dispensing apothecaries attached to the practicing doctors. Historians of medicine and drug therapy consider Sir Alexander Fleming's discovery of penicillin in 1929 as the point, when the real foundation of modern pharmaceutical research was laid down. The next major breakthrough came in 1932 with the synthesis of sulphonamides in Germany by Klarer and Mietzsch. The subsequent two-decade period between 1938 and 1958 saw a spate of new antibiotics, anti-infectants, and cortiscoteroids being introduced for human therapy and cure. All this of course has meant immense benefit to mankind, in terms of extension of life span, and elimination of major diseases. But, in addition, it has also meant a radical restructuring of the pharmaceutical industry; not only have synthetics replaced drugs of natural origin, but mass-scale methods have also been adopted for

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natural products. This is an important development that has led to the concentration of pharmaceutical production in those units where research was undertaken, and also in those firms which had the opportunity to start early. In other words, the concentration was twofold: pharmaceutical activity (in terms of production, sales and research) was confined to a few geographical locations, and a few large giant multi-national corporations (MNCs). Physicians’ preference for ready-made synthetic drugs over others had resulted in a large-scale spurt in global demand for such drugs. Together with the ongoing “therapeutic revolution” of the period, the major companies were transformed from full-line commodity houses, which manufactured and sold a complete range of all medicaments the pharmacist needed to compound the doctor’s multi-ingredient prescriptions, into vertically integrated research based manufacturers by the mid-1950s. The change at the firm level was that nationally based pharmaceutical companies became internationally organized with their sales, production and other activities increasingly carried out by the subsidiaries and affiliates located in countries other than of their parents.

I.2.1. WORLD PHARMACEUTICAL PRODUCTION

Until the 1980s, data on the worldwide production and consumption of pharmaceutical products were difficult to find except for the advanced Organization of Economic Cooperation and Development

\footnote{William Breckon, Ibid.}
(OECD) countries (Switzerland did not publish even such information). A large number of less developed countries did not maintain any data at all. However, the situation has undergone a tremendous change since then. Not only do developing countries, like India, Brazil, Mexico and Thailand, maintain systematic records of pharmaceutical production, sales and other activities, but they have also made it mandatory for the firms to submit data on all-important aspects, though a lot more remains to be done. Besides, a number of private research organizations have been regularly collecting classified data for more than one and a half decades or so. Some of these research firms do share their information either in part or in full, while some others sell the same for a certain price. Available data for 1998 indicate that the world pharmaceutical industry is estimated to be of the value of $310 billion.

The market for pharmaceutical products is estimated to grow at a compounded annual growth rate (CAGR) of 8% per annum until 2005, starting from 1998. In 1998 the market grew by 7% as against 6.6% in the previous year. When we look at the growth rates of individual countries, developing countries such as South Korea, Taiwan and India have shown higher growth in the range of 12-15% per annum during 1997-98. Though some of these countries experience low per capita

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7 PJB Publications, SCRIP, 2000 (pharmaceutical league tables), Surrey, UK.
8 Ibid.
consumption of drugs and pharmaceuticals in their domestic markets, the higher growth rates are attributable mainly to their export performance since the mid-1990s. However, the largest pharmaceutical markets, in any case are those belonging to the developed regions of the world. In fact, when we compare the estimated figures for production and consumption of pharmaceuticals in 1973, with those of 1998, there is no significant difference in the pattern of production, consumption or sales. In 1973, six leading producers the US, Japan, Germany, France, Italy and the UK accounted for $22 billion, which made up for 74 percent of the total world output. The same countries in 1998 notched up $192 billion, which is 76 percent of the total world pharmaceutical sales.

**TABLE I.1**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>1998 Sales ($ billion)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>US</td>
<td>100</td>
<td>40</td>
</tr>
<tr>
<td>2</td>
<td>Japan</td>
<td>39</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>Germany</td>
<td>18</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>France</td>
<td>14</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>Italy</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>UK</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Brazil</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>Spain</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>Canada</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>Argentina</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>251.3</td>
<td>84</td>
</tr>
</tbody>
</table>

**Source:** SCRIP, 1999.


In other words, the concentration in terms of market sales for 1998 has gone up by 2 percent, as can be seen in Table I.1.

1.2.2 MERGERS AND ACQUISITIONS

From the early 1990s onwards the world pharmaceutical industry has been experiencing a series of mergers, acquisitions and takeovers. The number of such instances has increased after globalization and the coming into existence of World Trade Organization (WTO).\textsuperscript{11} It is understood that global pharmaceutical MNCs resort to mergers and alliances in a bid to reduce costs, avoid R&D duplication, expand market access and reduce expenditure on R&D by spreading to a wider base. The total number of alliances has gone up from 120 in 1986 to nearly 400 in 1994. These alliances often allow pharmaceutical companies to draw upon others' research expertise, bring products to market more rapidly and more effectively and commercialize products. The four mega mergers in the global pharmaceutical industry that took place between 1993 and 1998 have been Glaxo-Wellcome, Hoechst-Marion-Merrell Dow-Roussel, Ciba-Sandoz (to form Novartis) and Hoechst Marion Roussel with Rhone Poulenc to form Aventis. More recently world pharmaceutical industry has witnessed a fresh round of mergers: Glaxo with Smith Kline Beecham, Pfizer with Warner Lambert, Hoechst with Rhone Poulenc.

\textsuperscript{11} A detailed analysis of mergers, acquisitions and their implications for Indian pharmaceutical industry is undertaken in Chapter III below.
Mergers and acquisitions and all other forms of alliances are a move further in the direction of concentration in an already concentrated pharmaceutical industry turning it into an even more of a centralized monolith. It is argued that in these cases size itself acts as an entry barrier to other firms.

Besides adopting the strategy of mergers, acquisitions and other forms of alliances, which have become a dominant feature of the pharmaceutical MNC giants in the post-1990 scenario, they are also quite well known for various other strategies in order to keep their profitability at higher levels. A major and widely observed strategy of the global pharmaceutical MNCs is to select a few broad therapeutic groups, which can ensure them high profit rates. Most of these select therapeutical categories with higher profit margins are controlled by a few dominant MNCs with two or three leading products, which account for a major proportion of their net sales across the globe. In other words, it is a combination of ‘patent protection’ with ‘brand-promotion’, a lethal strategy to synchronize ‘double monopoly’ of the proprietary medicines. Various researchers have documented these strategies at different points in time and the same trend continues even at present.12

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12 Leif Schaumann has demonstrated these trends for the world pharmaceutical industry, so also for the Indian Pharmaceutical Industry up to 1975; Sanjaya Lall had separately confirmed these trends for the period until 1977; Barrie James has also concurred for the same, for mostly UK firms until 1977; we had worked out on the lines of Barrie James for the Indian pharmaceutical MNCs and found similar results until 1979. See the following: Leif Schaumann, Pharmaceutical Industry: Dynamics and Outlook to 1985, Stanford Research Institute, California, 1976, Table 3, p.13; Sanjaya Lall, op.cit., 1978; Barrie G. James, The Future of the Multinational Pharmaceutical
It is shown in Table I.2 that nearly 30% of the total world pharmaceutical market is dominated by ten top therapeutic categories, of which three segments are growing at more than 20% per annum. These

**TABLE I.2**

**LEADING THERAPEUTIC CATEGORIES IN THE WORLD PHARMACEUTICAL INDUSTRY – 1998**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Therapeutic category</th>
<th>Sales ($billion)</th>
<th>Sales Growth (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Anti-Ulcerants</td>
<td>12.9</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>Cholesterol &amp; Triglyceride reducers</td>
<td>9.6</td>
<td>20</td>
</tr>
<tr>
<td>3.</td>
<td>Anti-Depressants</td>
<td>9.4</td>
<td>21</td>
</tr>
<tr>
<td>4.</td>
<td>Ca-Antagonists</td>
<td>8.7</td>
<td>1</td>
</tr>
<tr>
<td>5.</td>
<td>Cephalosporins</td>
<td>6.8</td>
<td>1</td>
</tr>
<tr>
<td>6.</td>
<td>ACE-Inhibitors</td>
<td>6.5</td>
<td>4</td>
</tr>
<tr>
<td>7.</td>
<td>Non-narcotic Analgesics</td>
<td>6.2</td>
<td>4</td>
</tr>
<tr>
<td>8.</td>
<td>Anti-rheumatic non-steroids</td>
<td>6.0</td>
<td>4</td>
</tr>
<tr>
<td>9.</td>
<td>Anti-Psychotics</td>
<td>3.9</td>
<td>30</td>
</tr>
<tr>
<td>10.</td>
<td>Broad-Spectrum Penicillins</td>
<td>3.8</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>73.8</strong></td>
<td><strong>7</strong></td>
</tr>
</tbody>
</table>

*Source: SCRI P, 2000.*

three top therapeutic segments are anti-psychotic drugs (30%), anti-depressants (21%) and cholesterol and triglyceride reducers (20%), which are used to reduce cholesterol in blood stream, whereas the first two groups of drugs are used in the treatment of chronic depression and psychiatric disorders respectively. When viewed from the largest sales turnover angle, anti-ulcerant drugs category (used for stomach ulcers)

_Industry to 1990, Associate Business Programmes, London, 1977, Ch.3; J. Manohar Rao op.cit., 1981, Ch.3, Table 3.8._
remains the leading therapeutic category in 1998 with annual sales in this segment touching $12.9 billion. It is interesting to note that outside the top ten therapeutic segments, by far the fastest growing sub-class is Erectile Dysfunction (impotency), which grew by 277% in 1998, driven by the blockbuster launch of Viagra by Pfizer Corporation of US. The second fastest growing segment is, compounds used to treat heart indications, the Angiotensin II antagonists, which is currently in the 56th place. Angiotensin II antagonists grew last-year by 104 percent to $1.1 billion.

Concentration in terms of sales turnover by individual companies is also found to be quite acute, as has always been the case with the world pharmaceutical industry. The companies, which have been dominating the world pharmaceutical markets since 1955-60, continue to exercise control even in 2002. The only changes that are noticeable are, the transformation of these firms into newly incorporated alliances via mergers, acquisitions and take-over. These changes have put these pharmaceutical MNC giants in an unassailable position of dominance and it is not possible to alter these positions in the near future. Table 1.3 presents the top fifteen pharmaceutical MNCs in the World in 1998.

It is shown in Table 1.3 below that in 1998, Novartis, Merck and Glaxo-Wellcome shared the top position in the global pharmaceutical market. The sales performance of Novartis in 1998, was driven by its two top selling brands ‘Lanisil” and ‘Aredia”. Merck and Glaxo-Wellcome,
similarly, gained from their respective two top brands each, namely, "Zocor", "Fosamax", and "Flixonase", and "Serevent". In case of Pfizer, in addition to strong sales of its cardiovascular drug "Norvasc", the new success of "Viagra" also boosted its sales turnover. The top 15 firms notched up about half of the world pharmaceutical sales in 1998, while if

<table>
<thead>
<tr>
<th>Rank</th>
<th>Pharmaceutical Company</th>
<th>Global Share (%)</th>
<th>1998 Sales ($ billion)</th>
<th>Growth (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Novartis</td>
<td>4.2</td>
<td>10.6</td>
<td>5</td>
</tr>
<tr>
<td>2.</td>
<td>Merck &amp; Co</td>
<td>4.2</td>
<td>10.6</td>
<td>8</td>
</tr>
<tr>
<td>3.</td>
<td>Glaxo-Wellcome</td>
<td>4.2</td>
<td>10.5</td>
<td>1</td>
</tr>
<tr>
<td>4.</td>
<td>Pfizer</td>
<td>3.9</td>
<td>9.9</td>
<td>21</td>
</tr>
<tr>
<td>5.</td>
<td>Bristol-Meyers-Squibb</td>
<td>3.9</td>
<td>9.8</td>
<td>21</td>
</tr>
<tr>
<td>6.</td>
<td>Johnson&amp; Johnson</td>
<td>3.6</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>7.</td>
<td>American-Home Products</td>
<td>3.1</td>
<td>7.8</td>
<td>1</td>
</tr>
<tr>
<td>8.</td>
<td>Roche</td>
<td>3</td>
<td>7.6</td>
<td>6</td>
</tr>
<tr>
<td>9.</td>
<td>Lily</td>
<td>2.9</td>
<td>7.4</td>
<td>17</td>
</tr>
<tr>
<td>10.</td>
<td>Smith-Kline Beecham</td>
<td>2.9</td>
<td>7.3</td>
<td>6</td>
</tr>
<tr>
<td>Total Leading10 Companies</td>
<td>35.9</td>
<td>90.5</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Astra</td>
<td>2.8</td>
<td>6.9</td>
<td>16</td>
</tr>
<tr>
<td>12.</td>
<td>Abbott</td>
<td>2.5</td>
<td>6.4</td>
<td>8</td>
</tr>
<tr>
<td>13.</td>
<td>Hoechst Marion</td>
<td>2.5</td>
<td>6.2</td>
<td>2</td>
</tr>
<tr>
<td>14.</td>
<td>Schering Plough</td>
<td>2.5</td>
<td>6.2</td>
<td>14</td>
</tr>
<tr>
<td>15.</td>
<td>Warner Lambert</td>
<td>2.4</td>
<td>6</td>
<td>37</td>
</tr>
<tr>
<td>Total Leading15 Companies</td>
<td>48.6</td>
<td>122.2</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>


we take the top 20 (not shown in Table), they together accounted for more than 57% of world sales. Within the top 20 firms, Warner-Lambert experienced the highest growth rate at 37%, which was again on account
of the top two or three of the company's branded drugs. For example, cholesterol-reducing drug “Lipitor” of Warner-Lambert grew by 199%, and “Rezulin”, a new anti-diabetic drug drove up the sales by 97% over the previous year, i.e., 1997.

I.3 GENERIC COMPETITION IN THE WORLD PHARMACEUTICAL INDUSTRY

From 1990 onwards the generic competition in the world pharmaceutical industry has been hotting up. This development is due to a variety of reasons. There has been a sustained campaign from the World Health Organization (WHO), along with a number of expert voluntary groups favouring generic substitution of drugs in the treatment of human diseases. The prescriptive proprietary segment dominated by the pharmaceutical MNC giants, as shown above is becoming inaccessible to the large majority of human population living not only in the developing countries of the third world, but also in the advanced countries. In fact, the strong advocacy of generic substitution of drugs for the prescriptive medicines gained rapid momentum with the stipulation of Waxman Hatch Act, in the US. There has been a rise in the use of generic drugs in place of patented drug products as part of cost cutting measures by the Health Management Offices (medical insurance agencies in the US). Further, a large majority of drugs, with an estimated market value of $40 billion have been loosing patent
protection until 2005, which would enlarge generic markets the world over.

An additional feature of the generic drug market is that developing countries like India, China, Taiwan, Brazil and Korea have proven advantage in terms of competitive pricing which has been worrying the major pharmaceutical MNCs, particularly those from the US. For originator drugs, which first faced the generic competition in the 1990s, generics gained 47% of the market after 18 months, whereas for products whose patents expired by 1992, generic competition claimed 72% of prescriptions within 18 months. In fact the share of generic drugs in the US prescription market has more than doubled from 18.6% at the end of 1984 to 43% in 1996.

I.4 INDIAN PHARMACEUTICAL INDUSTRY: THE SIZE

Given the size of the world pharmaceutical industry the Indian one may be termed a still fledgling industry with roughly 1% share of total world pharmaceutical production. Even in terms of per capita drug expenditure, we are behind Ghana, China, Pakistan, Indonesia and Kenya, as shown in Table I.4. The low per capita expenditure on drugs in India is attributable also, among other things, to the inaccessibility of

13 A detailed list of dates of patent expiry for various drugs is provided in Table IV.18, Chapter IV below.
15 Ibid.
16 This aspect we have shown further in the following sections of this chapter as well as in chapter IV in Part II below.
TABLE I.4
PER CAPITA DRUG EXPENDITURE IN VARIOUS COUNTRIES – 2001

<table>
<thead>
<tr>
<th>Country</th>
<th>Expenditure ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>412</td>
</tr>
<tr>
<td>Germany</td>
<td>222</td>
</tr>
<tr>
<td>US</td>
<td>191</td>
</tr>
<tr>
<td>Canada</td>
<td>124</td>
</tr>
<tr>
<td>UK</td>
<td>97</td>
</tr>
<tr>
<td>Norway</td>
<td>89</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>37</td>
</tr>
<tr>
<td>Chile</td>
<td>30</td>
</tr>
<tr>
<td>Mexico</td>
<td>28</td>
</tr>
<tr>
<td>Turkey</td>
<td>21</td>
</tr>
<tr>
<td>Morocco</td>
<td>17</td>
</tr>
<tr>
<td>Brazil</td>
<td>16</td>
</tr>
<tr>
<td>Philippines</td>
<td>11</td>
</tr>
<tr>
<td>Ghana</td>
<td>10</td>
</tr>
<tr>
<td>China</td>
<td>7</td>
</tr>
<tr>
<td>Pakistan</td>
<td>7</td>
</tr>
<tr>
<td>Indonesia</td>
<td>5</td>
</tr>
<tr>
<td>Kenya</td>
<td>4</td>
</tr>
<tr>
<td>India</td>
<td>3</td>
</tr>
</tbody>
</table>


drugs for the majority of the population living in rural areas and accounting for more than 60 per cent of the total population in the country. This point has been elaborated in the section on drug distribution in India in Chapter IV in Part II. Further, a large majority of the population in India does not use allopathic medicines and they rather depend more on traditional systems of medicine. If only a fraction of the segment using traditional medicines is convinced to shift to the allopathic system of medicines there would be a significant increase in the present market size for ethical pharmaceuticals. There is no
systematic mechanism exists in the country, at present, to monitor and supervise the functioning of the traditional systems of medicine. The first Draft National Policy on Traditional Systems of Medicine was prepared under the Ministry of Health and Family Welfare only in 2001, which is yet to get its final approval. The per capita drug expenditure in India, as such, does not include expenditure on traditional medicines.

In other words, the low per capita drug expenditure is only indicative of consumption of allopathic medicines and not other types of drug products.

I.5 HISTORICAL CONTEXT OF THE INDIAN PHARMACEUTICAL INDUSTRY

The allopathic system of medicine has been a late starter in India. Earlier Indian systems of medicine such as Ayurveda, Siddha, and Unani enjoyed wider public confidence and were largely in use prior to the colonial rule, and continue to be used in most of the rural areas even now. The establishment of the modern pharmaceutical industry in India may be said to have commenced with the setting up of Bengal Chemicals and Pharmaceutical Works in 1901 by Prof P.C. Ray, in Calcutta. Simultaneously, B.D.Amin set up Alembic Chemical Works in Baroda. The other significant developments, which helped the indigenous drug industry, were the establishment of Haffkine Institute in Bombay, the King Institute in Madras in 1904, and the Pasteur Institute in Coonoor in
1907. Prior to 1900 most of the pharmaceutical activity was in the form of imports. The two government factories established in 1887 in Darjeeling district and in 1890 in the Nilgiris district, were involved in the production of Quinine Salts and other allied activities; they could be sustained until the end of World War I. However, the outbreak of World War II gave fillip to the manufacture of sera, vaccines, ether, chloroform and a few simple drugs based on coal-tar distillation products.\(^{17}\)

However, the Indian drug industry was not in a position to keep pace with wartime needs due to its meager size. The early post independence years (1948-53) proved to be a turning point in the history of the Indian pharmaceutical industry. It was during this period that the foundations for a truly modern pharmaceutical industry in this country were laid.

After India became independent in 1947, in keeping with the demands at the time, a strong nationalist economic policy was adopted. The philosophy of self-reliance and self-sufficiency led to the pursuit of an import-substituting industrialization policy and there was less emphasis on foreign technology and foreign direct investment (FDI). The colonial legacy inherited by the Indian industry in general and the pharmaceutical industry in particular had left its imprint on the structure, growth and performance of this sector. The distortion in industrial structure resulted in: (a) inadequate capabilities in the capital

\(^{17}\) See, *Report of the Pharmaceutical Enquiry Committee* (Bhatia Committee), Government of India, New Delhi, 1954.
goods sector combined with underdeveloped and foreign-dependent local enterprise; and (b) a strong and powerful presence of multinational corporations.\(^{18}\) The structure of Indian industry as well as the pharmaceutical industry underwent several changes soon after independence.

It is important to mention here the role of certain elite sections and business classes, which, driven by the spirit of “economic nationalism”\(^{19}\) had striven hard to create new lines of industrial production by establishing firms in competition with the mainly British controlled enterprises operating in India.\(^{20}\)

These classes were also instrumental in drafting the *Bombay Plan* in 1944, which became the key resource input for the first Industrial Policy Resolution in 1948, soon after independence.\(^{21}\) The 1948 industrial policy resolution gave a define direction to industrialization in India and laid foundation for a mixed economy. Since the First Five Year Plan had envisaged a greater role for agriculture it was from the Second Plan and the Second Industrial Policy Resolution in 1956 that a

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\(^{18}\)Rajat K.Ray, *Industrialisation in India: Growth and Conflict in the Private Corporate Sector 1914-47*, Oxford University Press, Delhi, 1979. Some kind of distinction is made between multinational corporations (MNCs) transnational corporations (TNCs) and multinational enterprises (MNEs). We, however, prefer the term MNCs. For a discussion on these terms cf. [http://www. Mtholyoke.edu/acad/intrel/mnc.htm](http://www. Mtholyoke.edu/acad/intrel/mnc.htm).

\(^{19}\)See Bipan Chandra, *Nationalism and Colonialism in Modern India*, Orient Longman, Hyderabad, 1982. Discussion on “economic nationalism” is taken up further in Chapter II below.


\(^{21}\)A detailed discussion on industrial policies and its relation to scientific and technology policies, consequently their impact upon the Indian pharmaceutical industry is undertaken in Chapter II below.
greater role was assigned to the state in industrial development. The objective was to extend control to some more industries and promote import substitution to reduce foreign dependence, expand capital goods sector, develop small-scale industries and create larger employment. Going by the understanding of the *Bombay Plan* that large scale investment requirements would be met not by the private sector in the initial stages of development, the government made huge investments in basic and capital goods industries. Thus the public sector received a prominent place in the path of self-reliant industrial development in the core areas.

The 1970s witnessed three important developments, which led to some revision in the thinking of Indian policy makers. First, prompted by the prolonged industrial stagnation of the late-sixties the mood was to tighten the policy regime via increasing controlling mechanism in industrial and trade policies to enhance the overall industrial production, which was experiencing a secular deceleration. Second, a cautious approach was to be adopted in every sector of the economy, say for example, in issuing licenses for setting up new production units, or new capacities. Third, in continuation of the above, and in moving further in the direction of stronger measures, three laws were enacted in quick succession, which had a major impact on different industries in India. The Monopolies and Restrictive Trade Practices Act (MRTP) was promulgated in 1969 to regulate utilization and installation of capacities.
The passing of the Indian Patent Act in 1970, which recognized only process patents and not product patents was very crucial particularly to the pharmaceutical industry. The Hathi Committee Report on the pharmaceutical industry in 1975 had provided the most comprehensive conceptual foundation for an indigenous industrial and technological effort and also became the basis for the Government of India’s New Drug Policy in 1977. The government’s policy rested on those premises, until India signed the WTO pact, and agreed to revise its patent laws to comply with WTO clauses.

The most important act enacted in 1973 was the Foreign Exchange Regulation Act (FERA) with reference to Foreign Direct Investment (FDI) and MNCs. The main purpose of this act was to bring down the equity of foreign multinationals below fifty percent, since it was hoped that it would dilute controlling power of MNCs. However, the vast majority of the MNCs, rather than selling their equity stake, chose to expand the equity base and sell additional shares to the Indian public. These additional shares ended up being widely dispersed, leaving the MNCs as the largest single shareholders. Thus, the MNCs were not only able to retain de facto control, with as little as 25% equity, but were also able expand operations making full use of Indian capital. The only difference was that Warner-Lambert became Warner-Hindustan, Ciba-Geigy became Hindustan-Ciba-Geigy, and in tobacco Imperial Tobacco

22 These aspects are dealt in greater detail, in Chapter III in Part I and Chapters IV and V in Part II below.
Company became Indian Tobacco Company to reflect the "Indianness" of the firms. In fact, it is pointed out that it was not all bad for the MNCs with the passage of restrictive legislation, and in some areas many public sector firms entered into collaboration with MNCs.23

1.5.1 THE NEHRUVIAN LEGACY

In the present section an attempt has been made to bring out the nexus between industrial policy, science and technology policy and the drug policy as it has evolved in India since 1947 until the present, that is, 2002.

After attaining Independence India embarked upon a strategy of building up domestic capabilities in the capital goods and intermediate goods industries, while also progressively reducing the weight of foreign capital in various sectors of the economy that were earlier controlled and dominated by it. The government therefore was naturally concerned at fostering self-reliance through progressive reduction of foreign control and promoting indigenous efforts by bringing together national industrial and science and technology policies. The guiding philosophy of Indian planning derived its inspiration from Jawaharlal Nehru's understanding that a strong research and scientific base was needed in India through the creation of national scientific organisations, and institutions devoted to advanced research and engineering activities.

On the eve of launching of the First Five Year Plan, Nehru declared that increase in production and promotion of self-reliance were essential parts of the programme for strengthening India. Inspired by the Soviet success, he felt economic planning to be a scientific technique rather than an ideological procedure. It is important to note here that Nehru

recognized the role of the state as a very significant engine in regulating technology flows and in generating and organizing R&D activities. In an import-substituting industrialization programme, Nehru’s belief was that the state should acquire a special position as a monitoring, co-coordinating and controlling agency for the actions of both public sector and private sector. The process of R&D is a unique method of exploiting scientific discovery through the conversion of scientific knowledge into technical innovation. It needs highly trained personnel, requires a large market or demand and relies upon a special climate of combination between universities, industry and government to function efficiently. Therefore, it is very important for a country to systematically formulate specific goal-oriented “technological strategies” by prioritizing technology-related sectors, not in a disjointed way, but in the overall context of long-run national objectives of accomplishing technological self-reliance and autonomy from foreign control.

In pursuance of the goal oriented technological strategies and in keeping with the philosophy of self-reliance of science and technology policy-making apparatus, with close coordination of development planning apparatus, was established under various ministries and under the direct control of Prime Minister Nehru himself. As we shall attempt to show below, a large part of indigenous capability building through the state supervised industrialization and technology acquisition and generation programme may be ascribed to the initial Nehruvian legacy in the Indian economy.

24 S. Gopal, Jawaharlal Nehru: Towards A Biography, Oxford University Press, New Delhi, 1979, pp.18-22.
25 William R. Kinter and Harvey Sicherman, Technology and International Politics, Lexington, Massachusetts, p.75.
26 A “technical strategy” is a highly purposeful and structured activity with the comprehensive and systematic use of technology to enhance or maintain the nation’s entire scientific and technological endeavour. Therefore, choice of a technological strategy should have ‘national interest’ as priority while interested agencies or groups or private firms may be involved in individual goal seeking without impinging on the national, and social objectives. See. Victor Basiuk, Technology, World Politics and American Policy, Columbia University Press, New York, 1977, pp.215-229.
I.6 INDUSTRIALISATION AND SCIENCE AND TECHNOLOGY GENERATION AND ACQUISITION

For the purpose of analyzing the interlinkages between industrial policy, science and technology policy in the overall context of developmental planning experience of India from 1947 to 2002 we have divided the total period into four sub-periods in order that the underlying political economy contexts are captured. The first sub-period starting from 1947 to 1970 is characterized by vigorous efforts to build up industrial and technological capabilities in the economy under import substituting industrialization strategy with strong “state activism”. This could be because the Indian entrepreneurial class, among other things, was more developed as a class at the time of Independence and were driven by the spirit of “economic nationalism”. Further, this class wanted to use the State to carve out some autonomous space for itself in trans metropolitan capital. This strategy of state monitored industrialization strategy also extended into the second sub-period starting from 1971 up to 1980. This sub-period, however, witnessed a greater openness of foreign technology and investment, while attempts to preserve the self-reliant development path in the industrial policies, though not given up, were not as vigorous as in the earlier years. The third sub-period starts at 1981, which marks a substantial change in the attitude of the Indian state towards foreign technology and foreign investment. However, the efforts were not brisk, and some kind of vacillation in the matter of totally diluting the role of the state is discernible, owing partly to pressures from “opinion-making” lobbies and partly to the hesitation of the ruling classes to dismantle the state apparatus completely. This period comes to an end by 1990. The last

sub-period was characterized by a major crisis in balance of payments, and paucity of foreign exchange reserves. Indian economic policy has undergone a total change on the issue of state monitored development path. From 1991 onwards a plethora of pro-liberalisation polices culminating in India's becoming a member of WTO and pursuing WTO monitored development path. We make an attempt in the subsequent sections to bring forth the place of the pharmaceutical industry in the context of these developments.

1.6.1 PERIOD 1: STRONG DIRIGISME\textsuperscript{28} (1947-70)

Immediately after independence the Indian endeavour to shake off the colonial influence started manifesting itself in terms of drawing out plans for comprehensive industrialization and agricultural developmental strategies. On April 6, 1948 the Government of India announced its first Industrial policy resolution, entailing maximum utilization of goods and services and achievement of higher standard of living as the main objectives.\textsuperscript{29} Indian industries were classified broadly into three categories; Schedule-A, comprising of heavy manufacturing industries which were to be the state monopoly; Schedule-B which allowed private participation and Schedule-C which included consumption goods industries and was left to the domain of private enterprises.

The Government of India recognized in its IPR-1948, the important role of indigenous technology on the one hand, and participation of foreign capital and enterprise on the other, for achieving the programme

\textsuperscript{28} We are using the expressions 'dirigisme' and 'dirigiste' in a similar way as Prabhat Patnaik has developed and applied these concepts to the Indian context over a period of time. Prabhat Patnaik had in fact argued at different points in time various facets of Indian dirigisme. He argued, for example, that the Indian dirigisme was a classic case of bourgeois economic nationalism characterized by the state pursuing a relatively autonomous capitalist development path. He stated: "...protection against foreign goods and capital (even while collaborating with the latter), non-alignment, a democratic polity, and a strong state capitalist sector were the hallmarks of the Indian dirigiste strategy. P. Patnaik, ibid.

\textsuperscript{29} Government of India, Industrial Policy Resolution, April 6, 1948, New Delhi, para 8.
of rapid industrialization.\textsuperscript{30} As regards the investment of foreign capital in industry it was decided that the manner and scope of such investment should be regulated in the national interest. The policy in regard to foreign investment was further explained in the First Five Year Plan, where it was considered desirable that foreign investments “should be channelized into those spheres which were in urgent need of development”.\textsuperscript{31}

In fact, the pharmaceutical industry was considered one of the priority sectors, which was in requirement of foreign direct investment and also foreign technology. The First plan also recognized the importance of coordination of scientific and industrial research for rapid industrialization. It said, “while the institutions engaged in research have to develop and maintain contacts with industry so that the results obtained by them are applied in practice, it is at the same time the responsibility of managements in industry to be on the alert for new inventions and innovations in their field of work.”\textsuperscript{32}

The Industries (Development and Regulation) Act was passed in 1951 to enlarge the sphere of Central Government to cover some more important industries under its umbrella. The act also empowered the government to establish Development Councils in Scheduled Industries. Among the various functions assigned to the Council, one of the critical functions was, “to promote, undertake scientific and industrial research and the collection and formulation of statistics.”\textsuperscript{33}

Although there have been various pronouncements with regard to the co-ordination of scientific research with industry, no significant breakthrough was achieved in this direction until the commencement of Second Five Year Plan in 1956. Simultaneously, the government had announced the Second IPR on April 30, 1956. The Second IPR and the

\textsuperscript{30} ibid., paras 8-10.
\textsuperscript{31} Government of India, \textit{First Five Year Plan}, New Delhi, 1952, p.412.
\textsuperscript{32} ibid. p.413.
\textsuperscript{33} ibid. p.424.
Second Plan both laid emphasis on heavy and machine-making industries, expansion of the public sector and shift in the existing pattern of investment.\textsuperscript{34} Further, the Second Plan differed from the first in two major respects; a) in the reduced share of agricultural investments; and b) the shift, within the enlarged share of the organised industrial sector, towards ‘heavy’ industry.\textsuperscript{35} Though the Second IPR of 1956 laid the basic framework of Indian policy toward foreign participation in domestic industries, there was no direct reference to import neither of technology nor about the establishment of in-plant R&D in indigenous industries. However, there were articulate references toward preference for Indian technological know-how over foreign know-how.

Interestingly, private capital and foreign capital were not unhappy about the increased investments in the public sector. Rather they wanted more public investment flows into areas like infrastructure and machine building which involve high risks and long gestation periods and are therefore not attractive to them to make investments in.\textsuperscript{36} Nevertheless, the pharmaceutical industry was not to be a state monopoly, according to the second IPR of 1956, since it was put in Schedule B category of industries. In this schedule the public sector units, private sector units and foreign sector units were to operate without any discrimination. The second IPR states:

"Industries in the second category will be those listed in Schedule B. With a view to accelerating their future development, the State will increasingly establish new undertakings in these industries. At the same

\textsuperscript{35} ibid. p.87.
\textsuperscript{36} The authors of Bombay Plan expressed the idea that private capital could take over the more profitable investments at a later date and also hoped to buy up some of the enterprises, which were to be created in the public sector. Ironically the present public sector divestment policy is carried out as a part of the strategy to integrate Indian economy with WTO regulated international regime. See \textit{The Bombay Plan}, New Book Company. 1944.
time, private enterprise will also have the opportunity to develop in this field, either on its own or with State participation”. 37

Clearly the pharmaceutical industry, indeed as it was in Schedule B was to be developed rapidly. Further, it is clear from the phraseology that the growth of the Indian public sector was not intended to block either the interests of private capital or foreign capital. Indeed, the outlook was one of co-existence of private and public investments with the intention of promoting the larger interests of private capital in the long run.

Prime Minister Nehru’s perception of industrialization had always centred on the concept of according a major thrust to science and technology. His unflinching faith in science as a salvaging mechanism for many ills afflicting the Indian economy, polity and society are well documented. He declared: “It is science alone that can solve the problem of hunger and poverty, of insanitation and illiteracy, of superstition and deadening custom and tradition, of vast resources running to waste, of a rich country inhabited by starving people. Who indeed could afford to ignore science today? At every turn, we have to seek its aid – The future belongs to science and those who make friends with science”. 38

This staunch faith of Nehru in Science and his adherence to centralized economic planning had been quite instrumental in the development of a strong research and scientific base in India through the creation of national laboratories and scientific and research institutions. In continuation of his commitment to science and technology Nehru established an advisory committee with himself as chairman to coordinate scientific work. The basic purpose of this committee was to avoid duplication in research and to utilize existing equipment to the advantage of the country. In May 1956 the Scientific Advisory Committee to the Cabinet (SACC) replaced this body. Apart from

37 See, IPR 1956, op.cit. paras 10-14.
coordinating scientific and research activity between various governmental and non-governmental research organisations SACC was supposed to formulate and implement scientific policy.

A systematic attempt to carry out applied research in India may be said to have commenced with the setting up of the Council for Scientific and Industrial Research (CSIR) in 1942 as an autonomous body to engage in basic and applied research for fostering industrial development. The Atomic energy Commission (AEC) was established in 1948 under the chairmanship of Homi J. Bhabha, who was also a close friend of Nehru. The establishment of Indian Council of Agricultural Research (ICAR), and the Indian Council of Medical research (ICMR) and various Regional Research Laboratories (RRLs) during the early 1950s stand testimony to Nehru's commendable efforts in building institutions and scientific infrastructural facilities.

1.6.1.1 SCIENCE POLICY

The first move to give a concrete shape to the organization of science in India started with the appointment of SACC in 1956, as mentioned earlier. The formal adoption of Scientific Policy resolution (SPR) took place in 1958. The objectives of SPR were as follows:

i) to foster, promote and sustain by all appropriate means, the cultivation of science, and scientific research in all its aspects - pure, applied and educational;

ii) to ensure an adequate supply, within the country, of research scientists of the highest quality, and to recognize their work as an important component of the strength of the nation;

iii) to encourage and initiate, with all possible speed, programmes for training of scientific and technical personnel, on a scale adequate to fulfill the country's needs in science and education, agriculture and industry, and defence;
iv) to ensure that the creative talent of men and women is encouraged and finds full scope in scientific activity;

v) To encourage individual initiative for the acquisition and dissemination of knowledge, in an atmosphere of academic freedom; and

vi) in general, to secure for the people of the country all the benefits that can accrue from the acquisition and application of scientific knowledge.39

Many researchers, scientists and scholars of repute hailed the announcement of SPR of 1958 as the beginning of India's efforts in organizing scientific and technological pursuits. Homi Bhabha's remarks on the SPR are worthy of recollection: "While Scientific Policy Resolution resulted in a positive and dynamic approach by the Government towards promotion of science education, training of scientific and technical manpower in India, and setting up of sophisticated R&D infrastructure and facilities, their role in promotion of industrial development or indigenisation of imported technologies remained largely undefined, and in practice uncommitted".40

While sub-period-1 represents a thorough going exercise in building up of scientific institutions, and of a strong public sector controlling the "commanding heights" of the economy, there seems to be a lack of coordination between different governmental institutions on the one hand, and the sectoral policies on the other. In fact, there was a strong opinion that there was a greater need for a technology policy than for a science policy. For example, the observations of Atma Ram, the then Director General of CSIR are representative of a trend, which argued the need to conceive a technology policy, which would link science and industry and provide guidelines to the industry. He said that, "Scientific

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Policy Resolution is a well drafted statement of intentions. We are yet to work out a strategy for development.41

Implicit in the statements above, was an argument for a policy regime that would encourage "reverse engineering" (a term which has received a great deal of scorn from the supporters of IPR protection under the WTO regime), which was in vogue at the time and derived its inspiration from the "Japanese miracle". There was strong a group of policy planners and scientific administrators in India, who were impressed with the Japanese success and wanted India to pursue the path of Japanese dirigisme, not only in sub-period-1, but also throughout sub-period-2. During the 1960s the mood of the government administration and policy makers was toward the reform of industrial organization, for which a number of committees were set up. The Industrial Licensing Policy Inquiry Committee examined industrial licensing. In addition there was the Monopolies Enquiry commission in 1964. The Ramaswamy Mudaliar Committee inquired into questions relating to imports of technology in 1966; and the regulation of foreign collaborations was taken up by the Administrative Reforms Committee in 1966 itself.

The Mudaliar Committee pointed out that a tremendous technological gap existed between India and the rest of the world and that India could afford to close its doors to technological developments. Therefore the Committee concluded: "------import of know-how, particularly process know-how or product design, should continue to be allowed on a discriminating basis, so that Indian industry is able to keep in touch with the world technological main-stream. After importing foreign technology wherever this is necessary, it should be the endeavour of Indian research and development to build and develop it to suit Indian conditions, Indian environment and Indian raw material availability.

This in fact is what Japan has done with great advantage to her economy."\textsuperscript{42} The Committee’s fascination for the Japanese model was obvious. The view that the Japanese model could be effectively adopted in the Indian context continued to be held by several policy planners even during the late-1980s when important steps towards liberalization of imports of foreign capital and technology were launched. However, the emphasis on the role of the state as an active player in regulating technology and capital flows, and in exercising its power “to force or promote specific industrial outcomes” was continued.\textsuperscript{43}

\textbf{I.6.2 PERIOD 2: WEAK DIRIGISME (1971-80)}

Some scholars argued that India pursued a liberal policy towards foreign capital and technology from 1947 until 1967 and from 1970 onwards it embarked upon a protectionist strategy of strict controls.\textsuperscript{44} The examples cited in support of this kind of perception are the promulgation of Foreign Exchange Regulation Act (FERA) in 1973, and Indian Patent Act in 1970. It is argued further that Indian industrial houses had pressured the government into embarking on a protectionist path, possibly implying thereby that the Indian corporate sector was making use of the Indian state for advancing their own interests.\textsuperscript{45} However, the above viewpoint does not hold good for the following


\textsuperscript{43} Statement by one of the members of the Planning Commission clearly reveals this fact. See, for example, \textit{Industrial Policy and Technological Innovation}, by Abid Hussain. [7\textsuperscript{th} Foundation Day Lecture, November 7, 1987, RRL, Hyderabad.]

\textsuperscript{44} See, for example, Nagesh Kumar, \textit{Multinational Enterprises and Industrial Organization: The Case of India}, Sage, New Delhi, 1996; also, see, T.N.Srinivasan, “India’s Reform of External Sector Policies and Future Multilateral Trade Negotiations,” Center Discussion Paper No. 830, Yale University, Yale. 2001.

reasons. First, as we have argued earlier, FERA was not necessarily favourable to Indian corporate sector, in any special way. The Indian Patent Act of 1970 was the result of discussions over a long period prior to the commencement of the 'protectionist regime' in question. Second, Bagchi et. al. have indicated in their study,\(^{46}\) that despite the existence of IPA the utilization of patents by indigenous corporate sector was not so favourable. However, in the case of pharmaceutical industry, the provision of process patenting for a short span of time (five years from the date of sealing) rather than the right for product patenting for a full length of patent life of fourteen years gave the Indian drug firms a competitive edge over the rival foreign companies.\(^{47}\) As a representative government elected by the popular vote, of a country that has emerged out of colonial rule, it encountered two compulsive challenges: one, the country faced a severe foreign of exchange crisis, and two, there was a visible dearth of local entrepreneurs. Probably these reasons also weighed significantly in the government adopting a more favourable attitude towards foreign collaborations and foreign investments in that period. As the local fund of entrepreneurship, capital, and technology increased, the foreign collaboration policy was made more selective and restrictive in the late 1960s itself. In fact, the procedure of approvals of foreign collaboration proposals was stream lined in 1968. One of the steps initiated in streamlining foreign capital inflows was establishment of the Foreign Investment Board (FIB) to deal with cases below Rs.2 Crores or the proportion of foreign equity up to 40 percent, and those exceeding than stipulated were referred to the Cabinet Committee. A sub-committee of the FIB was empowered to approve cases of foreign collaboration in which the proportion of foreign-held equity did not


exceed 25 percent and total equity investment up to Rs.1 Crore. The administrative ministries were authorized to approve cases involving purely technical collaboration.

In addition, the government, through three lists, separated areas: (a) where no foreign collaboration was considered necessary, (b) where foreign technical collaboration was permissible, and (c) where even financial collaboration could be considered. Such lists were to be updated at regular intervals. With regard to technical collaborations, maximum rates of royalty were specified for different items, with a maximum ceiling of 5 percent, for a period of normally five years. In order to ensure that foreign collaboration was avoided in areas where local technology might be available, local scientific agencies were represented on FIB and other screening bodies. Another guideline issued by the government, also in 1968, was that wherever Indian consultancy was available, it was to be utilized exclusively. If foreign consultants were also required, Indian consultants were to be given the prime role.

The guidelines for foreign collaboration that evolved over time required the importer to furnish the reasons for preferring the particular technology and its source. The technology imported should also be available for sublicensing within the country and should have no minimum guaranteed royalty or restrictive clauses with respect to exports, source of capital goods, raw materials, or spares. Foreign brand names should not be used for internal sales, and there should be no limit to renewals or extension of the collaboration. All the measures described above, could also be representative of the fact that Indira Gandhi, the then Prime Minister, wanted to deliberately keep up her “left- image” to garner popular support, by playing down on foreign capital.

The present exercise in this section so far has been to show that in sub-period-1 a systematic and comprehensive effort had been undertaken to strengthen, streamline and devise statutory procedures to acquire foreign capital and technology through overall supervision of the state. According the state a pre-eminent position, so that the benefits of scientific and technological gains are properly synchronised was the quintessence of the Nehruvian strategy unveiled in sub-period-1, which was carried over to sub-period-2. Hence, promulgation of FERA in 1973 represents only continuation of the consolidation process started in the earlier period. Similarly, the Indian Patent Act (IPA) 1970, also has its origins in the previous period. Before IPA was finally announced, there were three conferences of scientists, educationists and technologists, which were held in 1958, 1963 and 1970 respectively. At these conferences discussions were generally concerned with physical inputs for research and development, manpower resources, and some organizational and structural aspects of scientific institutions.

On the 17th of August 1968 the SACC was reconstituted as the Committee on Science and Technology (COST). The COST Report on Science and Technology in 1970, states: “the inputs of research and development in certain sectors such as health, irrigation, power, geology, university research (to name only a few) have not been commensurate with their activities or their responsibilities. These sectors should have received higher priorities in the context of the goals set for them and programmes that have been sought to be implemented.”

In May 1971, the Department of Science and Technology (DST) was created along with the setting up of the National Committee on Science and Technology (NCST). These two bodies were supposed to appraise, evaluate and redirect the implementation of scientific and technological programmes and to create guidelines for distribution of funds for R & D.

The NCST and DST had drawn up the first ever Science and Technology Plan (STP) that was to be an integral part of the Fifth Five Year Plan. The STP, which was placed before the Parliament in 1973, echoed the objectives contained in the Draft Fifth Five Year Plan: “The Science and Technology Plan as an integral part of the Fifth Plan is one of the major policy instruments for achieving self-reliance. Maximum utilization and development of indigenous scientific and technological elements for achieving the targets of the Fifth Plan may require suitable adjustments in fiscal policies, lending policies of public financial institutions and foreign exchange allocation policies towards foreign investments”.\textsuperscript{50} The domestic scientific and technical effort, it was envisaged in the same document, must be committed not only to the operation of technology through R & D, but also learning, adopting, improving and then displacing imported technology.\textsuperscript{51}

As many official documents before and after the enactment of IPA clearly show, whether or not there was pressure from the domestic industry to enact such a patent law, it was in keeping with the Indian perception of long-term objectives of self-reliance as a part and parcel of overall developmental planning.

During the period of \textit{weak dirigisme} (1971-80), two important events occurred as regards the Indian pharmaceutical industry. First, the Hathi Committee Report (HCR), which came out in 1975, examined thoroughly the questions concerning production, pricing, technology and distribution (among many other related things, which the Committee examined) in the Indian pharmaceutical industry. Immediately, as a sequel to the HCR the first ever drug policy in India was announced in

\textsuperscript{50} Government of India, \textit{Draft Fifth Five Year Plan, 1974-79}, Part-I, para 2.29, pp.18-19, New Delhi, 1974.
\textsuperscript{51} Ibid.
1978, which later came to be referred to as the New Drug Policy.\textsuperscript{52} However, the establishment of the public sector pharmaceutical firms the Hindustan Antibiotics Limited (HAL), and the Indian Drugs and Pharmaceuticals Limited (IDPL) took place during sub-period-1 only, as a part of the general strengthening of the public sector units in various industries. Second, the announcement of Drug Price Control Order of 1979, which was more comprehensive in terms of coverage of formulations and was intended to be more on the lines of the HCR.

The period 1971-80 represents a weak dirigisme for two fundamental reasons: (a) a conspicuous slow down of public institution building, public-funded R&D, and weak coordination of activities between different government institutions on the one hand, and university research on the other; (b) there were no efforts to create additional statutory, provisions to strengthen indigenous industrial and technological capabilities directly, except for the enactment of FERA of 1973. There were attempts to modify and dilute the provisions of second IPR of 1956 in the year 1979.

I.6.3 PERIOD 3: DIRIGISME IN RETREAT (1981-90)

During the early 1980s the government came forward with the explanation that India experienced a severe foreign exchange crisis in 1981 and faced an acute balance of payments problem. To tide over this crisis the government claimed that it had borrowed a 5 billion SDR loan from the International Monetary Fund (IMF). However, it is not clear that IMF loan was necessitated by the b.o.p. crisis. After all India did not take the full loan. It was a puzzle at that time why India had gone in for

\textsuperscript{52} We had examined at length the questions raised by HCR and evaluated in detail the drug policy of 1978 in our earlier study. See J. Manohar Rao, \textit{New Drug Policy and the Prospects of Self-Reliance: A Study of the Drug and Pharmaceutical Industry in India}, (unpublished M. Phil thesis), Jawaharlal Nehru University, New Delhi, 1981.
such a loan. Many experts who had analyzed the situation at the time felt that it was the beginning of liberalization era, since the loan came with severe conditionalities, and that would demand altering the course of self-reliance that had been pursued until then. Consequently, important changes in industrial policy were announced. The major thrusts of the policy changes were more towards a liberalized regime. As a part of the changed strategy the process of liberalization garnered momentum from 1982 onwards, the first step of which was review of FERA companies and delicensing of twenty-five broad categories. Broad banding of products in 28 industries, which started with chemicals, and pharmaceuticals in 1986. Liberal credit facilities and encouragement of foreign collaborations were prominent among the many other incentives that were advanced as a part of the liberalization package.

The development which charted a different course for the Indian industry in general and the pharmaceutical industry in particular, was the first ever formulation of technology policy in India, which was announced in 1983, with the title Technology Policy Statement (TPS).

It is not possible here to capture the overall developments of the functioning of macro-economy during the period of weak dirigisme, due to various reasons, in particular the fact that in doing so the focus of the problem that we are dealing with here may get diffused. Hence, we prefer to confine to the TPS of 1983, particularly the aspects relating to imports

53 Prabhat Patnaik, among many others, had warned that India was embarking upon an IMF loan, which could be avoided. He was particularly insistent that India was pushing itself into pursuing on an IMF dictated strategy of liberalization in the ensuing period of time, as a result of that loan. See P. Patnaik, "Foreign Capital and Technology in India's Economic Growth: A Note", Paper presented at National Seminar on Import of Technology and its Impact on Development, May 12-13, 1979, New Delhi.
of foreign capital and technology, the philosophy of self-reliance, and the implications for Indian pharmaceutical industry.

In 1976, a Technical Evaluation Committee with officials drawn from the CSIR, the DST and the DGTD was set up to assist the FIB in screening foreign collaboration proposals. There were some strong proposals to ‘reform’ certain decisions of the Second IPR of 1956, so that some kind of ‘free flow of capital and technology’ could be facilitated.54

It must be noted here, however, that there was change in government at the Centre, with the Janata Party assuming office in 1977. The new government, which survived less than three years, was responsible for certain modifications in the industrial policy. One of important features, which distinguished Janata Party government’s industrial policy with the previous ones, was its emphasis on rural industrialization with the help of District Industries Centres. Though there was this shift in the Janata government’s emphasis, it did nevertheless continue with the philosophy of self-reliance, which was also reflected in the New Drug Policy of 1978. However, when TPS was announced in 1983 Indira Gandhi was in power, and it was Rajiv Gandhi’s Congress, which won a landslide victory in 1984 after Indira Gandhi’s assassination. The TPS also continued to place emphasis on the reduction of technological dependence in key areas. Technology acquisition from abroad was not to be at the expense of the national interest, and due recognition and encouragement was to be given to indigenous efforts. The TPS contemplated the preparation and periodic updating of lists of technologies that had been adequately developed locally, and when the local technologies were available, imports would not be permitted in the same areas. Still, if a certain importer insists on importing such technologies where local substitutes are available, the onus of demonstrating the necessity of such an import was on the import

A National Register on Foreign Collaborations (NRFC) was to be developed to provide analytical inputs at various stages of technological acquisition, as a part of the TPS included a technology Absorption and Adaptation Scheme (TAAS), which aimed at providing catalytic support for the accelerated absorption and adoption of imported technologies. It was made mandatory for all importing firms to highlight steps taken towards the absorption of technology imports.

Though the TPS of 1983 marked a kind of political liberalisation strategy, sometimes veiled in the guise of philosophy of self-reliance, the more "liberal" attitude towards technology imports was quite evident from the year 1979 itself. Capital goods imports outside the category of Open General License (OGL) were allowed selectively and restricted to a limited specified quota up to 1979; and even these imports required prior approval of the concerned authorities. In the post-1979 scenario, the emphasis was on international competitiveness in order to increase manufactured exports, and in pursuance of this objective technology import policy was liberalized. The gamut of OGL was expanded to include capital goods imports against replenishment (REP) licenses without the government's prior approval. The Ministry of Commerce set up a coordination committee to sanction foreign exchange for the import of know-how, designs and consultancy in the process of modernizing export oriented units. The capital goods in respect of 13 specified core sector industries were thrown open to global tenders after 1978-79, irrespective of local availability. Policy guidelines were issued in November 1980 to streamline foreign collaboration approvals.

Although India has made considerable progress towards the self-reliance and building up of indigenous science and technology capability, its

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achievements have fallen short of both the expectations and the potential. Thus the proportion of projects, particularly in large and modern industries, based on indigenous technology is still minimal. In spite of the fact that substantial investments are made in R&D in public funded research institutes and national laboratories the proportionate technological outcomes for industrial and commercial application tend to be quite small.\textsuperscript{57}

\textbf{1.6.4 PERIOD 4: DIRIGISME UNDER SIEGE BY THE WTO (1991-2002...)}

The economic reform process initiated in the 1980s gathered momentum in 1991. Several liberalization measures – abolition of controls, regulations, and licensing mechanisms were pushed through, eliciting the comment from J. Bhagwati: “reform by storm has suffocated the reform by stealth of Mrs Gandhi’s time and reform by reluctance under Rajiv Gandhi”.\textsuperscript{58}

Following the death of Rajiv Gandhi, P.V. Narasimha Rao, who became Prime Minister in 1991 inducted into his cabinet Dr. Manmohan Singh, a noted economist as Finance Minister. Soon after assuming office the Prime Minister and the Finance Minister announced a programme of economic liberalization, which included measures like

\textsuperscript{57} For instance, the gross income of NRDC, which is the sole agency for licensing CSIR innovations, from royalty and premia on account of licensing in the year 1981-82 was a meager Rs.1.02crores, compared to remittances of Rs.286.69crores made by enterprises in the form of royalty, and technical fees in the same year and an expenditure of nearly Rs.100crores in CSIR laboratories. See, Department of Science and Technology, Research and Development Statistics, 1980-81, DST, New Delhi, 1982. In fact, Bagchi et.al. have shown that despite the efforts from various CSIR Committees, the manufacturing firms regularly opted for foreign collaboration route, bypassing various requirements regarding ceilings on payment of royalties for licenses of patents or manufacturing blueprints obtained from foreign firms. See, A.K.Bagchi and S.Dasgupta, "Imported Technology and the Legal Process" in A.K.Bagchi and N. Banerjee(eds.), Change and Choice in Indian Industry, K.P.Bagchi and Company, Calcutta, 1981. pp.393-416

devaluation of currency to improve export performance and global competitiveness of Indian industries, delicensing and deregulation of domestic industries, disinvestments of public sector, and reduction in import tariffs, abolition of quotas, and shift towards currency convertibility among many other things.

There are a number of reasons that were advanced by the government as justification for giving up the philosophy of self-reliance, pursued until then. One of the prime reasons, as mentioned by the government, as the inevitable basis for resorting to large-scale borrowing from the IMF and World Bank, and the subsequent macro-structural changes in the Indian economy, was the severe crunch in foreign exchange reserves and the consequential crisis in balance of payments. However, certain tell tale pointers towards pursuit of liberalisation agenda were distinctly visible even before 1991. The macroeconomic stabilization programme started with exercises of controlling fiscal deficits, restricting money supply and major devaluation of rupee in 1991-92. The rupee was made partially convertible by 1992-93, fully convertible on trade account in 1993-94 and fully convertible on current account by 1994-95, with the hope that this exercise would bring in much anticipated foreign investment on the one hand, and boost Indian exports in the world market on the other.59 Much before these measures were initiated the Indian government had undertaken a large-scale removal of restrictions on imports of capital goods and expanded items under OGL. The liberalized trade policy had evolved over a period of time. For example, the P.C. Alexander Committee (1977), the Abid Hussain Committee (1984), and the Narasimham Committee (1985) had in some way contributed to the transformed trade-policy. In fact, the announcement of the Long Term Fiscal Policy (LTFP) of 1985, which had

envisioned the complete removal of import licensing, had its moorings in the above-mentioned committees' recommendations.60

Even staunch supporters of 1991 economic reforms have acknowledged this fact. The statement by I.M.D. Little, aptly sums up the situation.

"The macro-economic crisis of 1991 was the occasion for reform. But while adjustment, in the sense of a large reduction in the domestic absorption of resources, was forced by the crisis this was not wholly true of the accompanying programme of structural reform. A realization that a major change of economic system was needed had been slowly gaining ground in policy-making circles over the previous decade. The crisis permitted the new Prime Minister to take advantage of this change of outlook, and initiate a wide ranging programme of reform with devastating speed".61 However, some protagonists of economic reform were not happy with the pace at which the whole reform process had been progressing. For example, Khatkhate in a review article62 lamented that Indian politicians and economists resisted the speedy process of Indian economic reforms for the past three decades.

The major protagonists of the 1991 reforms have time and again emphasised that the principal challenge for macro economic policy in India is to reduce the fiscal deficit of the government and, more broadly, the deficit of the non-financial public sector (NFPS) in a way that is supportive of the efficiency and equity aspects of the reform programme.63

60 ibid.
It is also argued that large fiscal deficits were responsible for macro-economic instability and the proximate cause of 1991 economic crisis.\textsuperscript{64} Therefore, it was suggested that reduction in public expenditure by both central and state governments, public sector disinvestment to retire government debt and thereby reduce interest payments, raising user charges on water, and tariff rates for electricity use, and reduction in fertilizer and food subsidies were the requisite steps for reducing fiscal deficits and budgetary losses.\textsuperscript{65}

Prabhat Patnaik has argued against these notions at different points in time and has shown that the proposition relating to fiscal deficits as the cause for high interest rates is theoretically untenable. Likewise to claim that larger fiscal deficits are necessarily damaging to the economy, or that public sector disinvestments can retire public debt to the advantage of the economy, stands to neither theoretical nor empirical scrutiny.\textsuperscript{66}

About the argument that subsidies, particularly, food subsidies should be removed, Utsa Patnaik has argued that large food stocks have been created by the reform policies themselves which have reduced mass income growth and hence mass demand, resulting in a decline in off take and stock piling. She has also observed that there is a simultaneous increase in poverty coupled with lower per capita calorie intake in the country.\textsuperscript{67} In criticizing the globalisation protagonists, she remarks that "the level of literacy on economic theory has reached an all time low",

\textsuperscript{64} Nirupam Bajpai and Jeffrey D. Sachs, "Fiscal Policy in India's Economic Reforms", in Jeffrey D. Sachs et al. (eds.), \textit{India in the Era of Economic reforms}, Oxford University Press, New Delhi, 2000 (PB), pp.81-120.


\textsuperscript{66}ibid.

and "their obsessive adherence to the dogma about reducing the fiscal deficit (at the behest of their Fund-Bank mentors) makes them deaf to all reasoned argument..."\(^{68}\). In fact, such obsession, without any basis in economic theory, she christens as *Talibanisation of Economic Theory*.

The grand finale of the sub-period-4, i.e., *dirigisme* under siege by the WTO, is at the time of India joining the WTO itself in 1995, which has

### TABLE I.5
**GLOBAL PHARMACEUTICAL MARKET BY VALUE (1997-2001)**

<table>
<thead>
<tr>
<th>COUNTRY/REGION</th>
<th>1997 MARKET VALUE</th>
<th>1997 MARKET SHARE (%)</th>
<th>2001 MARKET VALUE</th>
<th>2001 MARKET SHARE (%)</th>
<th>2001 CAGR (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>100</td>
<td>33</td>
<td>129</td>
<td>35</td>
<td>6.5</td>
</tr>
<tr>
<td>West Europe</td>
<td>81</td>
<td>27</td>
<td>101</td>
<td>27</td>
<td>5.7</td>
</tr>
<tr>
<td>Japan</td>
<td>49</td>
<td>17</td>
<td>48</td>
<td>13</td>
<td>0.7</td>
</tr>
<tr>
<td>Latin America/Caribbean</td>
<td>23</td>
<td>8</td>
<td>34</td>
<td>9</td>
<td>10.6</td>
</tr>
<tr>
<td>SE Asia &amp; China</td>
<td>16</td>
<td>5</td>
<td>27</td>
<td>7</td>
<td>12.3</td>
</tr>
<tr>
<td>Middle East</td>
<td>6</td>
<td>2</td>
<td>8</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Africa</td>
<td>6</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Indian Subcontinent</td>
<td>6</td>
<td>2</td>
<td>8</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Eastern Europe</td>
<td>6</td>
<td>2</td>
<td>8</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>C I S</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>12.2</td>
</tr>
<tr>
<td>Australasia</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>297</td>
<td>100</td>
<td>378</td>
<td>100</td>
<td>6.2</td>
</tr>
</tbody>
</table>


far reaching implications for the Indian industry in general and the pharmaceutical industry in particular.

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\(^{68}\) Ibid.
1.7 SITUATING INDIAN PHARMACEUTICAL INDUSTRY IN THE CONTEXT OF THE WTO\textsuperscript{69}

So far it has been shown in the above analysis that the Indian industry in general and the pharmaceutical industry in particular could attain reasonable capabilities in production and technology generation as a result of the strong dir\'gisme until the mid-1980s. It is also argued above that the Indian pharmaceutical industry had gained specifically from the stipulations provisioned in the Indian Patent Act of 1970. This aspect is dealt further in Chapter III below. However, a brief evidence of the competitive capabilities in terms of price advantage and export performance is provided in this section as well. When seen in the international context, the share of Indian pharmaceutical output is in the range of Rs.1500 crores approximately (\$ 3 billion), compared to the world pharmaceutical turnover of Rs.1500000 crores approximately (\$ 300 billion) which is just about 1 percent share.

Table I.5 above gives the status of India's position in the global pharmaceutical market. The major therapeutic categories, which dominate the Indian pharmaceutical market, are provided in Table I.6. Though the share of the Indian pharmaceutical market on a global level may not be significant, but in terms of growth of therapeutic segments, several segments are growing at a compound annual of 15 percent per annum.

Table I.6 below gives us the picture of some of the dominant

\textsuperscript{69} A detailed analysis is available in Chapter III below.
## TABLE 1.6
OVERVIEW OF MAJOR THERAPEUTIC SEGMENTS IN THE INDIAN MARKET

<table>
<thead>
<tr>
<th>Therapeutic Category</th>
<th>Market size (Rs. Billion)</th>
<th>Growth per annum (%)</th>
<th>Major firms</th>
<th>Off Patent Drugs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analgesics &amp; Antipyretics</td>
<td>4</td>
<td>17-18</td>
<td>Burroughs Wellcome, Smithkline, Beecham, Hoechst</td>
<td>Aspirin, Analgin, Paracetamol</td>
</tr>
<tr>
<td>Antacids</td>
<td>1.8</td>
<td>8-9</td>
<td>Knoll, Parke-Davis</td>
<td>-</td>
</tr>
<tr>
<td>Anti-Ulcerants</td>
<td>2.3</td>
<td>17-18</td>
<td>Glaxo, Ranbaxy</td>
<td>Ranitidine</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>21.6</td>
<td>13.5</td>
<td>Glaxo, Ranbaxy, Cibla Hoehrst</td>
<td>Amoxycillin, Ampicillin, Sulphamethoxazole, Cephalixin, Cephalosporins</td>
</tr>
<tr>
<td>Anti-TB</td>
<td>2.9</td>
<td>11</td>
<td>Ciba, Cadilla</td>
<td>Popularly used</td>
</tr>
<tr>
<td>Anti-Diarhoeals</td>
<td>3.9</td>
<td>19-20</td>
<td>Rhone-Poulenc, Smithkline Beecham</td>
<td>Popularly used</td>
</tr>
<tr>
<td>Cardiac</td>
<td>5.6</td>
<td>17-18</td>
<td>Sun Pharma, Torrent</td>
<td>Most drugs</td>
</tr>
<tr>
<td>Corticosteroids</td>
<td>3.6</td>
<td>16.5</td>
<td>Glaxo, Crosslands</td>
<td>All</td>
</tr>
<tr>
<td>NSAIDS &amp; Anti-Rheumatics</td>
<td>5.2</td>
<td>15</td>
<td>Knoll, Roussel, Hindustan Ciba Geigy</td>
<td>All Major</td>
</tr>
<tr>
<td>Respiratory system Ailments</td>
<td>5.6</td>
<td>24.5</td>
<td>Pfizer, Cipla, Parke Davis</td>
<td>-</td>
</tr>
<tr>
<td>Vitamins</td>
<td>5.7</td>
<td>14</td>
<td>E. Merck, Pfizer</td>
<td>All</td>
</tr>
<tr>
<td>Others</td>
<td>1.2</td>
<td>11.5</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Source:** As in Table I.5
players in the various therapeutic segments of Indian pharmaceutical market. In the changed scenario of the 1990s economic reforms and more particularly in the context of the WTO there are important implications for the Indian pharmaceutical firms. They are now expected to concentrate more in the production and trade of off-patent drugs for which there is a substantial market in the world in the wake of generic substitution mentioned earlier, at least, until such time as they invest more in internal R & D efforts and become internationally competitive. This is only one of the many aspects of the post-WTO situation that has come to the fore. A detailed discussion would be taken up later in Chapters IV and V in Part II.

**TABLE I.7**

**INDIAN PHARMA JOINT VENTURES ABROAD**

<table>
<thead>
<tr>
<th>S.NO.</th>
<th>Company</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Ranbaxy</td>
<td>China, Nigeria, Malaysia, Indonesia</td>
</tr>
<tr>
<td>2.</td>
<td>Dabur</td>
<td>Nepal, UAE, Egypt, Canada, Pakistan</td>
</tr>
<tr>
<td>3.</td>
<td>Core</td>
<td>China, Vietnam, Sri Lanka, Dubai, South Africa, Mexico, CIS.</td>
</tr>
<tr>
<td>4.</td>
<td>Kopran</td>
<td>Europe, Canada, China, Middle East.</td>
</tr>
<tr>
<td>5.</td>
<td>Lupin</td>
<td>Thailand, USA, China</td>
</tr>
<tr>
<td>6.</td>
<td>Cipla</td>
<td>China, Africa, Syria, Yemen, Vietnam, Russia</td>
</tr>
<tr>
<td>7.</td>
<td>Dr.Reddy's</td>
<td>Russia, Indonesia, China, Middle East, South Africa</td>
</tr>
<tr>
<td>8.</td>
<td>Wockhardt</td>
<td>USA, Syria</td>
</tr>
</tbody>
</table>

**Source:** As in Table I.5

In the last 15 years or so some Indian firms could emerge strong and have formed joint ventures in other countries. Though the number is
small (about 8 firms) some of these could earn the reputation of being the leaders of the industry. Table I.7 above presents the picture of joint ventures by Indian pharmaceutical firms abroad.

Though Indian pharmaceutical firms seem to have made some forays into the foreign markets through joint ventures abroad, as shown in Table I.7 above, still a large number of critical challenges face these firms in the context of the TRIPS Agreement and the new WTO regime. An attempt has been made in the present study to examine various issues arising out of India joining the WTO, which affect the Indian pharmaceutical firms.

1.8 SUMMARY

In this Chapter the salient and unique features of the pharmaceutical industry are brought about. Being a research-based industry, the pharmaceutical industry derives its strength mainly through patented drugs backed up by aggressive brand-promotion drive by the individual drug firms. In fact, a strong implementation of intellectual property protection by the national governments is a crucial factor in the marketing strategies of individual firms. A broad historical outline of the origin and growth of the therapeutic care and its role in the development of the world pharmaceutical industry has also been discussed.

The world's largest pharmaceutical markets are found to be highly concentrated in terms of production and sales. This trend has been
continuing ever since the allopathic drug care has come into existence. The largest share of 40 percent of market sales was claimed by the US followed by Japan and Germany with 15 and 7 percent respectively. The diversified and conglomerate structure of the industry has undergone rapid changes by the onset of the globalization process in the 1990s. The main restructuring that could be observed in the industry was a series of mega-mergers, acquisitions and takeovers, which started from the early 1990s onwards. This trend has been found to increase its pace with the coming into force of the WTO. The total number of alliances has gone up from 120 in 1986 to 400 in 1994. The period between 1993 and 1998 represented the phase of mega mergers in the global pharmaceutical industry.

The ten largest therapeutic product groups that dominated the world pharmaceutical market during 1995-2000 did not represent any radical departure from the past trend that has been observed for the preceding four decades. The companies, which have been dominating the world pharmaceutical markets since 1955-60, continue to exercise control even in 2002. The world's top ranking drug firms remain to be Novartis, Merck and Glaxo-Wellcome PLC. The difference is that Novartis is born out of merger of Hoechst AG of Germany, and Glaxo-Wellcome PLC is born out of Glaxo and Burroughs Wellcome of the UK. In other words, the period between 1990 and 2000 represented an important phase of centralization and pooling up of capital resources by the largest
corporations of the world. Another important feature of the world pharmaceutical market is that there has been gradual but steady shift within from branded competition to generic competition.

Given the size of the world drug market the Indian share of 1 percent in total world pharmaceutical production is not quite significant. In the early stages of post-Independent India the first and second industrial policy resolutions of 1948 and 1956 respectively gave a definite direction to industrialization and laid foundation for a mixed economy. The industrial licensing policy, the MRTP Act and the Indian Patent Act of 1970 have all played a constructive role in building up indigenous capabilities in the pharmaceutical industry. The Hathi Committee Report on the pharmaceutical industry in 1975, and the New Drug Policy in 1977 have provided the most comprehensive conceptual foundation for an indigenous industrial and technological effort. A large part of indigenous technological capability building was due to the state monitored 'institution building' for technology acquisition, generation and absorption, which was mainly due to the Nehruvian legacy in the Indian economy.

In the foregoing analysis we have argued the 'state activism' has been progressively weakened throughout each subsequent phase starting from strong *dirigisme* (1947-70), to weak *dirigisme* (1971-80), moving to *dirigisme* in retreat (1981-90) and finally culminating in the current phase of *dirigisme* under siege by the WTO (1991-2002...). We have
argued further that these developments are not quite encouraging to the Indian pharmaceutical industry. In the ensuing Chapters we would show that these developments in fact have deleterious effect on the future growth of the Indian drug industry.

In fact we have argued above that India's emergence in the world pharmaceutical market has been taken notice of only after it could successfully compete in the global market, and establish joint ventures abroad.

In the next Chapter we buttress these points by bringing the role of government's policy in the process of technology acquisition in the pharmaceutical industry.