Chapter V

TRANSFER OF SOVIET TECHNOLOGY TO STEEL INDUSTRY IN INDIA AND EGYPT: NATURE AND PATTERN
The technological backwardness and underdevelopment of the Third World were primarily the legacy of colonial and imperialistic domination. As they broke these shackles, it was logical to find them pre-occupied with the primary issue of underdevelopment of their societies. Most of the newly independent developing countries opted for a programme of industrialization in spite of the agrarian character of their economies. Quite a number of these countries initiated a strategy of planned development of heavy industries particularly iron and steel and energy industries.

In some ways India set the pattern by formulating the first five year plan which in a sense was the first important step for its industrialization programmes. The second five year plan really shaped India's drive for industrialization particularly iron and steel industries. Likewise, we find the Arab world under the leadership of Nasser woke up to the need for controlling its resources and organising industrialization. The nationalisation of Suez canal was the first step which also coincided with a planned programme of industrialization in Egypt in the late fifties. Similar trends, although in varying degrees, were noticeable in other developing countries.

However, contrary to their needs and expectations, an international environment, characterised by ideological confrontations, neo-colonial manoeuvres and technological dominance virtually stalled the developing countries' efforts for accelerated
industrialization. International technical and financial cooperation which was an inevitable and necessary corollary for the fulfilment of their development aspirations proved to be a bitter experience. In the emerging scenario, national development through transfer of technology from industrialized countries became problematic. The development of basic industries involved huge capital expenditure, besides technology and expertise; hence it continued to remain stagnant. The fundamental question confronting the newly independent countries remained as to how they would raise the required resources without forfeiting their political freedom. Political nature of international assistance, coupled with the unfair attitude of industrially advanced capitalist countries, imposed severe constraints in the exercise of their technology options.

It was against such a background that the Soviet Union emerged as an alternate source for technology, capital and other resources. By mid-fifties, Soviet programme of economic aid to developing countries had been launched, gradually increasing in its quantity and quality over the following decades. A characteristic pattern of this aid programme was that it became concentrated in those developing countries with which the Soviet Union had managed to develop close and friendly ties. India and Egypt are such examples.

The urge of developing countries for accelerated industrialization also coincided with the potentialities of the
Soviet economy to meet such requirements. Besides, it also coincided with the prevailing Soviet framework of understanding the problems of Third World. Thus the new trends in international scenario as well as the indigenous needs of developing countries paved the way for transfer of Soviet technology to developing countries.

The Soviet Union has transferred its technology and expertise to a number of developing countries. As discussed earlier, besides India and Egypt, it also assisted Iran and Pakistan to establish iron and steel industries. However, the main thrust of Soviet role in the industrialization of developing countries was really directed towards India and Egypt, perhaps more because of the fact that it is precisely these two countries which had introduced fundamental reforms in socio-economic development. It was further facilitated by, as discussed in the previous chapter, the growing convergence in the perception and interests of these countries with the Soviet Union. Hence it is logical for us to examine the transfer of Soviet technology to India and Egypt in the specific context of iron and steel industry.

5.1 TRANSFER OF SOVIET TECHNOLOGY TO STEEL INDUSTRY IN INDIA

On the eve of independence, India displayed all the features of a backward society typical of a subjugated colony.
The economic structure of the country was characterised by a predominantly backward agriculture and virtually stagnant industry dominated by lower forms of production. Manufacturing sector played only a minor role in the economy while light industries dominated bulk of the industrial production, accounting for 78 per cent of the output of manufactured goods. Even in the fairly established industries, production was from 1 to 2.5 per cent of the corresponding per capita production achieved by British industries. The major factor that restricted the growth of Indian industries, particularly iron and steel, was the colonial mode of exploitation enforced in the country by Britain. It had turned India into a colonial source of raw materials, market for British products and a sphere of British capital investment. In the process, it destroyed not only the traditional Indian industry but also impeded the growth of new industries as well.

The development of steel industry in pre-independent India progressed at a snail's pace. The foundation of Indian iron and steel industry was laid in 1871 with the setting up of a small open top furnace at Kulti for the production of pig iron. Since then, the Tata iron and steel works at Jamshedpur, the Indian iron and steel works at Burnpur and the Mysore iron and steel works at Bhadravati were established. On the eve of independence,

India had only two integrated steel plants, both in the private sector, with a total installed capacity of 1.3 million tonnes of ingots.  

In 1950, crude steel production in India stood at 1.4 million tonnes as against the world production of 189.8 million tonnes and consumption remained at 1.8 million tonnes of crude steel. The per-capita consumption of steel, which was exceptionally low in India, around 5 kilograms, reflects the colossal gap in the production and consumption of steel compared to the industrialized countries (see Table 5.1).

Table 5.1

<table>
<thead>
<tr>
<th>Year</th>
<th>Production</th>
<th>Consumption</th>
<th>Per capita consumption (Kgs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>1.4</td>
<td>1.8</td>
<td>5.0</td>
</tr>
<tr>
<td>1955</td>
<td>1.67</td>
<td>2.9</td>
<td>7.4</td>
</tr>
<tr>
<td>1965</td>
<td>6.5</td>
<td>7.5</td>
<td>12.2</td>
</tr>
<tr>
<td>1977</td>
<td>9.7</td>
<td>8.7</td>
<td>18.0</td>
</tr>
<tr>
<td>1987</td>
<td>12.8</td>
<td>15.5</td>
<td>19.7</td>
</tr>
</tbody>
</table>

Source: 1. International Iron and Steel Institute, Steel Statistical Handbook, 1989 (Brussels, 1989), Table 11, pp.37-38;  
2. SAIL, Statistics for Iron and Steel Industry in India 1990 (New Delhi, 1990), Table 21, p.31; and  
As the domestic production of steel could not match the growing requirements in the country, India had to import large quantities of steel during the forties and fifties. Naturally, the idea of indigenous production in proportion to the demand for steel permeated the consideration of the government. It found expression in the programmes of industrial development launched in the course of successive five-year plans in the country.

The first five-year plan, implemented during the period 1951-56, addressed itself to the development of infrastructural facilities such as power, transport and communications, besides agriculture. It also envisaged modest investments in the industrial field; emphasis was laid on the fuller utilisation of existing capacities as well as on the development of existing steel plants in the country. In addition, in pursuance of the decision to establish new steel plants, the Ministry of Production which was in charge of the development of steel industry till 15 June, 1955 made preparatory efforts to establish three integrated steel plants in the public sector.4

Having recognized the importance of iron and steel industry for the fulfilment of the programmes of industrialization, Government of India initiated a series of efforts for the

establishment of new iron and steel plants in the country. In the meantime, the Technical Mission appointed in 1952 had reported a projected demand of 6 million tonnes of ingot steel in 1960-61. As regards the government policy, the Industrial Policy Resolution adopted by the Government in 1948 emphasized clearly the responsibility of the state in the development of basic industries.

Eight years after, through the second Industrial Policy Resolution of 1956, Government adopted the socialist pattern of society as the objective of social and economic policy. It envisaged for the state and the public sector an increasingly active role as far as core industries were concerned. Accordingly, industries were classified into three categories, and development of the first category of industries was the exclusive responsibility of the state. Iron and steel was an important industry which found place in Schedule A belonging to the first category.\(^5\) Thus, by the end of the first plan, Government of India had spelled out its policy with regard to the development of key sectors of the economy.

India was well endowed with the major raw material inputs necessary for steel making in abundant quantities. The iron ore available in the country accounted for 10 to 20 per cent of

the world's total, with an iron content of 60 per cent which was quite impressive by world standards. A wide variety of coking coal, well known reserves of flux grade limestone as well as the location and availability of such reserves offered substantial opportunities for the rapid development of steel industry in the country.

However, scarcity of financial resources remained a major impediment in the growth of capital intensive industries in India. India's depleting foreign exchange reserves, combined with a chronic balance of payment deficit, raised genuine constraints for heavy investment. The extent of the crisis is evident from the fact that the trade deficit of India increased from Rs.217 crores in 1971-72 to about Rs.7,731 crores by 1989-90. Among the other constraints that stood out, prominent were the weak technology infrastructure, inadequate experience in steel technology, lack of skilled personnel and disorganised transport and communication network.

The major impediment that posed severe challenges in the development of steel industry in India was the active shortage of capital resources. International assistance was the inevitable option before the country. Unfortunately, the international environment was characterised by the Cold War, ideological polarisation and military alliances and as such it made it highly

6. Reserve Bank of India, Reserve Bank of India Bulletin, June 1990 (Bombay), S-610.
difficult for India, as for many other developing countries, to mobilise financial and technological resources without subscribing to either of the camps. Aid programmes of developed countries were generally tied to the economic, political and strategic considerations of the donor. It has been rightly argued that while the European imperial system cultivated metropolitan tastes and values among the colonised people, American government and its Western allies developed more benign methods for achieving the same ends.\footnote{M.K.Saini, "Non-Alignment and Multinationals', in V.D.Chopra, ed., NAM Summit: New Delhi to Harare (New Delhi, 1986), p.274.}

India's commitment to preserve her political freedom and sovereignty while seeking capital and technological assistance from the developed countries paved the way for the evolution of non-alignment as a movement. As a policy, it envisaged to promote India's freedom of action and right to choice as well as the capability to judge issues on their merit. It was such identical considerations among the newly independent countries that brought them together at the Bandung Conference of Afro-Asian countries in 1955. The economic issues, as also the political issues, claimed the attention of Nehru, Nasser and Tito when they met in Brioni in 1956 which proved to be the first major step towards giving a specific form and content to the non-aligned movement.\footnote{K.B.Lall and S.D.Muni, "Non-Alignment and the New International Economic Order", in K.P.Misra and K.R.Narayanan,eds., Non-Alignment in Contemporary International Relations (New Delhi, 1983), pp.138-9.}
The Indian leadership appears to have vigorously pursued the cause of newly independent countries. Articulating the socio-economic priorities as well as the philosophy of non-alignment, Jawaharlal Nehru, the Prime Minister of India, in his inaugural address at the United Nations Economic Commission for Asia and the Far East, asserted:

If it is considered right in the larger interest of the world that a country like India and other countries in the East should be industrialized, should increase and modernize agricultural production, it is in the interests of those countries that can help in this process to help the Asian countries with capital equipment and their specific experience. But in doing so, it is to be borne in mind that no Asian countries will welcome any such assistance if there are conditions attached to it which lead to any kind of economic domination. We would rather delay our development, industrial or other, than submit to any kind of economic domination by any country.

Having resolved to establish public sector steel industries, as outlined in the Industrial Policy Resolutions of 1948 and 1956, India approached various industrialized countries such as the United States, West Germany and Britain for technical and financial assistance. Interestingly, in many quarters, it was argued that import of steel would be a viable alternative to establishing domestic steel industry.

As early as late forties, India had appointed two consultants M/s Kopper and Co. and Arthur G. Mckee & Co. of USA and the

International Construction Company of UK with a view to establishing two steel plants of 0.5 million tonnes of ingot capacity each. The British consultants estimated a cost of Rs.90 crores for a one million tonne plant and between Rs.50 crores and Rs.62 crores for a 0.5 million tonne plant. In view of the magnitude of the expenditure involved as well as inability of the country to attract foreign assistance, the proposals had to be dropped. 10

5.1.1 The Origins of Bhilai Steel Project

In the mid-fifties, it was increasingly felt that India will have to establish new steel plants in view of the import of large quantities of steel, the value of which amounted to Rs.320 crores during 1955-57. Moreover, projected demand for steel by 1960-61 was estimated to be around 6 million tonnes which meant a gap of around 3 million tonnes of ingot steel. It was in these circumstances, the secretary of the Ministry of Production visited Germany on 15 August, 1953 and signed a memorandum of association with a firm consisting of a combine of M/s Fried Krupp, Essen and M/s Demag Aktiengesellschaft Schafft, Duisburg for the establishment of a steel plant on highly unfavourable conditions to India.

The agreement with the German combine envisaged the constitution of an Indo-German company to own and manage a steel plant with an installed capacity of half a million tonne of ingot steel at an estimated cost of Rs.80 crores. The terms of agreement maintained that the German combine will contribute share capital in Deutsch Mark not exceeding the equivalent of 20 million US dollars.\textsuperscript{11} Interestingly, the German contribution in this regard was tied to the proportion of payments received in Germany for orders placed with the combine. In addition, it provided for German participation in the board of directors of the company proportionate to their investment.\textsuperscript{12}

Subsequently, a technical consultants agreement was entered into between the Government of India and the German combine on 21 December 1953 which stipulated the role of the German combine as a consultant for a fee of DM 18.9 million.\textsuperscript{13} The German investment under the agreement, which would have amounted to borrowing at nearly 12 per cent, besides equity participation, attracted sharp criticism in the country. Consequently, the collaboration with the German combine on the above

\textsuperscript{11} Memorandum on Indo-German Association in the Indian Steel Plant, Text of Agreements with Messers Fried Krupp, Essen and Messers Demag Aktiengesell Schafft, Duisburg, Government of India, Ministry of Production (New Delhi, 1953), Clause 1.

\textsuperscript{12} Ibid, Clause 4.

\textsuperscript{13} Text of the Technical Consultants Agreement with Messers Fried Krupp, Essen and Messers Demag Aktiengesell Schafft, Duisburg, Government of India, Ministry of Production (New Delhi, 1953), Clause 15.
terms was terminated.

During the early fifties, Government of India approached Britain soliciting technical and financial cooperation for setting up steel industry. The idea of a large scale integrated steel plant in the public sector appeared to be anathema to the former colonial master. However, Metallurgical Export Equipment Company, representing six British engineering concerns, made an offer to a Birla Mission which visited London during the period for a steel plant in the public sector. This point was confirmed by Birla in his reply to the Estimates Committee of the Second Lok Sabha. Birla revealed that "negotiations were concluded for requisite finance from British and American sources without any government aid or guarantee". The negotiations between the Government of India and various international firms from Germany and the UK dragged on for many years.

In the meantime, India had outlined the programmes of Industrial development to be implemented during the second five year plan period (1956-61). It envisaged rapid industrialization with a heavy industry bias within the framework of the Industrial Policy Resolution adopted in 1956. Reaffirming government commitment to the public sector steel industry, the draft second plan observed:

15. India, Lok Sabha, Estimates Committee, n.10, p.7.
The expansion of the iron and steel industry has obviously the highest priority since more than any other industrial product, the levels of production of these materials determine the tempo of progress of the economy as a whole.

The outlay for public sector steel industry increased from Rs.33 crores during the first plan period to Rs.350 crores during the second plan (see Table 5.2). The foreign exchange component in connection with the establishment of 3 new steel plants during the second plan period was estimated to be Rs.228.5 crores.17

Table 5.2

SHARE OF STEEL IN PUBLIC SECTOR IN FIVE YEAR PLAN OUTLAYS

<table>
<thead>
<tr>
<th>Five year plan</th>
<th>Overall allocation in Plan (Rupees in crores)</th>
<th>Outlay in public sector</th>
<th>Outlay in public steel sector</th>
<th>Public sector steel industry to total public sector outlay (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>3,760</td>
<td>1,960</td>
<td>33</td>
<td>1.68</td>
</tr>
<tr>
<td>Second</td>
<td>7,720</td>
<td>4,672</td>
<td>350</td>
<td>7.49</td>
</tr>
<tr>
<td>Third</td>
<td>12,671</td>
<td>8,577</td>
<td>670</td>
<td>7.81</td>
</tr>
<tr>
<td>Fourth</td>
<td>24,759</td>
<td>15,779</td>
<td>1,121</td>
<td>7.10</td>
</tr>
<tr>
<td>Fifth</td>
<td>67,145</td>
<td>40,097</td>
<td>2,237</td>
<td>5.58</td>
</tr>
<tr>
<td>Sixth</td>
<td>172,210</td>
<td>97,500</td>
<td>4,000</td>
<td>4.10</td>
</tr>
<tr>
<td>Seventh</td>
<td>348,148</td>
<td>180,000</td>
<td>6,420</td>
<td>3.57</td>
</tr>
<tr>
<td>Total</td>
<td>636,413</td>
<td>348,585</td>
<td>14,831</td>
<td>4.25</td>
</tr>
</tbody>
</table>

Source: Compiled from Statistics for Iron and Steel Industry in India 1990, SAIL (New Delhi, 1990), Table 295, p.373.


The negotiations between the Government of India and international firms dragged on for many years. The offer of assistance extended by the German and the British sides was tied to various conditions which were found incompatible with the socio-economic realities in the country. It was at this juncture Soviet Union expressed its willingness to assist India in the construction of a one million tonne integrated steel plant in the public sector. In response to the Soviet gesture, the Union Cabinet extended an invitation on 10 December, 1954 to depute a team to study the possibilities. It culminated in the inter-governmental agreement between India and the Soviet Union signed on 2 February, 1955 for the construction of an integrated steel plant at Bhilai in Madhya Pradesh.

The Indo-Soviet agreement on the construction of the Bhilai steel plant was unique in several respects. As per the agreement, an integrated steel plant of 1 million tonne ingot capacity at Bhilai was to be constructed on a turn-key basis by the Soviet Union. To this end, Soviet Union extended a credit of Rs.647.4 million to India which would meet the foreign exchange cost of the plant. 18

The agreement maintained that the detailed project report (DPR) will be prepared by the Soviet organisations. It also envisaged to associate the Indian side at all stages of the work.

in India and in the USSR, pertaining to the planning, construction, erection, operation and other matters relating to the work. The agreement stipulated the responsibility assigned to Indian and Soviet organisations in clear terms. The responsibility of the Indian side was mainly to provide such technical and other data related to the quality and availability of raw materials, besides the organisation and management of the work. 19

Article IX of the Agreement provided that the Soviet organisations shall make available in India and the USSR the services of such number of experts as may be mutually agreed upon from time to time. There were explicit provisions in the Agreement for the training of Indian personnel both in India and the USSR - which is an essential pre-requisite for the effective transfer of skills. The responsibility of the Soviet side, as provided in the Agreement, was not only to supply of equipments and design, erection and commissioning of the works, but also to all aspects of the transfer of Soviet experience and expertise and technology of steel production. 20

The bilateral agreement as well as the DPR provided for a strict time schedule for the execution of the project.


20. Ibid, Articles XVIII-XXI.
According to the planned sequence of the construction work, as provided in the DPR, the volume of building, erection and operation, in per cent of total volume, were set as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>1956</th>
<th>1957</th>
<th>1958</th>
<th>1959</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10</td>
<td>35</td>
<td>40</td>
<td>15</td>
</tr>
</tbody>
</table>

The construction activity on site commenced on 6 May, 1956 and the first blast furnace was commissioned on 4 February, 1959.

The pace with which the bilateral agreement was entered into with the Soviet Union as well as the speed of its execution sent ripples all over. In the wake of the Soviet entry into the field, both the German and British firms, perhaps encouraged by their parent governments, hastened to finalise agreements with India. Thus, when a new agreement was signed with German firms in November 1956, they waived off both their insistence for share in the steel plant and participation in the directorship of the company.

As long as the Soviet Union was not in the picture, British firms raised major objections for their assistance for a steel plant in the public sector. However, Indian insistence for public sector steel plants was acceded to by the British

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side when Soviet Union extended technical and financial cooperation for the Bhilai steel project. It enabled India to set up another integrated steel plant at Durgapur with the cooperation of a British consortium on better terms. In turn, a technical mission from Britain visited India in April 1955 under the Colombo plan to explore the possibility of the Durgapur project. The mission, led by Eric Coates, submitted its report in August 1955 and subsequently, the Government of India entered into an agreement with a consortium of British equipment manufacturers under the name of Indian Steel Works Construction Company (London) (ISCON) during January 1956.

The Soviet offer of assistance, thus, placed India in a better position to negotiate with Western firms. India could reject the demanding terms of the German combine and could arrive at an acceptable agreement with the British consortium primarily due to the Soviet willingness for transfer of steel technology to establish projects in the public sector. Reflecting on the sequence of events, V. Dymshits, who was the chief engineer of construction (Soviet) at Bhilai during 1957-59, observed:


This was the bitter lesson taught by history over the last few centuries. When the Americans came to Bhilai in 1948, they liked the local ore and said that they would not mind putting up a plant, but for themselves and not for Indians.... Western companies were thrown into a flutter when talks got underway between the Soviet Union and India on the construction of a steel plant. They back-pedalled and agreed to concessions. The West German industrialists hastily concluded a contract on the construction of a plant at Rourkela with an annual capacity of not 500,000 tons of steel, as intended earlier, but 1,000,000, that is, the same rated capacity as Bhilai. The British consortium also became more compliant; it agreed to build a third state-owned steel plant at Durgapur. 24

The first phase of India's first steel plant in the public sector was built by the Soviet organisation almost on a turn-key basis. In addition to supplying necessary credits, equipment and machinery and design, Soviet Union made the services of its experts for the construction and operation of the Bhilai steel plant. The maximum strength of Soviet personnel was 819 in 1959 and the number of experts declined as the one million tonne phase was coming to a close (22 February 1961). 25

Even before Bhilai steel plant completed its one million tonne first phase, expansion of the plant was under the active consideration of both the Government of India and the Soviet Union. To this end, another agreement was entered into between the two governments on 12 September 1959, and an additional agreement on 12 February 1960 for the expansion of Bhilai

24. Veniamin Dymshits, How Bhilai was Built, Soviet Land Booklets (New Delhi, n.d.), p.11.

steel plant to 2.5 million tonnes. The agreement signed in 1959 provided for a Soviet credit of 150 million roubles. In pursuance of the inter-governmental agreements, the DPR for expansion was prepared by the Soviet side which was approved by HSL on 20 November 1961.

The bilateral agreements and various contracts signed subsequently contained more or less similar provisions for the participation of Indian and Soviet organisations. A notable feature of the expansion programme was the increasing role assigned to Indian organisations and personnel at different stages of the work.

In pursuance of the inter-governmental agreements for the first expansion of Bhilai steel plant, a contract (No.7300) was signed between Tiazhpromexport (Moscow) and HSL (Ranchi) on 9 February 1962 for the supply of equipments from the Soviet Union. As per this contract, Soviet assistance was extended to the development of Rajhara and Nandini mines, besides the expansion of Bhilai steel plant. As per the contract, the Soviet Union was to supply during the period 1962-65, 67,000 metric tons of the equipment and 137,000 metric tons of materials, including 55,000 metric tons structural and 82,000 metric tons refractories. Para 3 of contract No.7300 provided for the

26. Ibid, p.76.
27. Text of Contract No.7300 between Tiazhpromexport (Moscow) and Hindustan Steel Limited (Ranchi) for Supply of Equipment for Expansion of the Bhilai Iron and Steel Works, Government of India, Ministry of Steel and Mines (New Delhi, 1962), para 2.
deputation of Soviet specialists to India for rendering technical assistance in this regard. There were various provisions, as in the case of earlier contracts and bilateral agreements, for the successful completion of the expansion scheme envisaged. The expansion of Bhilai steel plant from 1 million tonne to 2.5 million tonne was achieved broadly during the period 1962-1967.

The second expansion of Bhilai steel plant from 2.5 million tonne to 4 million tonne stage began with the preparation of the feasibility report by the Central Engineering and Design Bureau, now re-named as Metallurgical Engineering Consultants (MECON), India in February 1970. The DPR for 4 million tonne expansion of Bhilai was submitted by MECON in September 1973 and approved by HSL in 1975. The second expansion of Bhilai steel plant to 4 million tonne stage envisages various technological improvements such as continuous casting and heavy 3,600 mm wide plate mill. The expansion programmes are also characterised by larger indigenous participation at the design, equipment manufacture and other levels.

In proportion to the increase in indigenous participation, the role of Soviet organisations at the 4 million tonne expansion stage of Bhilai steel plant progressively declined. However, a number of Soviet organisations actively participated in the expansion programme in various capacities. For instance, of the 75 major areas for which documented analogous drawings were required by MECON, majority were supplied by Soviet organisations.
According to preliminary division of supplies, the continuous casting plant was proposed to be manufactured in India on the basis of the technical project for equipment to be elaborated by Soviet organisations. It suggests the qualitatively higher level of Soviet participation with the progressive growth in indigenous skills.

5.1.2 The Origins of Bokaro Steel Project

As the pace of industrialization gathered momentum, demand for flat products was found to increase in the country. Most of the requirements of quality flat products were imported in the fifties and sixties which accounted for a major chunk of the import bill. The value of imports for five years during the second plan period totalled about Rs.519 crores. The production and demand forecast for the third plan projected an acute shortage of flat products such as sheets and tin plates.

In view of the growing demand as well as acute shortage of flat products, Government of India had kept Bokaro as the possible location for the fourth integrated steel plant in the public sector, producing such products. The Hindustan Steel Limited which was entrusted with the responsibility of organising


Bokaro (until 1964), commissioned M/s Dastur & Co., the leading Indian consultants, to prepare the DPR. As per the DPR submitted by Dastur in July 1963, the stage I of the plant (1.5 million tonne) was estimated to cost Rs.3,577 million with a foreign exchange cost of Rs.1,516 million. However, no action could be taken to pursue the Dastur report in the absence of foreign aid. 30

Bokaro, the fourth integrated steel plant in the public sector, was established in the sixties with the active cooperation of the Soviet Union. However, Indian efforts for raising the required capital and technological resources were intertwined with various humiliating experiences, particularly from the United States. Although at different times the United Kingdom, Soviet Union, Japan and West Germany came into the picture, from the time it was seriously thought of in the 1960s, it was the United States that India approached formally for technical and financial cooperation. In the light of Soviet participation in the construction of a steel plant at Bhilai, besides German and British participation at Rourkela and Durgapur, respectively, it was natural for the United States to have extended assistance for India, thereby balancing the 'perceived' Soviet pre-eminence in the Third World. It is also likely that the renewed Cold War trends in the sixties prompted the US

30. India, Lok Sabha, Committee on Public Undertakings (1969-70), (Fourth Lok Sabha), Sixty-eighth Report, Bokaro Steel Ltd. (New Delhi, 1970), pp.3-4.
administration to extend their assistance for realizing an American showpiece of private enterprise at Bokaro.

The establishment of Bokaro steel plant was preceded by a protracted ideological tussle between the Government of India and the US administration. The American proposal for assistance envisaged an Indo-US consortium to construct, own and run Bokaro steel plant. It ran counter to the Indian approach which was guided by the Industrial Policy Resolution of 1956. When the US Agency for International Aid (AID) officials visited the country in early 1962, Government of India repeated its insistence on building a government owned steel plant at Bokaro.

In the wake of the unresolved ideological conflict over public sector, the United States began to evolve various technical and other excuses to disengage themselves from the whole affair. A re-revised formula of semi-alloyed enterprise in which US firms participate with Indian Government in the construction of state-owned steel plant was also forwarded subsequently.31 The idea of a fresh 'feasibility survey' exclusively by the US side also emerged. The new feasibility report submitted by the United States highlighted deficiencies of raw materials, transport, skilled manpower and infrastructural facilities. Inevitably, the AID lobby not only called into question social priorities in the country, but seized the

feasibility report to question the feasibility of an immediate aid decision. However, the real issue at stake was pertaining to the ownership and management of Bokaro.

On the issue of management, the US team raised far-reaching issues of policy. First, it recommended that Bokaro should be managed by an organisation separate from HSL which controlled the existing three public sector steel plants. Secondly, it categorically declared that the organisation will have to surrender complete management to the Americans for a considerable period. The Committee on Public Undertakings, in its sixty-eighth report (Fourth Lok Sabha) reveals that as per the US proposal, the management of the steel plant would have to be entrusted to an American firm for a period of 10 years. The idea was to bring back the US consortium to take over Bokaro and develop it as an 'American impact project'. These proposals which would have paved the way for US capital infiltration in India not only violated the basic tenets of the industrial policy but were inimical to the interests of the country.

The first and foremost consideration underlying the objections raised for US assistance for Bokaro was ideological - the insistence on the primacy of private enterprise over public

32. India, Lok Sabha, Committee on Public Undertakings, n.30, p.6
sector. It was argued that commitment of half a billion dollars to a single steel plant in the Indian public sector was contrary to American way of life. It has also been argued that a modern steel plant such as Bokaro would have posed severe threats to US shipping and steel interests. A final anti-collaboration argument proceeded from the position that American credits to Bokaro would be an unsound investment. 34

The idea of American participation for Bokaro steel plant in the public sector was vigorously discouraged by the US steel industry, American press and the Congress. By the time the House of Representatives took up the Broomfield amendment to bar aid to Bokaro in August 1963, the climate of US support to Bokaro had become intensely hostile. The Broomfield resolution provided Bokaro a decent burial in the 'American style' and indirectly prompted India to withdraw its request for aid. The Bokaro fiasco made the Union Minister C.Subramaniam to announce in the Lok Sabha on 11 September 1963 that "the time has come for us to withdraw the Bokaro steel plant from the list of projects for which we seek US aid". 35

The US assistance for Bokaro steel plant having become unrealistic, Government of India resolved to invite open tenders


for separate sections of the plant from abroad. It was in this context Soviet Union expressed its willingness to assist India in realizing the Bokaro project. India responded quickly by sending an official delegation to Moscow in July 1964. It culminated in the signing of an inter-governmental agreement between India and Soviet Union on 25 January 1965 for financial aid and technical cooperation for the establishment of the plant.

The agreement envisaged the setting up of a public sector steel plant at Bokaro with a capacity of 1.5 to 2 million tonnes of steel per year with provision for expansion of the capacity to 4 million tonnes of steel per year. To this end, Soviet Union committed to the Government of India a credit up to 190 million Roubles bearing 2.5 per cent interest per annum.36 Article 2 of the inter-governmental Agreement provided for the preparation of the DPR for the works with a capacity of 4 million tonnes by the Soviet organisations, besides the working drawings of the shops. The Agreement containing 18 Articles included provisions for the supply of equipments, training of personnel both in India and in the Soviet Union as well as substantial local participation at all levels of the project. The credits extended by the Soviet Union for the Bokaro project was to be repaid in 12 equal

annual instalments. Thus, Indo-Soviet agreement on Bokaro steel plant contained almost all the features of the inter-governmental agreement entered into earlier for setting up Bhilai steel plant.

Within the purview of the inter-governmental agreement, a contract (No. 7622) was signed by the Bokaro Steel Limited (BSL), New Delhi, with Tiazhpromexport, Moscow on 6 February 1965. As per this contract, the Soviet side was to furnish the DPR for Bokaro project within nine months of signing the contract (No. 7622). The DPR of Bokaro comprising of 27 volumes was submitted by the Soviet side on 22 December 1965. The Memorandum on the acceptance of the DPR reveals that the detailed project report prepared by the Soviet organisations incorporated the most progressive technology and many other recent developments of Soviet and world practice, high capacity units, comprehensive mechanization and automation of technological processes and transport systems.

Indo-Soviet collaboration in the construction and expansion of Bokaro steel plant displays a number of important

37. Ibid, Article 8.
38. Text of Contract No. 7622 between "Tiazhpromexport" (Moscow) and Bokaro Steel Limited, Signed on 6 February 1965, Government of India, Ministry of Steel and Mines, BSL (New Delhi, 1965), Para 2.
features. As provided in the DPR, efforts were made to install the best technology in steel making such as continuous casting and computerisation and automation of process controls. In addition, there has been a steady growth in the indigenous participation, much more than in the construction of the other three integrated steel plants. The Indian metallurgy consultants in the private sector, M/s Dastur & Co. was appointed as Indian consulting engineers on the 1.7 million tonne stage of Bokaro for a period of seven years for a fee of Rs.18.35 million. However, Padma Desai has argued that the Indian consulting firm was gradually edged out of its predominant role as consultants and designers of the plant. A large number of Indian organisation such as MECON, HEC and various private firms played an active role in the execution of the work of Bokaro both in the first phase and its subsequent expansion up to the 4 million tonne stage.

5.1.3 The Origins of Visakhapatnam Steel Project

Indo-Soviet agreement for cooperation in the construction of the Visakhapatnam steel plant is another step forward in the transfer of Soviet technology to India. The agreement between the Government of India and the Government of the USSR for the steel works at Visakhapatnam with an annual capacity of three million tonnes was signed on 12 June 1979. The Soviet Union

40. Padma Desai, n.34, pp.86-87.
extended a credit of 250 million Roubles for the first stage of the project. As per the agreement signed between the two governments on 12 May 1983, another credit of 140 million Roubles was extended for the second stage of expansion up to three million tonnes of annual steel capacity. The amount of credit that will be utilised is to be repaid within seventeen years by equal annual instalments. It carried an interest rate of 2.5 per cent per annum.

The most noteworthy aspect of the cooperation agreement, as the title itself suggests, has been the larger involvement of Indian organisations from the preparation of the DPR to the construction and final commissioning of the plant. The DPR for Bhilai and Bokaro projects was prepared by Soviet organisations whereas in the case of Visakhapatnam, it was to be prepared by Indian organisations, in close consultation with Soviet organisations. In turn, Dastur & Co., the Indian consulting organisation, prepared the detailed project report (in 33 volumes), taking into account the equipment and technology proposed by the Soviet side.


42. Text of Agreement between the Government of India and the Government of the USSR for Cooperation in the Construction of an Iron and Steel Works at Visakhapatnam, Government of India, Ministry of Steel and Mines (New Delhi, 1979), Articles 1, 15.

Construction of this modern integrated steel plant at the coastal location which envisages a capacity of 3 million tonne steel is being built in two overlapping stages of 1.5 million tonnes each. The construction work of the project began in 1982 and the first blast furnace was blown in on 28 March 1990.44 A large number of Indian, Soviet and other international firms are participating in the execution of the project. The construction contemplates application of up-to-date processes and highly efficient units fully in keeping with the world level of steel technology. For instance, by Soviet licence, in coke oven, coke batteries are constructed with coke ovens of 41.6 cm³ volume and 7 m height which are the biggest not only in India but also in the world. The Visakhapatnam project, thus, has become a new model in the transfer of Soviet technology to India.45

The foregoing discussion reveals that India experienced considerable difficulties in setting up indigenous steel industry during the fifties and sixties. It was practically impossible for the country to mobilise international economic and technological assistance in setting up greenfield steel plants. Moreover, as and when Western sources made the offer of assistance,

44. D.R.Ahuja, Visakhapatnam Steel Plant - Built to be a Class Apart, in VSL Souvenir on the occasion of Dedication to the Indian Nation the Visakhapatnam Steel Plant and India's Largest Blast Furnace 'Godavari' on 3 May 1990 (New Delhi, 1990), no page number.

45. V.I.Solodkov, VSP-Yet Another Temple of Indo-Soviet Co-operation, ibid.
it was invariably accompanied by certain terms and conditions which were totally inconsistent with the prevailing national policies and priorities.

On the other, the Soviet Union extended substantial cooperation in the development of iron and steel industry in India on terms quite acceptable to the country. Transfer of Soviet technology to steel industry in India has followed a distinct pattern. All the projects that have received technical and financial cooperation are in the public sector. Transfer of Soviet technology to the steel plants at Bhi\lai, Bokaro and Visakhapatnam has been effected within the framework of an inter-governmental Agreement entered into separately for each project. Besides defining the responsibility of both sides, inter-governmental Agreements contain explicit provision for the training of personnel in India and the USSR.

The inter-governmental Agreements entered into between the Government of India and the Government of the USSR contain provisions for substantial credit facilities. The credits so extended for the steel projects at Bhi\lai, Bokaro and Visakhapatnam carried an interest rate of 2.5 per cent, with a repayment period of over 12 years.\footnote{Government of India, Ministry of Finance, \textit{External Assistance} (New Delhi, 1964), pp.36-40.} The mode of repayment was governed by the Rupee-Rouble arrangements which did not involve much
foreign exchange constraints. It was these features of the Soviet model that made the transfer of Soviet technology relevant and appropriate for the country.

5.2 TRANSFER OF SOVIET TECHNOLOGY TO STEEL INDUSTRY IN THE ARAB REPUBLIC OF EGYPT (ARE)

The Arab Republic of Egypt has been a major recipient of Soviet technology in the Arab world comprising of 22 independent countries with a population of over 130 million people. Transfer of Soviet technology to the ARE (hereafter referred to as Egypt), particularly in setting up a major integrated steel plant at Helwan, has been an important development not only in terms of the development prospects of Egypt but that of the entire region.

Arab countries, in spite of the huge oil revenue to the region, revealed major variations in their aggregate GDP, per capita GNP and resource endowments. Around six oil exporting countries in the region accounting for 10 per cent of Arab population controlled almost half of the total Arab GDP. As for instance, in 1970 seven oil exporting countries accounted for 52.2 per cent of the aggregate GDP of the region (US $20,330.4 million of the aggregate GDP of the region) while 77 per cent of the same was controlled by 12 oil producers. These figures increased to 75.7 per cent and 90.6 per cent,

respectively, in 1979. On the other, per capita income varied from US $100 to US $15,000 among the countries in the region. 48

In spite of the spectacular growth in oil revenue, the entire region reflected a disproportionately low level of industrial and technological development. The extent of industrial backwardness is illustrated by the fact that manufacturing accounted for on an average 13.3 per cent of GDP in 1970 for the region as a whole, with the percentage share of majority of the countries being much below the average for the region. Exports from the region comprised mostly of raw materials, consumer and intermediate goods whereas imports, as a rule, included a large proportion of manufactured goods. 49

The proportion of imported capital goods was highest in the Arab world which was almost 100 per cent while imports of intermediate goods in the region was around 43 per cent during the seventies. This trend, according to Samir Amin, reflects the weakness of the Arab mode of industrialization which has often led to extreme dependence on international market and multinational corporations. In the process, oil-poor Arab countries, which includes Egypt as well, had to face considerable difficulties. 50

49. Yusif A. Sayigh, n.47, pp.84, 105.
50. Samir Amin, n.48, pp.55-58.
Industrial growth and technological advancement of the region have been further hindered by the virtual non-existence of science and technology institutions as well as due to severe outflow of the scarce human resources. A study on the national science policy making bodies in 61 countries has come out with rather startling findings. It revealed that of the 17 Arab countries in North Africa and Middle East, 10 countries did not establish any such bodies to bear the responsibility of national science policy until 1969.51 Besides, the Arab region has long been a major source of reverse transfer of technology. The outflow of Arab engineers, scientists and doctors to West Europe and the United States up to 1976 was 17,000, 7,500 and 24,000, respectively, in addition to the outflow within the region.52 It has also been estimated that between 1962 and 1977, United States alone, which is a major recipient of Arab skills, absorbed some 18,200 professionals, technical and kindred workers.53


In the prevailing conditions, development of indigenous capabilities through transfer of technology met with severe constraints. Lack of technology policy and skills combined with the weakness of domestic technological institutions have often had an adverse effect on the technology choice and bargaining capacity of the countries in the region. It has been argued in this context that unless Arab countries invest a part of their huge capital surplus in this direction, instead of investing in international financial institutions which are negated by growing inflation, they are most likely to end up in a situation highly detrimental to their development prospects.  

A review of the economic conditions in Arab countries reveals a high level of multinational domination over major sectors of the economy. Although formal foreign ownership has declined substantially in certain countries, multinational control and domination continue to exist in a variety of ways such as supply of equipments in piecemeal forms, excessive monopoly prices and refusal to transfer technology inputs which enable the recipient to maintain control over the production process.  


55. Samir Amin, n.48, pp.71-76.
projects (90-100 per cent) in the region are conceived, planned, designed, equipped and constructed by foreign agencies with minimal participation of indigenous skills and organisations. Reflecting on the state of weakness of indigenous capabilities and consequent adverse effect, it was observed:

In one case, to ensure completion of construction contracts in Egypt (1978), German and Swiss crane drivers and welders were imported at salaries 20-30 times those of their Egyptian counterparts (i.e., US $4,350-6,520 per month).

On the eve of the revolution in 1952, Egypt was no exception to the general pattern of development of the region and the characteristic dependence on multinationals. In the early fifties, foreign capital associated with monopolistic Egyptian private capital (the Misr group) dominated every sector of industry, banking trade and service sectors. Egypt also displayed all the major features of a backward and stagnant economy. The share of agriculture in the total production was about half in the forties while industry and electricity together accounted for only 8 per cent.

An estimate of the value of industrial production in 1948 placed the total at 250 Egyptian pounds (£ E) as the value of

56. A.B.Zahlan, n.52, p.3.
58. Samir Amin, n.48, p.72.
agricultural output. Cotton which is regarded as the white gold in Nile accounted for 80 per cent of total export revenue during 1947-50. Trade balance always remained on the negative side with adverse trade over 14 years from 1937-50 reaching a cumulative total of £ E. 235.6 million. On the other, public debt increased by £ E. 20 million on an average with an outstanding debt of £ E. 125,003,850 as on 31 January 1947.

The revolution, which brought an end to the rule of monarchy and foreign domination, was a turning point in the socio-economic development of modern Egypt. It was apparent by early fifties that development problems in the country were not susceptible to passive ad hoc measures and that basic restructuring of the economy was necessary for securing socio-economic development on a desired basis. This realization paved the way for a series of reforms such as agrarian laws, gradual replacement of private sector, Egyptianisation through the elimination of foreign control and ownership over means of production and a variety of other measures.

59. Bent Hansen and Girgis A. Marzouk, Development and Economic Policy in the UAR (Egypt) (Amsterdam, 1965), Table 1.1, p.6.


Land reforms initiated since September 1952 introduced greater equity in the distribution of wealth and income in the rural side. The process of Egyptianisation which gained momentum with the nationalisation of British, French and other foreign owned assets culminated in the nationalisation of Bank Misr and National Bank in 1960. In turn, while in 1952 public sector accounted for about 13 per cent of GDP and 28 per cent of gross capital formation, it increased to 18 per cent and 74 per cent, respectively, by 1959-60. Thus, the transition of Egypt from a private enterprise system into a planned economy with a dominant public sector took place between 1954 and early sixties. 62

The socio-economic reforms initiated by the nationalist government were neither tolerated nor appreciated by the United States and dominant powers in Europe. As a mark of their disapproval, developmental assistance to Egypt was abruptly stopped in the early fifties. As for instance, construction of Aswan Dam which has been regarded as highly essential for the development of Egypt's agriculture and industry, had to be temporarily dropped with the withdrawal of aid commitments by the World Bank and Western countries. 63 From an Egyptian viewpoint, the


withdrawl of the Western offer to finance Aswan High Dam and the consequent Suez crisis during which Anglo-French and Israeli forces invaded Egypt have their origin in the socio-economic programmes for the nationalist regime. 64

Politically, it was during this period Egyptian government under the leadership of Nasser had been developing its ideas on non-alignment. Nasser's association with Nehru, Tito and Chou En-lai presented Egypt, in the US and Western view, as an ally of the Socialist bloc. Egypt's resistance to colonialism and military pacts, besides its association with the non-aligned movement equipped the US led Western powers with enough justification for containing the former in the Arab world. 65 In the emerging scenario, Egypt's search for international economic and technological assistance met with the most severe constraints.

Egypt's quest for domestic production of steel received a new thrust with the revolution of 1952. As a regime committed to fundamental socio-economic reforms and achievement of gradual self-reliance in development, the nationalist government was committed to having an iron and steel plant on its own. Apparently, two factors seem to have influenced the decision of the


government: first, development of steel industry in the region was rather slow and there were no steel plants in the Arab world until 1958 when the first steel plant was established at Helwan in Egypt; second, in the whole of the sixties, most of the requirements of steel in the region and Egypt in particular were met through exports which meant a huge drain on foreign exchange reserves. As for example, in 1950, value of certain iron and steel goods imported to Egypt was around £ E.6,113,312 (see Table 5.3). Even at the end of the seventies, consumption of steel in the Arab countries was estimated to be 10 million tonnes of steel per annum as against a local production of 3 million tonnes of steel annually, leaving a staggering deficit of 7 million tonnes. 67

As early as the late forties, the then government of Egypt had made certain efforts to establish the Aswan Dam hydro-electric project and an iron and steel plant powered from it. To this end, a steel industry committee had been set up in the early fifties as well as a number of foreign experts were invited to examine the feasibility of the project. However, in the absence of capital resources and local skills the whole idea had to be temporarily abandoned. 68


68. Cuberbatch, n.60, pp.56-57.
Table 5.3
IMPORTS OF CERTAIN IRON AND STEEL GOODS TO EGYPT - 1950

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Item</th>
<th>Value in Egyptian Pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Bars</td>
<td>3,966,915</td>
</tr>
<tr>
<td>2.</td>
<td>Rails, fish plates, railway sleepers</td>
<td>318,886</td>
</tr>
<tr>
<td>3.</td>
<td>Sheets (common)</td>
<td>819,494</td>
</tr>
<tr>
<td>4.</td>
<td>Sheets (galvanised)</td>
<td>464,993</td>
</tr>
<tr>
<td>5.</td>
<td>Tin plates</td>
<td>271,512</td>
</tr>
<tr>
<td></td>
<td>Total (1 to 5)</td>
<td>6,113,312</td>
</tr>
</tbody>
</table>


Later, in 1952, the Revolutionary Command Council of the nationalist regime set up a Permanent Council for the Development of National Production with a view to identifying projects that would strengthen Egypt's industrial and technological infrastructure. Subsequently, the efforts of the Council culminated in the decision to set up a metallurgical complex at Helwan near Cairo. 69

However, the project experienced considerable difficulties as it was found increasingly difficult to attract international

69. Roger Owen, n.64, p.369.
financial and technological participation. Britain had already indicated its lack of interest in the project way back in the late forties.  

The United States, Western countries and other international agencies expressed their 'inability' to extend assistance for the project.

Perhaps, it was unrealistic for the nationalist government to expect participation of the US and Western agencies in view of two important developments: first, the socio-economic reforms with a distinct socialist bias which were being implemented in the country, and second, the strained nature of Egypt's relations consequent to the Suez crisis. Above all, offer of assistance, as and when it was made, was invariably accompanied by certain conditions which were inconsistent with the programmes of the government and the prevailing ideology of state sector. Hence, Egypt was more or less compelled to establish its first steel plant in 1954 as a mixed enterprise with shares to be held by the government, private sector and the West German metallurgical firm, Demag. In fact, half of the capital investment for the Helwan project was left to the private sector which included capital participation by West German steel company.  

70. A.N.Cuberbatch, n.60, pp.56-57.  

The project located at Helwan envisaged an initial production of 235,000 tonnes of steel per year by 1958 as against an estimated consumption of 310,000 tonnes in 1954 and 400,000 tonnes by 1960. The project ran into considerable financial and technological difficulties partly due to the over-optimistic planning and lack of coordination and partly due to the manner in which technology and equipments were transferred. In turn, cost of the plant went up to £ E.25 million by 1958 as against the original estimate of £ E.17 million.\textsuperscript{72}

The Helwan project, the first steel plant in Egypt and in the entire Arab region, soon became a problem plant in terms of technological, operational and economic parameters. Egypt's experience at Helwan until 1958, thus, reflects many similarities of the Rourkela steel plant in India built with the technological participation of the West German metallurgical firms, including Demag company.

It was in these circumstances Soviet Union expressed its willingness to extend economic and technological cooperation for the implementation of major programmes of industrialization in Egypt. To this end, an inter-governmental agreement was entered into between the Arab Republic of Egypt and the Soviet Union on 29 January, 1958 whereby the latter was to render

necessary financial and technological assistance for major projects in the state sector which included metallurgical industries. 73

The inter-governmental Agreement, thus, became a major step in the transfer of Soviet technology for the development and expansion schemes of Helwan project. The bilateral Agreement provided for the supply of design drawings and equipments for the successful operation of major industrial projects besides providing a framework for training of Egyptians in the Soviet Union as well as on the site in Egypt. 74

As per the agreement, Soviet Union committed a credit of 700 million Roubles to be utilized within four years of signing the Agreement. The credit so utilized carried an interest rate of 2\frac{1}{2} per cent to be repaid in 12 equal annual instalments. Another noteworthy feature of the Agreement was that such credits were to be repaid in Egyptian pounds through the National Bank of the Egypt in favour of State Bank of the USSR. 75

The specific details regarding the volume of equipments to be supplied by the Soviet side, number of personnel to


74. Text of the Agreement, ibid, Articles 3, 4.

75. Ibid, Articles 6-8.
be trained in the Soviet Union and deputation of Soviet experts to Egypt were to be spelt out by separate contracts. Accordingly, the General Board of Industrialization of the ARE and Tiazhpromexport (Moscow) entered into various contracts for supply of equipments and the development of human resources. In turn, a large group of Soviet experts, led by Chief Expert, examined the production and operational parameters of the Helwan steel plant and suggested measures to improve its performance. 76

As per the recommendations of Soviet experts and under their supervision, changes were made in the technology of production of pig iron and rolled stock, besides repair and maintenance activities. This is said to have increased the operational efficiency of the plant whereby the volume of production increased and cost of production declined. Perhaps, for the first time since its inception, Helwan steel plant made profits to the extent of £ E. 735,000 during the fiscal year 1969-70. 77

A second industrial complex in the Helwan area was constructed subsequently with the economic and technological cooperation extended by the Soviet Union, besides German Democratic Republic (GDR), Czechoslovakia and Romania. It consists of a number of large units such as steel works, coke and


77. Ibid, pp.139-40.
by-product plant, an ore dressing plant, machine tool factory and a foundry producing forgings. In addition, with Soviet cooperation, rated capacity of the plant has been enlarged from 300,000 to 1,500,000 tonnes of steel per annum, besides additional facilities for rolling steel to the extent of 200,000 tonnes per annum.\textsuperscript{78}

Apart from the basic iron and steel plant, the Helwan metallurgical complex which has received substantial Soviet technology houses other auxiliary industries such as the El-Nasr Company for pipes and metal melting; the El-Nasr foundry; the El-Nasr Company for auto products; and the General Egyptian company for rail roads.

With a view to promoting indigenous technological capabilities in metallurgy, Egypt established the El-Tabbin Metallurgical Institute in June 1971. The objective of the Institute has been to train Egyptians with University education and a three year work record to take up higher levels of technical and managerial functions of metallurgical industry. This Institute has been designed by the Soviet design organisation Gipromez while Moscow Institute of Steel has provided substantial support for organizing teaching and research activities.\textsuperscript{79}


\textsuperscript{79.} UNITAR, n.76, pp.131-2.
In the process of transfer of Soviet technology to this Institute, 21 laboratories received important Soviet equipments and related resources. In this Institute, Soviet specialists, along with their Egyptian counterparts, impart training for metallurgical engineers in various aspects of steel making such as economics and organisation of production, blast furnace and open-hearth technologies, foundry, rolling and mining activities. In the initial years of its inauguration, around 55 Soviet specialists were associated with El-Tabbin Metallurgical Institute. 80

As regards production, while most of the requirements of steel in Egypt were met through imports, steel production crossed the one million mark in 1985 and reached 1.7 million by 1987 81 (see Table 5.4). The Soviet-aided Helwan steel plant with an installed annual capacity of 1.5 million tonnes of steel accounted for the major portion of domestic steel output in the whole of seventies and eighties. Helwan steel plant has also begun to manufacture products, the requirements of which were previously met exclusively from imports. According to the estimates made by Egyptian experts, with the Works going into full production, the country will save 150 million Egyptian pounds in foreign currency annually. 82 Efforts have been


Table 5.4
CRUDE STEEL PRODUCTION IN EGYPT BY PROCESS, 1979-87

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen</td>
<td>505</td>
<td>739</td>
<td>619</td>
<td>664</td>
<td>700</td>
<td>700</td>
</tr>
<tr>
<td>Electric</td>
<td>232</td>
<td>226</td>
<td>233</td>
<td>255</td>
<td>205</td>
<td>912</td>
</tr>
<tr>
<td>Open-Hearth</td>
<td>163</td>
<td>50</td>
<td>127</td>
<td>124</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>Others</td>
<td>25</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Crude steel (Total)</td>
<td>925</td>
<td>1,015</td>
<td>979</td>
<td>1,043</td>
<td>1,000</td>
<td>1,707</td>
</tr>
</tbody>
</table>


made to commission new steel plants towards the end of the seventies (see Table 5.5).

In the mid-seventies, Soviet Egyptian economic and technological cooperation experienced considerable setbacks. This period coincides with the ascendancy of President Anwar Sadat to power. It is to be remembered at this juncture that President Sadat, through his October working paper presented to the People's Assembly in 1974 and approved subsequently, laid out a comprehensive outline for major restructuring of socio-economic and political policies, often referred to as El-Infitah (The Opening). It provided for a return of private sector, foreign
Table 5.5
INTEGRATED STEEL PLANTS IN EGYPT

<table>
<thead>
<tr>
<th>Location</th>
<th>Type</th>
<th>Stages</th>
<th>Capacity '000 tons per year</th>
<th>Consultants &amp; Contractors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helwan (near Cairo)</td>
<td>Integrated</td>
<td>Operation commenced in 1968; first expansion completed in 1973; second expansion due in mid 1975.</td>
<td>300</td>
<td>Soviet Organizations</td>
</tr>
<tr>
<td>Dakheila (near Reduction Alexandria) (Middex)</td>
<td>Direct</td>
<td>Agreement signed in July 1974; Commissioning set for 1977; Expansion in 1982</td>
<td>1,600</td>
<td>C.Itoh &amp; Co., Japan; Korf, West Germany; and CURD, Brazil.</td>
</tr>
</tbody>
</table>


capital and free enterprises system. Politically, there was a growing tendency for larger integration with the United States and Israel and various Western countries.

Although Egypt's relations with Soviet Union deteriorated with the departure of Soviet experts and defence personnel in the early seventies, evidence suggests that Soviet and other Socialist countries continued to assist Egypt in its developmental

efforts subject to periodical insistence on a detailed examination and review of the latter's new economic orientation and its political implications. As for instance, Egypt's Minister for Planning, on his return from Moscow in 1975, stated that Soviet Union had made substantial commitment ($151.64 million) for developmental projects planned for 1975 and indicated Soviet willingness to provide a further 5,000 million Roubles ($4,480 million approximately) for the five year plan (1976-80). It was also stated by the Minister that a wide variety of projects were approved for implementation, including expansion programmes of Helwan iron and steel complex with Soviet assistance of $102.40 million.84

In brief, as the foregoing discussion reveals, there were many similarities in the case of India and Egypt. In the fifties, both the countries displayed comparable socio-economic development such as a weak technology infrastructure, backward industry and predominantly agrarian forms of economic activities. In their search for technology both India and Egypt experienced considerable difficulties at the hands of Western sources. The offer of Western assistance, as and when made, was invariably accompanied by a host of terms and conditions generally inconsistent with the technological priorities and policy objectives of both the countries.

84. OECD, n.61, p.116.
The emergence of the Soviet Union as an alternate source of technology stimulated fundamental changes with regard to the attitude of Western sources. The Soviet offer of assistance, as evidences suggest, improved the bargaining power of India and Egypt vis-a-vis transnational corporations and Western sources in mobilising technological and economic cooperation for setting up iron and steel industries.

As far as the actual transfer process has been concerned, transfer of Soviet technology to steel industry in India and Egypt has adhered to a common pattern. The common features that accompanied transfer of Soviet technology included assistance for setting up basic industries such as iron and steel in the public sector, liberal credit facilities which carried a nominal interest rate of $2\frac{1}{2}$ per cent and longer repayment periods. These characteristic features, thus, conform to the Soviet model on transfer of technology advanced in the context of its economic and technological cooperation with developing countries.

However, a comparison of India's experience with that of Egypt may not be stretched too far. After all India had managed to develop more than one integrated steel complex with Soviet assistance whereas Egypt set up only one steel complex with Soviet assistance. Besides, the changing scenario of international politics particularly Egypt's turning away from the
Soviet Union since the early seventies was in some ways a sharp break in the common pattern. Hence, to understand the specific features of transfer of Soviet technology to developing countries, as for example, techno-economic features of the transfer process, we propose to focus our attention on Indian steel industry in the next chapter. Yet, it is not to suggest that these specific features may not be relevant in the case of other recipients of Soviet technology, rather it would enrich our understanding of the transfer process in its specific details.