CHAPTER IV

INDIA'S STEEL DIPLOMACY: THE SECOND PHASE
(1970-1985)

INTRODUCTION

The Steel industry in India grew in a highly protected and controlled environment with massive import tariffs, administrative control over prices, distribution (domestic market) and imports. Resources for the industry were allocated by the centralized planning process. It is a matter of record however that the initial forays into steel, both by the private enterprise-TISCO and the enterprise led by the state through Steel Authority of India were rewarded with success. Till the end of 1960s the Indian steel industry retained a clear and substantive manufacturing cost competitive advantage with respect to overseas producers, the paramouncy of the state and its apparatus not withstanding.

It is also a matter of record that despite this state leadership, or perhaps because of it, the Indian Steel industry, over the two decades since the late sixties (the 1970s and the 1980s) steadily lost the comparative advantage in the world market which it had successfully established earlier. By the end of the decade of eighties it emerged by standards of international comparison, as a relatively high cost and inefficient industry.¹

In this chapter an effort has been made to find out the reasons for the failure. More specifically it looks into the undoing of the advantages gained

through successful steel diplo-macy from 1951 to 1969. In spite of having a successful background of technology transfer negotiations and high level bargaining for the steel industry, we were unable to consolidate our advantages in the coming two decades.

SECTION I: THE BACKGROUND TO INDIA'S STEEL DIPLOMACY

The end of 1960s marked the end of the first phase of the Indian Steel diplomacy. India effectively and boldly bargained for the best of terms and conditions for her self-reliant industrial growth. The ground work was prepared by active foreign collaborations which were engineered for the for the Indian industry by the dynamics of the global cold war politics.

The First Phase: Success of the first phase is emphasised by the establishment of the three one million tonne plants as turnkey projects. Our diplomatic strength in this phase was shaped and propelled by the political will and the ambitions of top leaders and planner in the country, along with expert negotiators who could aptly give shape and realism to our national dreams.

The Second Phase: The second phase of the Indian steel diplomacy was marked by India's experience and success in steel production firmly set on a good technological base. Diplomatic capabilities in this phase were moulded by

(i) a much more confident and competent position of the nation as an established steel producer with international competitiveness;

(ii) a large trained and developed work force in steel industry. This work force was skilled in performance of various functions, technological as well
as commercial and possessed a fair measure of scientific and managerial knowledge as was required at each level and each sector of responsibility. This workforce had become an invaluable resource. This laid the foundations for a much faster rate of absorption of the transferred technology and thus rapid development in the steel capacity of the nation. This is no mean an achievement and is not equalled by many developing countries which are competitors to the Indian Steel Industry².

(iii) Last but not the least, there had been careful and systematic assimilation of expertise and knowledge through various R&D institutions, consultancy firms and training programmes in the country over the past two decades. These form the vital channels of technology transfer, its absorption and further development for the Indian industry particularly the steel industry.

These significant developments strengthened the hands of the diplomats, who negotiated the additional technological and financial inputs for our expanding steel industry in the second phase of Indian Steel diplomacy. It is worth mentioning at this point that the Indo-Soviet collaborations in steel, which in itself was one of the most successful aspect of India’s steel diplomacy, significantly enhanced our technology absorption capability through :-

(i) Allied institutional collaborations

(ii) Transfer of skills

(i) Allied institutional collaborations - For this newly found diplomatic strength, we need to make a special reference to the Indo-Soviet collaborations. In the field of technology transfer the Soviet Union was our most willing partner, as is evident

from the details included in the previous chapter. But this partnership with setting up of steel plants at Bhilai and Bokaro was not an end in itself. Massive mother plants like Heavy Engineering Corporation at Ranchi and Mining and Allied Machinery Corporation at Durgapur, were established with Soviet assistance. These plants provided the basic infrastructure for supply of steel plant and coal mining equipment.\(^3\) The key interface in the area of technology transfer of R&D centre of SAIL at Ranchi was with the Central Ferrous Metallurgy Institute in Moscow, which was amongst the biggest R&D institutions in the world. Initially the Indo-Soviet-Collaboration in research was confined to Bhilai Steel Plant in the first-agreement. In the second phase of Indian Steel diplomacy the agreement was signed with the Soviet Union in 1983 so that the research efforts by Indian and Soviet experts covered all plants under SAIL.\(^4\)

(ii) Transfer of Skills - V.E. Dymshits, First Deputy Prime Minister of the Soviet Union and N.V. Goldin, Soviet Minister for Industry and Construction paid a ceremonial visit to Bhilai in the first week of February 1984 as members of a soviet delegation attending the Silver jubilee of iron making there. Dymshits had been the Soviet Chief Engineer, Construction and Goldin his successor at Bhilai. Their presence indicated the high calibre of engineers whom the USSR had sent when it undertook the first major project in the country. The other part of the story is the excellence of the transfer of operational skills to Indians by the

\(^3\) Equipment manufacture was primarily initiated in the public sector through foreign collaboration. In the private sector some companies which helped the industry are: ACC-AVB, McNally Bharat Engineering Co.Ltd., Tenmaco, Hindustan Motors, Larson and Tubro, Davy Ashmore, Tata Robin Fraser, etc. K.Krishnamurthy, "The Process of Technology Transfer", in Technology Transfer in India’s Steel, p.56.

Russians. Sudhir Ghosh, former Secretary to HSL, made the only thorough enquiry into the experience during the one MT stage of the three plants built in the fifties. Ghosh gave the highest marks for the Soviet training process. The West Germans came second, the British third and the Americans last.

Both in construction and in plant operations, the Russians passed the know-how in a thorough going fashion. In strong contrast, the Germans and the British stopped at this stage of what may be termed as "show-how". If the Bhilai plant has functioned with fewer troubles than the other two plants it is because the Soviet experts have always been present continuously for the past three decades, participating in operations and in various phases of expansion up to four MT. With the Rourkela plant the Indians did acquire the LD process through the Germans, but failed to upgrade the process on their own. Unlike the Russians the Germans and the Americans were comparatively secretive and even reluctant to transfer operational technology, what to talk of designing.

When Bokaro was being built in the seventies and Bhilai being expanded a second time in the eighties the steel melting shops did receive new version of the LD converter with the moderate improvements contributed by the Russians. Bokaro is the only existing Indian plant designed to depend solely on LD converter for steel production. Converter installed in TISCO plant during its modernization in eighties were of contemporaneous Western design.\(^5\)

\(^5\) Ibid, K.Krishnamoorthy, p 57
SECTION-II: THE ROLE OF INDIAN STEEL DIPLOMACY IN THE SEVENTIES AND EIGHTIES

In the Fourth Plan period (1969-74), it was envisaged that the installed capacity would go up to 12.0 MT. of ingots, not including the growth in the secondary sector. This increase in capacity was to materialise through expansion programmes of Bhilai and IISCO and completion of 2.5 MT. ingot capacity at Bokaro. These expectations, however, did not materialise for a variety of reasons, and the actual position at the end of 1973-74 was that steel capacity in terms of ingot steel was the same as at the beginning of the Plan period (again excluding the secondary sector). It was therefore considered necessary to increase the steel-making capacity by setting up new steel plants. The Government announced setting up of three new steel plants at Salem, Vishakhapatnam and Vijayanagar. The expansion of Bhilai from 2.5 to 4.0 MT. and Bokaro to 4.0 MT. was also taken up during the Fifth Plan (1974-1979).  

An interesting observation regarding Indian public sector steel plants has been that technical progress has taken place in the industry mainly through the installation of new steel plants and not through the replacement or modernization of old machinery or in an existing plant. The government had not given much importance to the concept of modernization until very recently. It was only in 1984 that the investment proposal for modernization of the existing plant at Durgapur had been approved by the Public Investment Board (PIB) of the government, while proposals for the modernization of the Rourkela Steel Plan and IISCO prepared by SAIL have not been taken up for consideration by the PIB as yet. Even at the beginning of the Sixth Five-Year Plan the government was more

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Sen, Goyal, and Sengupta in Growth of Indian Steel Industry, ibid, *Metals in India's Development*, p 43
preoccupied with the ideas of investment in greenfield plants like the ones proposed at Paradeep/Daitari, Vijayanagar and Vishakhapatam than with the ideas of modernization of old plants. While the government could not later make much progress with the new projects, except Vishakhapatnam, to some extent because of constraint of resources and pessimism regarding the growth in size of the home market for steel, it began to realize, at the same time, the importance of modernizing plants and equipment in view of the comparatively higher marginal productivity of such investments and the economy of production cost.  

1. The Politics of the Decision on the Vishakhapatnam Steel Plant

Decision to build the Vishakhapatnam Steel Plant

A formal declaration of intent to build three new steel plants in the South was made by the Government of India as early as 1970. Mrs. Gandhi inaugurated the work on the Vishakhapatnam Steel Plant in 1971. But the pylon erected in 1971 by Mrs. Gandhi to mark the inauguration of the work on Vishakhapatnam Steel Plant gathered rust for years. Dasturco had prepared a feasibility report in 1971 and the detailed project report in 1977. A formal decision by the cabinet took its own time to materialize in 1979. In the mean time the Janata Party came to power. It was then in June 1979 with Mr. Biju Patnaik as the Steel Minister, that the plans were formalised for Vishakhapatnam Steel Plant. This decision should have come many years earlier in the interest of the country's economic development but many years were lost amidst country's political upheavals. In  

October 1979 the Minister made the announcement that the government has taken a decision to set up an integrated steel plant at Vishakhapatnam. Despite reports of a demand for a second steel plant in Mr. Biju Patnaik's home state Orissa, Prime Minister Morarji Desai, decided to go ahead with Vishakhapatnam. This decision of the PM is better understood in the light of the long and heated debate and severe regional pressures for a steel plant in the Southern India's port city Vishakhapatnam. These regional pressures had burst into angry regional agitations as in 1966, in which more than 9 score of lives were lost. The then President of India Mr. Sanjiva Reddy, did exert some leverage on the 1979 decisions.

The New Phase of Indo-Soviet Relationship

India entered a new phase of its relationship with the Soviet Union when the negotiations were initiated for building an integrated steel plant in the port city of Visakhapatnam in Andhra Pradesh. India's international negotiations for steel technology transfer had largely been successful due to the Indo-Soviet friendship in the arena of international politics. The Indo-Soviet agreement on Bhilai and Bokaro stand out as concrete evidence to the fact. For the successful commissioning of the plant the Government of India accepted the offer made by Soviet-Union, for technical and financial collaborations.

This third venture of the Soviet Union in the Indian public sector steel plant represents an entirely new phase of India's technology transfer negotiations for steel.

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The Indian consultancy firm, Dasturco was already working on the Detailed Project Report (DPR) when the Soviets came forward. A revised DPR was prepared to incorporate the data on the equipment and related technology that was to be supplied by the then Soviet Union.

Here, Soviets did not participate in a turn key project as in the case of Bhilai. In comparison to Bokaro also the degree of Soviet assistance negotiated for was significantly reduced. This was the phase when the capabilities of Indian consultancy, heavy engineering and equipment production had matured and developed considerably. Unlike Bokaro, in the mid-sixties, the firm stand of the government resulted in the Russian accepting an Indian organization as the principal consultant.

Thus, the impression that has gained ground that the Vishakhapatnam plant is largely like Soviet Bhilai Stage I is quite incorrect. The truth is that the Soviets were playing a minor role at Vishakhapatnam steel. They were there mainly as supplier of some items of equipment - coke ovens, blast furnaces, and sinter plants. The design and engineering and management are largely Indian. Also Soviet financial aid is a minor fraction of the total cost of the project - 10 percent of Rs.6,000 crores - covering a limited supply of equipment and services.

Vishakhapatnam was a symbol of the change in Indian diplomatic profile. By the end of the seventies and early eighties, India was capable of attracting the best of technologies from many of the developed countries and assemble them together in the functioning of a modern high technology steel plant. Indo-Soviet collaborations in this context had more political implications than purely economic.
The talks on Visakhapatnam were held without fanfare and there was no controversy such as that bedevilled Bokaro. The first financial protocol was for Rs.250 crores. In May 1983, another Rs.140 crores was promised for the second phase during a visit by the Soviet Deputy Prime Minister, Mr. I.V. Arkhipov. Both the financial agreements were signed well ahead of the dates on which equipment deliveries were envisaged.

A number of sophisticated items like the rolling mills were obtained from countries other than Soviet Union. The blast furnaces provided by Soviet Union too were some of the best in the world, the bell-less top was obtained from Belgium. The carbon lining for the blast furnace and the raw materials conveyor systems were supplied by Japan. Non-Soviet foreign supplies added up to about 10 percent of the project cost.

Some of the major technological advancements which have been introduced at Visakhapatnam were: seven-metre-tall coke ovens; selective preparation of coal and dry quenching of coke; large 5,000 tonnes per day (3,200 cubic-metre capacity) blast furnace; slag granulation in the cast house; utilisation of blast furnace top gas for power generation; 100 percent continuous casting; universal mill for the production of wide flange beams and universal beams.\(^9\)

The decision to build a steel plant at the port city was a new concept, for the former sites for steel plants were always near the mines to enable the access of the raw material. Thus, the plans for Vishakhapatnam provide a big variation from the assumption on raw materials supply which had been valid for all other steel plants. In view of the possibility of shortages in metallurgical coal due to limited reserves, a beginning had to be made with the regular import of coking

\(^9\) ibid, p 163
coal. Keeping this requirement in mind, the location for the erection of new port-based plants, dependent on the concept of imported coking coal were decided upon. One consequence of this new argument was the germination of the idea of a plant at Vijayanagar in Karnataka. This site is far away from coal mines but could be linked partly to imported coking coal arriving through Madras which is the outlet for exports of iron one mined from the Hospet area. Anyway, Mr. Patnaik (and Mr. George Fernandes, Industry Minister) tried to sugar-coat the bitter pill by telling the interested groups in Karnataka that the Government would explore the prospects of a steel complex near Mangalore port which was being developed along with the work on the Kudremukh iron ore project for exports to Iran.

This export plan could not go through after the ouster of the Shah of Iran. The successor regime under Ayatollah Khomeini abandoned many industrial development plans and this was among those abandoned schemes. The smooth negotiations with Soviet-Union represented the continuity of Indo-Soviet friendship after the end of the Nehru-Khrushchev era. Midway through the final talks on Bokaro, Khrushchev had been overthrown and Nehru had passed away. It goes to the credit of their successors that they picked up the threads of Indo-Soviet co-operation and tied it up as the deal for the Vishakhapatnam Steel Plant. Although the Janata Party government had replaced the Congress Party led by Mrs. Gandhi, the Soviet Union demonstrated its desire to strive for continued stability in relations with India.
Originally, the work on the plant to produce about 3.4 million tonnes of steel was under the supervision of the Steel Authority of India Limited. But on 31 March, 1982, a separate company, Rashtriya Ispat Nigam, was formed.\footnote{ibid, p 164}

2. India's first failure in Negotiations for a Turnkey steel project

Biju Patnaik's approach to the creation of a new steel plant was adventurous and a gamble in which ultimately his successors in the steel ministry and the new government as a whole were to find that the cards were stacked heavily against them.

Mr. Patnaik led a one man campaign to build a steel plant in his home state. The major port at Paradeep had been launched during Mr. Patnaik's tenure as Chief Minister of Orissa in the early sixties. When he became Steel Minister at the Centre, he virtually plucked out of thin air the idea of building a massive steel project there. On the one hand a major project was being planned at Vishakhapatnam, on the other Mr. Patnaik made a public statement about the superiority and the relevance of port-based steel plants. There was no planning or consultations regarding a steel plant at Paradeep nor had he taken his administrative and engineering colleagues into confidence.

On 15 August, 1978, during the celebration of India's 31st Independence Day, one of the visiting dignitaries was Count Lambsdorff, the Minister for Economic Affairs from the Federal Republic of Germany. Mr. Patnaik then suggested to him the possibility of another German-assisted steel mill in Orissa.
The German Minister reportedly promised Mr. Patnaik that he would study the proposal on his return home.\textsuperscript{11}

Following this conversation, the Steel Ministry promptly prepared a brief note for the Germans. Soon afterwards, the German Company Mannesman Demag came up with a tentative offer to help in the construction of a 1.5-million-tonne plant. The matter could not be pursued further as the Janata regime broke up. While the Congress (I) Government which returned to power under Mrs. Indira Gandhi was critical of several of the initiatives taken by the Janata Government, somewhat inexplicably, the Paradeep steel project was one of the ventures which it decided to pursue despite reservations of several Indian technical experts. And this it did with a lack of technical preparedness not normally associated with the firm sense of direction which Mrs. Gandhi was accustomed to impart to the administration.

Mr. K. C. Khanna, who had been appointed SAIL chairman in succession to Dr. Agrawal, was known to be opposed from the very beginning to the choice of Paradeep. Some newspapers quoted him as having described Paradeep as a "death trap."\textsuperscript{12} Mr. Khanna said that he as a technical man had "cautioned the Ministry that a thorough examination needed to be made before the final choice of the site because of the occurrence of cyclones and poor soil conditions in the area." Nevertheless, because of his position as SAIL chairman he agreed to be part of what was to turn out to be a disastrous enterprise in steel planning and international negotiations.

A technical committee which examined the offers of possible collaborators consisted of Mr. S. Samaddar, then Secretary, Steel and Mines, Mr. K. C. Khanna,
Mr. M. P. Wadhawan, vice-chairman of SAIL, Mr. P. C. Laha of Metallurgical and Engineering Consultants, and four other Government officials. The original contenders were: Mannesman Demag (West Germany), Davy McKee (Britain), Uznimportexport (Romania), Metchem (Canada), which had successfully collaborated in the Kudremukh iron ore mining project in Karnataka, Cofransid (France) and British Steel (Britain). Some of the original tenders withdrew for one reason or another and ultimately the technical committee short-listed Mannesman Demag and Davy McKee as the two worth considering for formal negotiations.13

Mr. Khanna and Mr. Samaddar were both extremely reluctant to plug Davy McKee, an arm of Britain's Davy Corporation, as the turnkey contractor for the Paradeep plant. Mr. Samaddar naturally had before him the sad experience with the British aided Durgapur plant which was the most ailing among the big industries in his home State of West Bengal.

Mr. Khanna and several others among the top brass in SAIL, as well as Mr. Samaddar, were alleged to have favoured the Germans for technical and managerial reasons. Mr. Samaddar was believed to have been removed from the job of Steel Secretary because of his obstinate opposition to the British collaborators. While the negotiations were going on Mr. Khanna admitted during an interview with K. Krishnamurthy that the ultimate deciding factor would be political. When Mrs. Margaret Thatcher, the British Prime Minister, visited New Delhi, it had been prophesied that she would be able to clinch the deal. When that did not happen, it was presumed that the Germans were ahead in the race

13 ibid, p 176
There are strong reasons to believe that after the proposal to water down the Janata Government-sponsored Jaguar military aircraft deal halfway, Mrs. Gandhi and her colleagues were considering a way to keep the British in good humour, especially in view of the hard-liner attitudes of the Americans towards India, politically, economically and particularly in the field of development of nuclear energy for peaceful purposes. Sometime earlier, the French, during the state visit of President Valery Giscard d'Estaing, had been awarded the contract for a massive aluminium complex in Orissa. The Europeanisation of economic links, anyway, was a major component of New Delhi's foreign policy during the 1980s. Another factor perhaps was the need to secure British support for a big loan India was negotiating with the International Monetary Fund.\textsuperscript{14}

The Paradeep contract, the biggest ever single deal proposed to be made by India in terms of cash, was also the most expensive tender to come the way of Davy. For the three-million-tonne plant, of $2,800 million foreign exchange component, about $220 million was to come in the form of grants from Britain whose aid to India for the preceding few years was all in the shape of outright grants. "It's a jumbo," was the comment in London of Mr. David Thomson, a member of the negotiating team. Along with Mr. Giles Dereham of Lazard's, Mr. Thomson had been shuttling to India and back more than a dozen times a year ever since the Paradeep plant idea was aired by Mr. Patnaik.

The Paradeep business was a really big deal for Britain whose once dominant position as partner of India in industrial and commercial ventures had been eroded. Throughout the negotiations the British Government had given a magnificent backup for Davy and this included the blocking of its take-over by the

\textsuperscript{14} ibid, p 177
Enserch Corporation of the United States. In its submission to the Government, Davy International had stated: "From the point of view of the British Government, it would be hardly possible with the best will in the world for full diplomatic weight to be thrown behind a United States-owned Davy as a fully British-owned company." 15

Apart from active lobbying by Mrs. Margaret Thatcher herself, the diplomatic support to Davy included many visits to India by Sir Peter Carey, Permanent Secretary to the UK Board of Industry, and Mr. Kenneth Clucas, a senior official from the British Department of Trade.

The German thrust on the other hand did not have the push from the Government in Bonn. The aid element in the package proved crucial. The West German government refused to increase its aid to India, to help the consortium led by Mannesman Demag, also including such British companies as GEC, Vickers and Taylor Woodrock.

The Indians, having accepted the need for Paradeep to be financed externally, insisted that the total cost of imported equipment should be met by cheap credit. It was because of this that Davy decided to form an international consortium. The British and the French Governments (unusually for the latter which normally only agrees to aid if the consortium is led by a French company) proved very accommodating - to say the least - in helping edge the contract towards Davy. In the process they underlined again the cut-throat nature of the international export credit war during the recession of early 1980s.

15 ibid, p 179
Originally, Davy had made an offer of $3163 million. In March 1981 it raised the quotation to $3303 million, complying with the technical requirements of the MECON document.

Later, Davy McKee was to claim that the Government of India had subsequently raised the level of technical requirements and Davy was required to supply a plant more sophisticated than was envisaged originally. The contention is untenable because in March 1981 Davy had increased its quotation after a study of the technical parameters and after detailed discussions with MECON and other Indian representatives. When submitting its revised offer in March 1981, Davy had written that "it would comply fully with the MECON technical parameters."

The Romanians and the Canadians were made to withdraw their tenders and quickly move off the negotiating table as not up to the mark and further negotiations were confined to those with Davy and Mannesman Demag. On the eve of the final consideration of the offers, Davy McKee unilaterally reduced its quotation from $3305 million to $2835 million. There was a reconfirmation on its part that the new offer also was in compliance with the parameters that had been defined. The Government then put it to Mannesman Demag whether it would competitively reduce its quotation. The Germans acted quickly, and reduced their estimates to $2600 million.

In terms of cash alone, the West German offer became more competitive. But there were a few other considerations. The Davy McKee quotation included a grant by the British Government and certain financial concessions which were together calculated at $388 million. These reduced the net cost of the Davy offer to $2447 million. Since the West German Government was unwilling to chip in

\[\text{ibid, p 185}\]
with grants in aid, the decision was taken to award the contract to Davy McKee on a firm fixed price, subject to a final settlement of various technical and financing details. The letter of intent was thus issued on 24 September, 1981. At this stage the estimate was a total cost of $1785 million in the freight on board cost of overseas supplies of equipment and another $769 million for the construction work in India. The cost was placed at $2554 million to be borne entirely by the foreigners. The difference between this and the amount of $2835 million was computed as the cost of interest during the construction stage. The French and the Germans were also to contribute some equipment.

Troubles began almost immediately after the letter of intent was sent out. When detailed negotiations opened on October 15, 1981, the Government of India found Davy McKee stalling on a number of questions concerning the furnishing of technical data and equipment specifications. Newspaper reports in March 1982 had given the impression that the Government of India suddenly decided to change the site to Daitari. What had really happened was that, soon after the issue of the letter of intent, Davy itself suggested that it would be advisable to shift the site of the plant from Paradeep to another place inland. Davy also made a brief report on the techno-economic aspects of the proposal to change the site. First, the proposal was informally conveyed to the Secretary of the Steel Ministry by Mr. A. N. Whiting of the Davy Corporation. The continued interest of the British Government was indicated by the fact that the British High Commissioner accompanied Mr. Whiting when he called on Mr. A. S. Gill, the Steel Secretary. Very quickly, on October 19, 1981, Davy put down the proposal in writing in letter to the Steel Ministry. The Government of India asked Davy for a detailed report and Davy responded in December 1981 saying that "from a civil
engineering point of view the currently proposed site at Paradeep will be considerably more expensive and time consuming. Daitari is technically a much more desirable and safe site than Paradeep and will cause less construction problems. Considerable economy in site preparation and civil engineering costs can be expected. 17

Both the British High Commissioner and representatives of Davy McKee pressed the Government of India to take an early decision on the proposal to shift the site to Daitari. Some time in January 1982, the Indian Government conveyed its agreement informally and all further planning and discussions were based on the assumption of construction at the new site. But the Government waited until March 16, 1982 to make a public announcement on Daitari. This knocked the bottom out of the basic arguments for a port-based plant and drew adverse comment from various quarters, including newspapers.

On 19 March, 1982, Davy submitted a formal proposal containing a formula to determine the cost at the new site. The Indian negotiators partly went along with this proposal but towards the end of April, Davy withdrew its proposal. The new site altered basic presumptions, Davy argued, although the suggestion for the change had come from it. The Indian side has argued that during the negotiations Davy tried to lower the specifications. For instance, the technical parameters prepared by MECON spelt out blast furnaces having an average daily capacity of 5,000 tonnes of hot metal. 18 The revised Davy proposal showed that what was offered would not give more than an average daily hot metal production of 4,400 tonnes. There were also major differences in specifications relating to the desulphurisation plant, sheeting for walls and roofs.

17 ibid, p 186
18 ibid, pp 187-188
and finally the lay out plan and the rolling mills. The MECON document mentioned an area of 800 hectares, while a lay out over an area of 680 hectares was proposed by Davy. When the Indian Government asked for a change in specifications to conform to the original parameters, Davy termed these as additionalities for which it demanded an extra price. Soon after the letter of intent was issued and the total pricing fixed, it became obvious to the Indian Government that Davy was trying to downgrade the specifications. India had the deplorable experience of the malfunctioning of the British assisted Durgapur plan. And acceptance of the Davy McKee specifications could have meant that India would have been stuck with a plant which would not be able to achieve rated capacity. Balancing facilities would have been required immediately after commissioning, it was feared.

As Davy had argued the case for economy when it suggested a change of site, the Indian Government was logical in expecting a reduction in the cost of construction as a result of the shift to Daitari. The original estimate had included $150 million for sand filling and piling at Paradeep. Although the Indian negotiators felt that Davy was dragging its feet, a memorandum of understanding was signed on February 15, 1982. This memo was a negotiating instrument necessary to begin the talks on the provision of Government credit and Eurocurrency loans on a commercial basis. In the next few weeks Davy made proposals which were at wide variance with the original offer. At the final stage, on May 9, 1982, Davy sprang a surprise by suggesting that the contract be confined to freight on board supplies of equipment from abroad and the Government of India should make arrangements for construction work. Davy, of course, offered to provide consultancy for this purpose for a fee. This last-minute
proposal was a repudiation of the offer on which the letter of intent was issued.

Yet another aspect of the new Davy memo was that, instead of the original quotation of $1785 million for the foreign equipment, the price was raised to nearly $2760 million - an increase of 55 percent in a period of less than a year.

One of the supposed attractions in the original offer was the time frame of 45 months for the erection and commissioning of the plant. The Davy withdrawal of the turnkey concept meant that this advantage also ceased to exist, as the time schedule was removed from the contract offer.

In sum, the three major assumptions on the proposed seventh public sector steel plant failed to materialise: first of all, the port-based concept; secondly, the fixed cost factor; and thirdly, the tight time schedule.

In an editorial, The Hindu took a low key view of the whole affair: "In the planning for the five plants which were built on greenfield sites, there was a great deal of preliminary work in the shape of feasibility and detailed project reports. The course adopted on Paradeep is different.... In the case of Paradeep no detail of any working paper on the technical aspects has been published. The short cut seems to have been taken by the Cabinet itself taking a decision in selecting a foreign partner from among the parties that offered to invest. The political will has played a clinching role.... The Paradeep proposal (financing by Eurodollar loans) can be taken as a tribute to the growing creditworthiness of the country. With a high interest burden, the project will have to be executed speedily and run efficiently. In this respect the project has thrown up a new sort of challenge."19

Revocation of Letter

On 14 May, 1982, the Indian Government revoked the letter of intent given to Davy. Obviously, the Government of India did think twice about it as this decision on the original award of the contract to the British company had distinct political implications. The political hopes were not accompanied by

19 The Hindu, Madras, September 25, 1981
economic concessions on the part of the British. The Britishers also wanted to
wriggle out of a deal which they rightly concluded they would not be able to fulfil
in accordance with the early promises.

The Hindu's editorial comment was incisive. Under the heading, "A matter
of initiative," it said: "The cancellation of the ill-conceived arrangement is logical.
The major lesson is that it is unwise to risk a deal without adequate preliminary
homework on the technical viability of a project. The country had already a
number of unprofitable plants - both in the public sector and in the private sector -
which are not doing well because of a faulty concept of the production range
itself. What next?.... What is material to the national interest is the early
expansion of the steel industry. The programme to be pushed forward now should
be that for Vijayanagar which has been accepted as a viable proposition. The
Government is suffering from cold feet in matters of industrial investment. It is
not necessary to "sell" Vijayanagar as a turnkey affair. It could be Indian designed
and constructed with some of the equipment being ordered from abroad on a
deferred payment basis. In the fifties, when the country had little indigenous
engineering expertise, three one-million-tonne plants were built successfully
despite the cassandras among foreign commentators. That type of courage should
be mustered now. Plunging into meaningful economic development is not merely
an accounting exercise of dollars and rupees. It is equally a matter of political
initiative."20

Sticking to a new line sketched by Mr.Patnaik, Mrs Gandhi's Government
was undoubtedly taking what nationalist minded officials, technocrats and
journalists considered to be many steps backward from the concept of progressive
indigenisation which had been the hallmark of industrial policy decisions from the
early sixties. For one thing the Government of India was chicken hearted about its
ability to find internal resources. There was, however, a lobby which contended
that a total contracting out to foreigners would deliver the goods quickly. The
presumption was based on the difficulties experienced in the procurement of
swadeshi equipment both at Bokaro and Bhilai. In one stroke there was a
conscious undervaluation of the Indian design and consultancy capabilities as well
as the ability of Indian capital and machinery making factories (largely in the

20 The Hindu, Madras, May 17, 1982
public sector) to do the job. The Government wanted to take a short cut, without much consideration for foreign exchange costs, and later events were soon to prove the error of its judgement.

As for the lessons from nearly four years of negotiations which ultimately turned out to be futile, it is best to refer to the editorial comments of the Financial Express dated May 18, 1982 even though they were made when details of the reasons for the breakdown were not known:

"In deciding to call off the deal with the British consortium for the construction of a steel plant at Daitari (earlier at Paradeep) on a turnkey basis, New Delhi has made amends for its past errors in this matter. The reasons for this final act, however, remain just as mysterious as everything else about the project has been. But on two counts New Delhi deserves kudos. First, for its refusal to succumb to diplomatic and possibly political pressures, and, secondly, for having, though belatedly, decided to view the whole project as a purely commercial venture and not as a touchstone of Indo-British economic relations on which so much calculated emphasis was laid in the wake of the new-found friendship between Mrs. Indira Gandhi and Mrs. Margaret Thatcher."

After straying a little into erroneous courses of action the government of India was able to shake off foreign blandishments and political inducements.

If we compare, then it turns out that though the history of the Indo-British relationship goes back to centuries. As far as our relationship in Iron and Steel ventures is concerned India always had a very bad deal at the end of the range of negotiations and relentless bargaining with the British. "...Durgapur which had the record of being the most inefficient steel plant in the country if not in the world, was the first British turnkey steel project in India." India's second turnkey venture with the British ended as the fiasco at Paradeep.

The Paradeep fiasco clearly proved that the level of self-reliance in technology attained by a developing country will ultimately determine its

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21 Financial Express, May 18, 1982
22 Hindu, Madras, June 26, 1982.
bargaining power and the extent of foreign technical cooperation it would be forced to seek. While major Indian public sector and private consultancy and engineering companies were implementing projects in other countries, they were not getting similar opportunities at home in the early eighties. This odd situation is hard to explain. In fact, if India is to progress with selling engineering projects abroad, the Government of India will have to place more trust in Indian agencies in awarding contracts inside the country.

The Paradeep misadventure disfigured the face of Indian politicians, administrators and some technicians. It is highly unlikely to be repeated by a country which boasts of having numerically the third largest reservoir of technical and scientific manpower among the nations of the world. The high profiled techno-economic diplomacy of the country was put to shame.

3. Vijaynagar - India's venture into yet another plant in public sector

Although administrative and technical assessments on an integrated plant at Vijayanagar, in Karnataka State, were ready for several years, the Government of India repeatedly deferred the investment decision. A pillar marking the notional launching of the scheme was put up in 1971 but the promise remained illusory until the middle of 1984. Numerous feasibility and detailed project reports have been gathering dust on the shelves of the offices of the consultants and the ministries concerned.

In 1969, Chairman, Karnataka Legislative Estimates Committee, Mr. M.Y. Ghorpade presented to the Prime Minister, Mrs. Indira Gandhi, a copy of the report on the Bhadravati Iron and Steel Works. Mr. Ghorpade had prepared
the report after visiting the major steel plants in the country. It contained his monograph on the "Case for Steel Plant in the Sandur-Hospet region." He had stated that "temporary difficulties of finding funds cannot rob this region of its birthright and the country of its long-term prospects. Sooner or later this land of iron and manganese must inevitably fulfil its natural destiny. But we must take bold and imaginative steps now. That is our sacred obligation to this land." In this paper, Mr. Ghorpade had referred to the reported willingness of West Germany and Japan to help in the speedy development of Karwar port in return for iron ore from this area. Mr. Garpade was nudging the government to take initiative for getting into an agreement with either Japan or Germany with the assumption that if they were keen to develop the Kanwar port in exchange of iron ore, a steel plant with their collaboration should not be that far fetched an idea. He had posed the question, "Why should not both Karwar port development and a steel plant in Bellary district be planned with German or Japanese collaboration? If it pays Japan to take our iron ore for steel making to Japan, it should also pay to produce steel where the ore is found. Such long-term collaboration is not beyond the genius of Japan and India." When Mr. Ghorpade became Karnataka's Finance Minister, he pursued the matter with Mrs. Gandhi in the early Seventies. "She was sympathetic to this approach," to quote Mr. Ghorpade, "and suggested that he discuss the question with D.P. Dhar who was then the Vice-Chairman of the Planning Commission."

The consultancy firm, M.N.Dastur and Company had in a report in 1964 spelt out the advantages of locating an integrated steel plant in the Sandur-Hospet

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23 ibid, K Krishnamurthy, p 192
24 ibid
region which contained deposits of more than 1,000 million tonnes of some of the richest iron ores in the world.

The study on new steel plant locations by an Anglo-American group, whose report was published in February 1970, considered Hospet (Vijayanagar) as the place with the lowest cost for the assembly of raw materials.

In the 1970s Mrs. Gandhi's government had intended to build three new steel plants in the South. The debates and tussles regarding Vishakhapatnam and Diatry had put Vijaynagar plant in the background. Plans for the Vijayanagar unit had been languishing for more than a decade, with one project report after another being shelved. The latest technical report on this Karnataka plant had won the seal of approval from the Steel Authority of India, with a remunerative product mix of flat items that were of interest to the West Germans. In the fifties, when the country possessed little engineering expertise and industrial capability, it launched on an adventure of building three major steel plants simultaneously. Now there was a wealth of technical talent, with some machine-building capacity to boost, and the Government should not have felt hesitant about plunging into the task of putting up three plants in this decade.

In his 1973 budget speech at Karnataka state assembly, Mr. Ghorpade mentioned the fact that "financial provision of Rs.125 crores has been made for the Vijayanagar steel plant in the Central Sector in the Fifth Plan." He was campaigning for the steel plant quite consistently and he was making the point to the central government as well.
It is true that when the German consultants from Mannesman Demag lost out to the British in the Paradeep project at Orissa, they directed their interest to Vijayanagar in Karnataka. This did raise faint hopes that the government might try to go in, as in the fifties, for three plants simultaneously - Vishakhapatnam, Paradeep and Vijayanagar. Inspite of all the efforts finally the project did not reach the level of preparedness with which technology transfer negotiations could be carried out.

The Vijayanagar steel project once again became an issue for political debate when the Janata Party assumed office in Karnataka early in 1983. What has often become devalued in the heat and dust of political controversy is the fact that, on an assessment of objective factors, Vijayanagar has a good case for the location of another greenfield plant.

Sadly, the international negotiations for the new steel plants were over all not so successful in securing technological upgradation and modernisation for the Indian steel industry during this phase.

Therefore it can be observed that by the end of the second phase of India's steel diplomacy, despite the initial enthusiasm, the creation of new capacities stood drastically curtailed. The scope of both Salem and Visakhapatnam was sharply reduced and Vijayanagar was totally dropped. This, coupled with the slow progress in the expansion of Bhilai and Bokaro, led to a situation where there was virtually no addition to capacity during the Sixth Plan (1980-1985).

Thus, the installed capacity for making steel, which was 1.3 MT. in 1951-52, had risen to 16.0 MT. by the beginning of the Seventh Five Year Plan. Over the entire 34 year period (1951-1985), this represented an annual average growth rate of 7.4 percent. But, as we have already pointed out, up to 1966 the
growth rate had averaged 11 percent. Therefore, from 1966 to the present, the
growth rate of capacity has been only 5% on average.

To put it in starker terms, if the visions of Nehru had been fulfilled and the
steel capacity in India had grown at the rate achieved during the first three Five
Year Plans, in 1985 the country should have had an ingot steel capacity of more
than 45 million tonnes - almost three times that which exists at present. If this
figure appears to be excessive, it is instructive to compare India's performance
with that of China as shown in the table 4.1 below.  

<table>
<thead>
<tr>
<th>Table 4.1 : Per Capita Consumption of Steel in India and China</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Kgs. Crude Steel)</td>
</tr>
<tr>
<td>India</td>
</tr>
<tr>
<td>China</td>
</tr>
</tbody>
</table>

Source: Metals in India's Development, GOI Publications, 1989, p 43

SECTION III: THE OPERATING NATIONAL CONSTRAINTS
FOR THE FAILURE OF INDIA'S STEEL DIPLOMACY

Evolution of the Public Sector Plants in India

Evolution of steel industry in the public sector has depended on a (a)
support from the government in terms of priority in planning; (b) budgetary funds,

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Sen, Goyal, and Sengupta in Growth of Indian Steel Industry, ibid, *Metals in India's Development*, p 43
(c) continuity in leadership which could support and enhance the requirements of the steel sector and (d) effectiveness of internal management.

In pursuance of his firm conviction Nehru actively sought the development of steel and basic industries in the country. Because of ambitions planning the Indian steel industry made rapid strides in the second and the Third Five Year Plans when the capacity of crude steel increased from 1.5 million tonnes to 8.9 million tonnes.

The pace of development slowed down after the demise of Nehru. Thus between 1964, when a decision on a green field plant for Bokaro and 1979 when another green field plan at Vishakhapatnam was conceded, there was a prolonged holiday for the steel sector. At the end of the Seventh Plan period the total steel output had reached only about 10 million tonnes. The budgetary support to the steel industry selective to other sector declined considerably after the 3rd steel policy pursued by the government through controls of price and distribution during the seventies dampened the ability of the public sector steel plants to generate internal resources. It is interesting to note that since the beginning of public sector productions of steel the domestic price of Indian steel has been in general lower than the international prices, till the end of seventies. The relatively lower cost of steel production in Indian and the governmental deliberate policy of keeping the price of steel as low as possible in order to subsidize development schemes explains the governments cheap steel policy.

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28 Ibid, R.P.Sengupta, p 64.
In fifties and sixties when Indian steel was fully competitive it was considerably less expensive than imported steel. By the sixties, the import substitution regime had removed any potential threat of foreign competition and import was permitted only on special steel or to make up for the short falls. We continued the export of pig iron and mild steel, but these declined significantly after 1976-77 and they came to an end by 1981-82. The integrated steel plants performed very poorly from the mid seventies. Capacity utilization at SAIL was 58 percent in 1980-81 and 71 percent in 1981-82.29

The Indian integrated steel plant sector represented a backdrop of a low level of technological development when compared with the steel industry of the major steel producing countries of the world. Both labour productivity and energy consumption, the two major indicator of efficiency of our technology compared very unfavourably with those of other countries.

The first constraint - The structure of decision-making in the public sector was such that plant or enterprise-level management was often not empowered to take the entrepreneurial decision to invest and which depends on the government department controlling the industry. For example, no project exceeding Rs. 10 crore in steel could be undertaken by SAIL unless approved by the PIB, although the routine investment for an item like rebuilding a coke oven battery will far exceed such limits. The efficiency of investment activity in steel would, therefore, be quite dependent, among other things, on the entrepreneurial quality and wisdom of the government in the matter concerned. Without priority of the

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government and necessary funds allocations, therefore, the technology transfer and technology upgradation negotiations could not proceed successfully.

There really was a problem of cruciality here. Since the steel industry has not been capable of generating adequate internal resources, it has to depend on government funds. If the public sector steel unit is to depend on government funds, then it should take the approval of the government for every project requiring a significant amount. It is thus only quite natural that the quality of entrepreneurship of the government department concerned would play a significant role in determining the rate of technical progress and its diffusion in our steel industry.

The second constraint - The Government enterprise was overshadowed by the pulls and pressures generated because of the nexus of the bureaucrats and the politicians. As a result we note that the long term steel performance was virtually shelved by the mid-1970s. It was replaced by political jockeying under the influence of regional considerations. A succession of ministers incharge of the steel portfolio indulged in reckless manoeuvres, regardless of the national considerations in the steel sector. There was an agitation for a steel plant at Salem in Tamil Nadu, followed by a bigger one in Andhra Pradesh for a steel plant at Vishakhapatnam. Similar agitations were simmering in other areas like in Orissa for a second steel plant.  

Balraj Mehta bring out a significant point when he says that the techno-economic considerations which should be over riding steel plant location, involving as they do huge investments were being subordinated to such

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Balraj Mehta in V.Krishnamurthy ed. *Tryst With Steel*, Intercorporate Marketing, New Delhi, 1988, p 68
pulls and pressures. One of the steel ministers went as far as to bring in foreign agencies like the British American Steel Consortium, to prop up the Vizag location and was not adverse to the construction of Bokaro as a national enterprise and condone its handing over to the Soviet agencies, in order to clear the way for the induction of the British American Consortium into the steel picture of the country, in complete violation of the national policy on the future building of steel plants by Indian agencies as set-up by Nehru. It had been quite galling for the bureaucrats that in the earlier days Nehru had curbed bureaucratic influence in techno-economic matters and had relied more on technical expertise, particularly in steel. 31

This was perhaps the most significant national constraint that came in the way of further successes for the Indian diplomatic ventures in the steel industry.

The Third Constraint - The country, in the mean while headed into depression and there was a slowdown in economic and industrial development in general. The established capacity of steel appeared higher than required. Internal demand having slackened, surpluses in steel production could have opened up the prospects of steel exports. But again this was handled in a very narrow and unimaginative perspective. Instead of seeing in it an opportunity and challenge, it was seen as a good excuse to scuttle the steel development altogether. This naturally became a major deterrent to the tempo of steel diplomacy which we noted in the previous chapter.

31 ibid, p 68
The Fourth constraint: The government as an entrepreneur, has often been unprofessional in its approach to industry.\textsuperscript{32}

(i) The predominance of bureaucrats and politicians in decision-making over professional experts involved in enterprise-level management has often resulted in the lack of a continuous and long-term policy in the growth of the industry concerned.

(ii) Many sensible proposals for technical change or modernization submitted by technocrats have not received favourable responses from the government because of the later's lack of wisdom and vision. This has been very demoralizing for the professional management of the enterprises.

(iii) The very fact that the importance of modernization of steel plants in the public sector could be appreciated by the government only as late as the 1980s is evidence of the above assertion. It is also a fact that political considerations play an important role in our investment decisions because political authorities use the management of the public sector, the distribution of power between the government and the enterprise-level management and the system of accountability to their own purpose.

The Fifth constraint - As the industrial Policy Resolution of 1984 reserved all future steel capacity for the public sector existing private sector was allowed to continue as long as their performance was satisfactory. The threat of nationalisation always hovered in the background. No expansion or modernisation of these plants was encouraged. Also the political motivation was at a very low key regarding the expression of this industry as compared to the fifties and sixties.

\textsuperscript{32} ibid, R.P. Sengupta, Technological Diffusion, p 71-72
All these have made technical progress and diffusion in our public sector heavy industries dependent on non-economic considerations. This has been a crucial factor in the failure of Indian international negotiations for technology transfer in this vital field. In the past two decades the initiatives for negotiations for technology transfer in the steel sector was taken by this government, propelled by the national urgency to establish the basic steel industry. As we moved along it was assumed that we would be able to tackle the associated problems. The first three public sector plants were the result of bold and vital diplomatic initiatives of our leaders. It is a matter of deep concern that steel plants particularly those of the public sector have experienced a decline in factor productivity and increase in energy consumption overtime indicating the lack of dynamism in our technology and revealing increasing inefficiency of its operation.33

This was the fallout of major national constraints highlighted above. The foiled efforts of diplomacy in the vital sector of our economy had serious implications for the system. As a corollary, we can say that we paid the price of economic stagnation because of foiled diplomatic efforts.

Assessment of the outcome of negotiations for steel technology transfer

As of today, we have to see the steel industry as part of a network of industries and technologies. We have to consider the totality of technologies required for the efficient functioning of the total system and investment has to be made accordingly, otherwise, we would again make the mistake of lopsided development of technology.

R.P. Sengupta, Technological Diffusion in Indian Steel Industry.
To assess the technology transfer so far, we could use the degree of technology absorption and assimilation as the measuring units.

(i) **Absorption and adaptation** - "After the transfer of technology comes its adaptation to the changing situation. This is primarily our responsibility, and if we do not perform the function, we cannot blame the person or organisations which gave us that technology, unless you would enter into a corresponding agreement which is what happened with the Soviet Union. They deliberately stayed with us because it meant that their contribution would be optimised by their staying with us and going through the process of adaptation. There is a conceptual distinction between transfer at a point of time and adaptation. Adaptation is a continuous operation. There is conceptually a third stage, I would call it assimilation. We cannot blame those who transferred technology, if we fail to assimilate fully".  

The process of bargaining for technology in the industrial sector can be entirely successful only if we consciously go through the three stages mentioned above i.e., transfer of technology, adaptation of the technology and finally its full assimilation for industrial application in the recipient country. We have not been quite successful in the technology transfer in the steel industry. As an example we can see that though India has been the third country in the world to introduce the basic oxygen converter technology of steel making in its Rourkela plant in 1959, it has not yet adopted and assimilated in its industrial application. The highly energy inefficient Duplex Bessemer-cum-tilting open hearth process of steel making is still in operation in the industry. IISCO which was first Indian steel plant introduced its first LD converter only as late as 1983. While open hearth

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process is still in use in its other steel melting shops.\textsuperscript{35} This shows our lack of absorptive and adaptive capabilities. Also because of this the advantage of the diplomatic success of having received a state-of-the art technology got entirely negated.

In the later decades we also realized that technology is fast changing and by the time the steel plant expansion was taken up, the technology adopted initially had become obsolete. Therefore, at the initial planning stage itself, emerging technologies should be kept in view while providing for future expansion. While negotiating technology transfer in this field we must pay attention to this aspect in particular. Otherwise, the project may be saddled with the same old technology during expansion also. We must realise that mistakes committed originally will continue to be a burden on the project for its life time. This emphasises the need for paying topmost attention at the planning and the negotiating stage itself not only to the initial technology and facilities but also to the possible adoption of new and emerging technologies in the growing life span of the plant expansion.\textsuperscript{36}

While quality of entrepreneurship, cooperation of labour and well-coordinated government policy for pricing and investment are necessary to ensure fast adaptation of new technology, this cannot, however, suffice unless the country acquires the technical capability of developing new processes of making and shaping steel and related basic and detailed engineering for the plant and equipment system. In the Second Five-Year Plan we had established steel plants through turnkey contracts with foreign collaborating agencies. The balance-of-payments crisis of the 1960s, however, forced on us an import

\textsuperscript{35} ibid, R P. Sengupta, p 62
\textsuperscript{36} ibid.
substitution programme and as a result, India developed the capability of manufacturing machinery and heavy equipment for many industries, including steel. But we could not make much progress.

(ii) Assimilation and Indigenous Research and Development - India, in general, has neither been able to develop any basic process technology and know-how and related basic engineering by assimilating foreign technologies, nor has it been able to develop in all the areas of engineering discipline the ability to design in detail although she is able today to manufacture various machines provided the drawings are available. One of the basic reasons behind this has been the inadequate R&D activity to assimilate an imported technology and the low priority input to such activities in the early years of planning. In spite of setting up a large number of national research laboratories India's per capita R&D expenditure remained as low as US$1 in 1976-77, whereas it ranged between US $30 and 160 in the advanced capitalist countries. Besides, one of the features of our R&D efforts at the national level has been the emphasis on basic and fundamental research rather than on industrial and applied research, which is more important from the point of view of industrialization. While India has today entered sophisticated fields such as nuclear energy or space research the technology gap between India and advanced countries is, on the other hand, widening in many of our basic industries like steel.

All the developed countries exchange 90 percent of the world's technologies among themselves. But for the absorption of imported technologies the advanced countries spend US $7 on R&D for every US dollar spent on import of technology, while India's expenditure on R&D ranges from US$1 to 1.5. The market of technology being highly monopolistic, this expenditure on R&D is very
important to reduce the long-run cost of investment. Unless technical capability is developed in the country, we have to pay a very high price to buy technology and engineering service, if not the hardware, for every new project. The lack of adequate emphasis on R&D activities to absorb foreign technology has made us dependent on foreign collaboration at the time of every expansion or modernization of steel plants. It is a pity that the government had to approach the Soviet Union even as late as 1981-8 for preparing the feasibility report on modernization of the IISCO plant at Burnpur.37

Even though we made a very promising start we could not maintain this tempo. In the subsequent years, we had been left far behind in the league of modern developing countries, both in production and consumption of steel. South Korea, China and Brazil overtook India several years back. This was mainly because in the seventies and eighties the country's planners and steel technologies somehow could not avoid a long period of stagnation in investment for plant upgradation and modernization. The vision that characterized the process of steel diplomacy in the first few years after independence was somehow lacking in at least the steel sector with the result that large addition to steel production capacity just did not take place.38 The fate of India's international negotiations for technology transfer did not show any promising horizons.

37 ibid, pp.77-76.
38 R.Venkatanarayan, "Iron and Steel - Planning for the Next Decade", in Metals for India's Development, p.9.
SECTION IV - SHIFT IN THE GLOBAL STRUCTURE OF STEEL PRODUCTION

A) Reversal of India's position vis-à-vis other developing countries

The world steel industry has experienced a serious structural crisis since the rise in energy prices from 1973 onwards. It has been reorganized technically as well as geographically. In 1975 steel production in the world fell by 9 percent in a single year. Total world production of steel has grown on point to point basis only by 0.3 percent per annum between 1973 and 1991. For the industrialized country, there has been an absolute decline in crude steel output from 462.6 MT in 1973 to 380MTs in 1991.

R.P. Sengupta has analysed this problem. He brings out the fact that the fall in the steel output in the Western World has on the whole been offset by the growth of steel output in the developing countries and the erstwhile socialist world. Steel output of the developing countries has risen from 34.2 MT in 1973 to 111.2 MT in 1991 at an annual average growth rate of 6.8%, on point to point basis. Among the erstwhile socialist countries it is the growth of steel output of China has been most impressive, rising from 25 MTs in 1973 to 71 MT in 1991, showing 6% annual average growth.39 It could be noted here that when most of the developing countries took advantage of the structural relocation of the industry, Indian diplomatic efforts as shown earlier did not show the results that had been targeted. Inspite of repeated efforts at negotiations with various world

leaders like Mannesdemag, Davy and Co., etc., the Indian side did not fruitfully conclude any deal except for the Vizag steel plant.

During the same period (1973-92) inspite of the faster growth of the steel production in developing countries as a whole, individually most of these countries continued to be substantially dependent on imports to meet their domestic requirements. It is indeed a pity that the growth of Indian Steel was to decelerate during a period when the developing world as a whole raised its share of global output from 4.1 percent in 1973 to 15.1 percent in 1991, while continuing to import large quantity of steel from the developed world. Crude Steel capacity of the Indian plants rose very impressively from 1.5 MT in 1950 to 8.9 MT in 1967-68 at an average annual compound rate of 11 percent. The annual rate of capacity expansion however sharply declined to 2.6 percent in the subsequent period between 1967-68 and 1991-92.

The shift in the regional structure of world steel industry is shown in Table 4.2 below:

Table 4.2: Shift in the Regional Structure of World Steel Industry

<table>
<thead>
<tr>
<th>Production of Crude Steel</th>
<th>Absolute Share in Level(MT) Steel</th>
<th>Share in World Steel</th>
<th>Absolute Share in Level(MT) World</th>
<th>Share in World Steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrialized Countries</td>
<td>462.6</td>
<td>66.3%</td>
<td>380.5</td>
<td>51.7%</td>
</tr>
<tr>
<td>Developing Countries</td>
<td>28.2</td>
<td>4.0%</td>
<td>111.2</td>
<td>15.1%</td>
</tr>
<tr>
<td>China</td>
<td>25.2</td>
<td>3.6%</td>
<td>71.0</td>
<td>9.7%</td>
</tr>
<tr>
<td>India</td>
<td>6.8</td>
<td>1.0%</td>
<td>17.1</td>
<td>2.3%</td>
</tr>
<tr>
<td>Total</td>
<td>697.5</td>
<td>100.0%</td>
<td>735.8</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

The growth of steel industry of the developing countries has ridden on the back of the growing pace of industrialization and the consequent expansion of domestic market for steel in these countries. Right though the post - 1950 period in the developing countries, a significant component of domestic steel demand had to be met out of imports. This significant and continued dependence on imported steel has been identified by R.P. Sengupta as "structural deficit of steel." This structural deficit of steel is indicative of a dependent nature of the industrialization process in general. Developing countries which have gone for technology acquisition from the developed countries have in general shown an accompanying gap between technological level of economic and social investment and the pre-existing structure of indigenous production.40

International competitiveness in any production line should be identified with the ability to offer products at international prices. This price competitiveness allows any industry to hold out against competition from abroad in the domestic market, to penetrate international markets, if commercial/national interests so dictate and in general lend support to the overall industrial health.

This is specially true for an industry such as steel. Being a universal intermediary, steel has for years determined the overall industrial competitiveness of different nations. For example, economists trace the loss of competitive edge of the American industry to domestically produced steel becoming costlier. It is also not a mere coincidence that countries such as Japan and West Germany and more recently South Korea, that have excelled in international markets and have experienced outstanding growth, are also amongst the cheapest producers of steel in the world.

This is shown in Table 4.3 below:

**Table 4.3: Average Increase in the Manufacturing Cost of Carbon Steel in Select Steel Producing Countries**

<table>
<thead>
<tr>
<th>Country</th>
<th>Increase between 1973-1990</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>22.8%</td>
</tr>
<tr>
<td>U.K.</td>
<td>330%</td>
</tr>
<tr>
<td>Japan</td>
<td>148%</td>
</tr>
<tr>
<td>W Germany</td>
<td>140%</td>
</tr>
<tr>
<td>India</td>
<td>460%</td>
</tr>
<tr>
<td>SAIL</td>
<td>963%</td>
</tr>
<tr>
<td>TISCO</td>
<td></td>
</tr>
</tbody>
</table>

Source: R.P. Sengupta, ICRA Sector Focus Series #2. Indian Steel Industry, p.3.

The cost competitiveness of the Steel Industry has two major determinants.

1. Physical efficiency in utilization of raw materials inputs and in the use of labour and capital,

2. Advantages in terms of input prices

   Physical efficiency is the outcome of factors such as technology and managerial efficiencies in utilization of resources etc., whereas advantages in terms of input prices typically accrue... to countries that have large raw material reserves and abundant in labour or capital.

   The role of technology has been tellingly brought out by the Japanese. Inspite of importing all the raw material required for making steel, they continued to be the world leaders on the sheer ability to convert it much more efficiently than others. India's quest for international competitiveness has to be guided by adoption and assimilation of the state of the art technology. It is in this context that we should see modernization and expansion programmes of various steel plants which began in the mid-1980s. One need not be reminded that it is this backlog of requisite investments that should have been made in the past decades,
that has made Indian steel, once the cheapest in the world, lose competitiveness. Postponement of investment also had implications for interval resource generation and the ability of the industry to expand its capacity. Indian per capita consumption of steel is abysmally low at 18 kgs per person. At the same time our ability to import steel is limited by the constraint on foreign exchange. It is, therefore imperative that we make a break-through from this abysmal level of low technological performance into frontiers of technical excellence.

B) Rapid Technology Development in The World Steel

The oil crisis of 1973 and 1978 set a recessionary trend in the world steel market and many of the developed countries and many of the developing countries had to cut down their production substantially. With the consequent rise in prices of inputs, it was difficult to produce steels economically. To overcome this situation the developed countries accelerated their efforts to upgrade the existing technologies and to bring in more sophistication and efficacy in production of steel.\(^{41}\)

In the steel production process whatever be the choice of route, the percentage yield of metal from iron ore and energy efficiency are of paramount importance for ascertaining the viability of the technology to be used in the steel plant. The sharp rise in the energy costs particularly of oil in the early seventies and again in the mid-eighties have induced not only drastic energy saving type of

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technological changes but also steps to replace oil. In the interest of improvement in the material yields, any technology which minimizes metal loss in slag or in fumes or minimal scarging or grinding loss, had an advantage. Imperatives for achieving higher productivity and energy conservation had also induced elimination of intermediate operations and near net shape casting, like continuous castings of slabs/billet or thin slab casting. Waste heat recovery and power co-generation with steam have also started attracting serious attention in view of the overall structural deficit of grid power and its problem of reliability.\footnote{Ibid., Sengupta, ICRA Part -2, p.27.}

There are numerous examples of such energy conservation technologies viz., dry coke cooling, BF top gas turbine, generation of power from waste heat of sinter plants, recovery of basic oxygen furnace gas, pre-heating of scrap for EAF (Electric Arc Furnace), hot charging and direct rolling of continuously cast semis etc.\footnote{ibid.}

The rise in the cost of energy, particularly oil also had a dampening effect on the investment in the energy intensive industries. This in turn had affected the off take of steel. Developed countries steel scenario underwent decisive changes in the seventies. The domestic demand in these countries had begun to reach a pleatue.\footnote{\textit{In the initial stages of industrial growth, the infrastructural developments such as railway lines and rolling stock, roads and bridges, reservoirs, water and gas works, electricity generation and distribution, construction of plant and machinery, parts and buildings its contribute to the rising steel consumption of the economy. Subsequently with the rising disposable increases, growth occurs in usage of automobiles and other consumer durables leading to further steel consumption. Beyond a certain level of economic advancement, however, the absorptive capacity of the economy for steel diminishes, corresponding to what is in a sense of point of saturation of infrastructural facility. Thus given this stock use of steel, its cumulative consumption - net wear and tear can be used to define the level of steel saturation in an economy and thereby indicate the potential for}}
Collapse of steel demand in virtually all developed countries with the exception of Japan put a halt to the expansion of their steel industries.

Some of the important developments during the period (1970-85) are as follows:

i) The industrialized countries are shifting to hi-technology areas - The technology explosion witnessed in informatics processing and electronics has made its impact on material consumption trends in the advanced countries. Further the concentration of these countries is on technologically sophisticated products rather than material intensive production lines, like lighter more fuel efficient automobiles.

ii) Increased yield from crude steel - Steel consumption is normally presented in terms of crude steel and this can give rise to distortions, as in the wake of technological developments, there have been a substantial improvement in the yield of finished steel products per tonne of crude steel. One of the principle advances was in continuous casting. The following table indicates the growth in the percentage share of steel continuously cast during 1976-1987.

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Table 4.4: Growth in % of Steel Continuously Cast

<table>
<thead>
<tr>
<th>Country</th>
<th>1976</th>
<th>1987</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>10.5</td>
<td>59.8</td>
</tr>
<tr>
<td>Japan</td>
<td>35.0</td>
<td>93.3</td>
</tr>
<tr>
<td>EC</td>
<td>20.3</td>
<td>81.2</td>
</tr>
<tr>
<td>USSR</td>
<td>8.1</td>
<td>16.1</td>
</tr>
<tr>
<td>S.Korea</td>
<td>21.9</td>
<td>83.5</td>
</tr>
<tr>
<td>Taiwan</td>
<td>-</td>
<td>89.4</td>
</tr>
<tr>
<td>Brazil</td>
<td>12.1</td>
<td>45.5</td>
</tr>
<tr>
<td>China</td>
<td>-</td>
<td>16.0</td>
</tr>
<tr>
<td>India</td>
<td>-</td>
<td>(estimated) 26.6</td>
</tr>
<tr>
<td>World Steel</td>
<td>16.4</td>
<td>55.2</td>
</tr>
</tbody>
</table>

Source: IISI.

It is an interesting fact that the incidence of sickness in the steel industry is mainly confined to those countries which have not adopted continuous casting to a significant extent.

iii) Oxygen Steel Making - This has become the dominant steel making procedure in most countries with the exception of erstwhile Soviet Union, India and some of the European countries, where a substantial amount of steel is still made by the open-hearth process. The share of some selected countries is shown in Table 4.5

Table-4.5: Share of Oxygen Sheets in 1987

<table>
<thead>
<tr>
<th>Country</th>
<th>% of share</th>
<th>Country</th>
<th>% of share</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>58.9</td>
<td>Japan</td>
<td>70.2</td>
</tr>
<tr>
<td>EC</td>
<td>71.0</td>
<td>USSR</td>
<td>33.7</td>
</tr>
<tr>
<td>South Korea</td>
<td>67.6</td>
<td>Taiwan</td>
<td>66.5</td>
</tr>
<tr>
<td>Brazil</td>
<td>75.0</td>
<td>China</td>
<td>56.0</td>
</tr>
<tr>
<td>India</td>
<td>37.2</td>
<td>World</td>
<td>55.9</td>
</tr>
</tbody>
</table>

Source: International Iron and Steel Institute.
iv) Increase in Production in the Developing Countries - There has been a significant growth in the capacity of several developing countries while many of this industrialized countries have resorted to capacity reductions in order to attain a balance between demand and capacity. Capacity shedding by some of the industrialized countries was also because they were not doing well in the export markets owing to the increased production in developing countries (see Table 4.6).

Table-4.6: Increase in Crude Steel Products in Selected Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>1976</th>
<th>1987</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>20</td>
<td>55</td>
<td>35</td>
</tr>
<tr>
<td>Brazil</td>
<td>9</td>
<td>22</td>
<td>13</td>
</tr>
<tr>
<td>South Korea</td>
<td>4</td>
<td>17</td>
<td>13</td>
</tr>
<tr>
<td>Turkey</td>
<td>2</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Taiwan</td>
<td>1</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>India</td>
<td>9</td>
<td>13</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: Metals in India's Development, GOI Publications, 1989

v) Increased International Trade - The volume of international trade increased from 114 Mt. of finished steel in 1975 i.e., 23 percent of the total production to 160 Mt. which is 25.8 percent of the total production.

To sum up, we can sat that there was an overall failure of the government negotiations for technology transfer in steel sector due to:

1. Indian steel lost its global competitiveness and the leadership vis-à-vis the other producers in developing countries
2. There were major technological break throughs in the world steel
Together these led to vast technological backwardness and huge technological gap in the Indian steel industry. Here we could conclude that India’s international negotiations were not successful in its second phase primarily because -

1. we lost out an international advantage that we had secured earlier
2. we failed to negotiate successful state-of-the-art technology transfers into our steel industry.