## OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

## DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as "developed", "industrialized" and "developing" are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

## FAIR USE POLICY

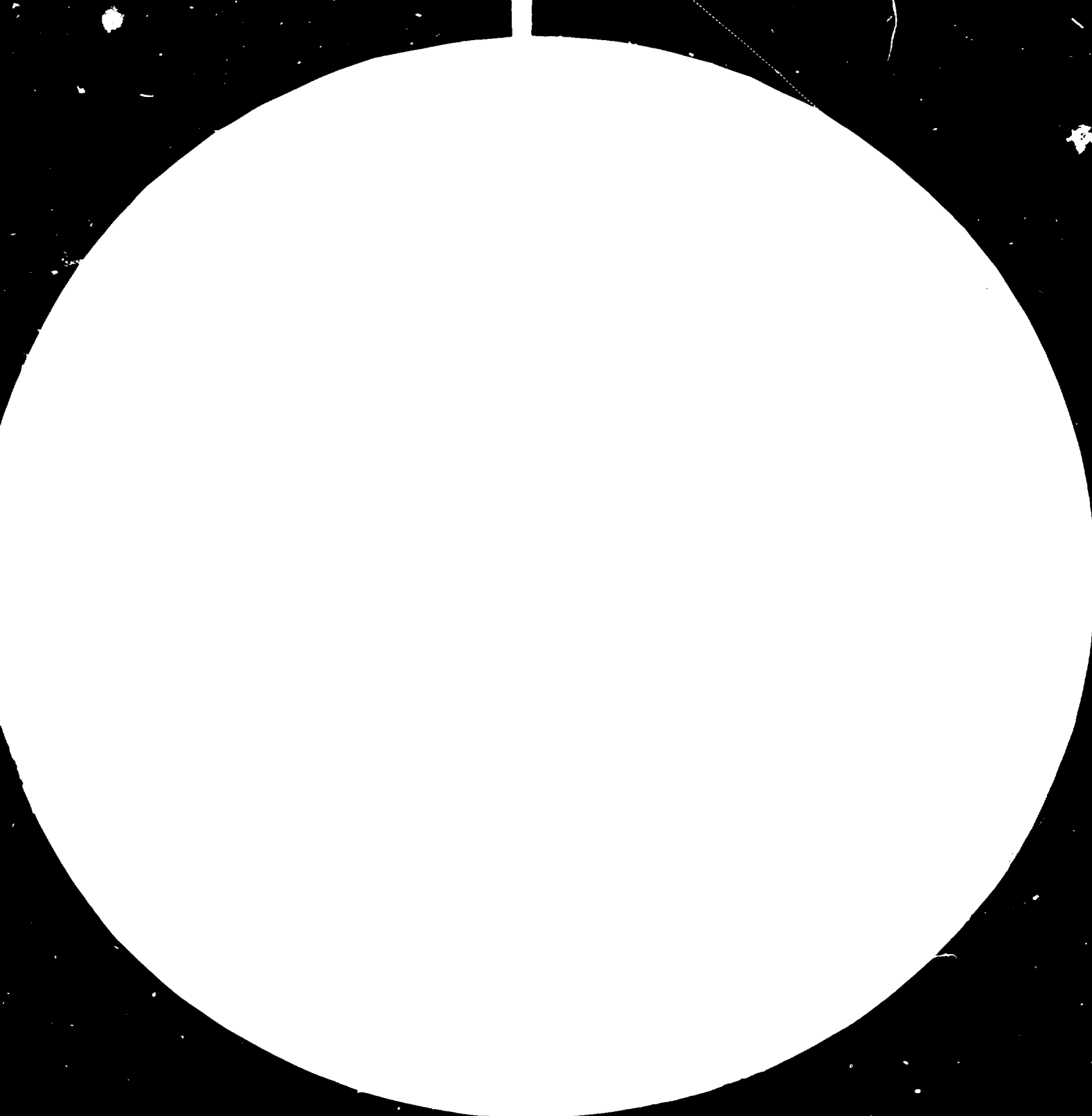
Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

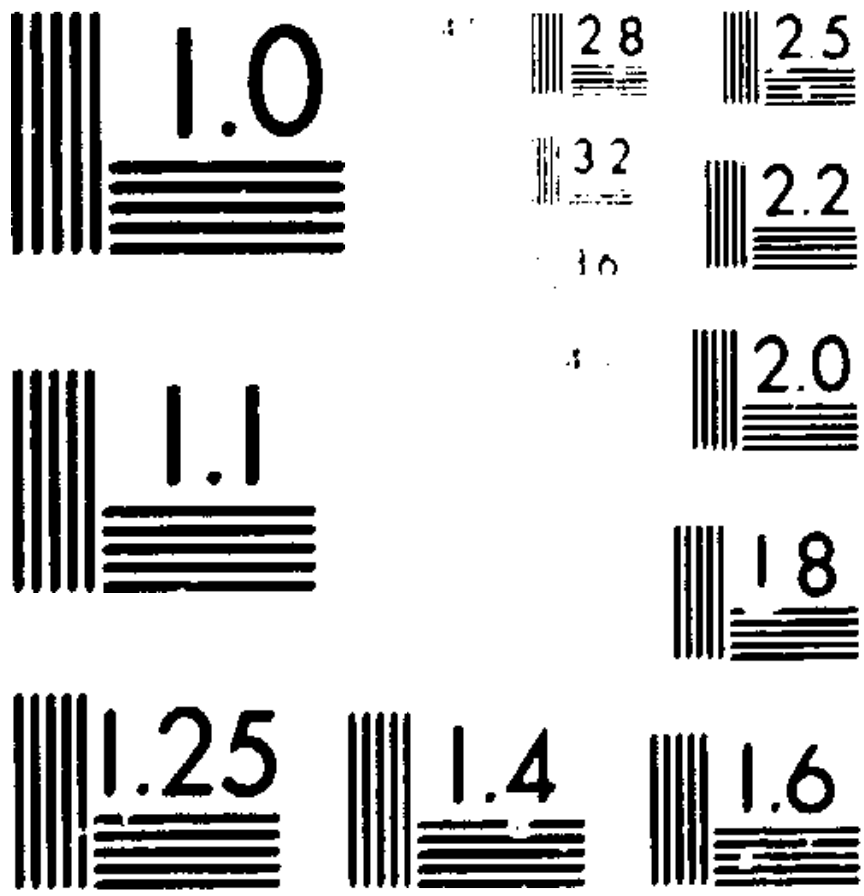
## CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org






MICROCOPY RESOLUTION TEST CHART

11636-E

Distr.
LIMITED

ID/WG.374/4
1 July 1982

Original: ENGLISH

United Nations Industrial Development Organization

Third Consultation on the Iron and Steel Industry
Caracas, Venezuela, 13-17 September 1982

Issue Paper No.3

# ENTRY OF NEWCOMERS INTO STEEL SECTOR*

003989

* This document has been reproduced without formal editing.

V.82-28367

CONTENTS

with
11636-E

United Nations Industrial Development Organization

Distr.
LIMITED

ID/WG.374/4/Corr.1
7 September 1982

Original: ENGLISH

Third Consultation on the Iron and Steel Industry
Caracas, Venezuela, 13-17 September 1982

Issue Paper No.3

ENTRY OF NEWCOMERS INTO STEEL SECTOR

Corrigendum

Page 17

Note[1/] should read "1990 scenarios for the iron and steel industry; Addendum: the dossiers. Dossier I: 1990 projects in the developing countries" (ID/WG.374/2/Add.1).

V.82-30167

This brief paper attempts to highlight one of the principal issues identified by a working group of experts at its meeting in Estoril, Portugal (3-5 February 1982), for presentation to the Third Consultation on Iron & Steel Industry. The issue relates to "the specific problems faced by developing countries which are attempting to enter, for the first time into the steel industry sector".

## I. Summary


1. Inexperience, lack of knowledge and expertise and scarce financial resources are the major handicaps that prevent the "newcomer" countries from entering into the steel sector. Lack of trained manpower prevents "newcomer" from selecting the desirable technology and plant & equipment, and securing good financing and technical assistance arrangements.

2. In the choice of technology, it is advantageous for the "newcomer" to adopt mini-steel route. It is also highly desirable that instead of having a complete range of steelmaking facilities as a single project, the "newcomer" establishes it in a stage-wise, step-wise manner.

3. Training being one of the most important elements in establishment of a steel industry, special attention has to be paid by the "newcomer" through:

a) preparation and implementation of a national manpower planning programme;

b) training of local personnel in foreign countries; and

c) creating suitable conditons within the country that would ensure availability of foreign experts to assist in the venture.

4. International community needs to adopt special measures, individually and on regional basis to provide technical/financial guidance and help to the "newcomers". They also need to consider providing special financing arrangement - aid and cheap credit - to enable the "newcomer" to remove constraints of lack of infrastructure facilities.

Establishment of steel industry in "newcomer" countries would not adversely affect the interests of developed countries. Instead, it would bring benefits to them for utilizing their surplus trained manpower through additional orders for capital goods and requirement of experts from the "newcomer" countries.

The "newcomer" countries should be able to obtain technical and financial assistance from both market economy and controlled economy countries.

II. Who are the "newcomers"?

5. At present about 32 countries could be considered as "newcomers". (Annex 1).

- There are countries that are hoping to establish, for the first time, a steel industry and have projects in either advanced stages of planning or under implementation - about 17 countries fall into this category;

- Another 15 countries already have units and are now considering expansion proposals.[1/]

6. Besides the above there are also a number of small countries which have no steel industry at all and do not have any definite immediate plans of entering into this sector.

III. Problems faced by "newcomers"

7. In establishing a steel project the actions that are necessary to be taken by any country are fairly well known - for example, market survey, feasibility study, selection of technology and supplier of equipment, financing arrangements, marketing, etc.

8. The "newcomer" country has clear cut long-term objectives in setting up a steel industry. He wants to develop capability for meeting internal demand, achieve foreign exchange savings, acquire - operational capabilities with rapid and cost efficient transfer and phase in of

technology; duplicative capabilities with training of indigenous personnel for taking over the activities that would initially be carried out by foreign contractor; and innovative capabilities involving development of indigenous process design and engineering competence.

9. In the case of "newcomer", attainment of these objectives are difficult because of his inexperience and lack of knowledge of the industry. The difficulties encountered in formulation of the project concept and its implementation become much more accentuated for the "newcomer" who lacks the expertise needed for solving them.

10. He has to face a formidable choice of options and he is unsure as to how to select the most optimal of these:

- Should he go in for a completely integrated plant with iron making, steel making, rolling, etc. or should he establish it in stages?

- What technology should he adopt - mini steel route or BF/BOF route?

- What should be the plant capacity?

- Should he confine his efforts to production of intermediate products only, like sponge iron or ingots?

- Would it be better for him to set up, immediately, downstream facilities like iron ore mining with a pelletization plant or start from the top of upstream, with a galvanizing unit or rolling mill using imported materials?

11. Even after the "newcomer" has found an answer to the above questions and taken an investment decision, he is still faced with problems involving selection of supplier of equipment and making financial arrangements.

12. Erection of the plant and the start-up operations have their own special problems which again the "newcomer", because of his inadequate knowledge, is unable to tackle properly.

13. Finally, there are other associated problems like maintenance of the plant, operating it at an optimal capacity, marketing of the products, etc.

14. Even those developing countries which are now considered as comparatively more developed, have passed through such a phase of development when they first set up their steel industry. They too, as "newcomers", had found difficulties in surmounting the problems of the type mentioned above.

IV. How does the "newcomer" solve the problems?

15. Based on the experiences of other developing countries which already have a steel industry and considering the special problems of the "newcomer", it becomes apparent that the major handicap which the "newcomer" suffers from is the lack of knowledge of the industry and absence of specially trained manpower - trained in diverse fields like engineering, science, finance, law, management, etc. It is this factor which incapacitates the "newcomer" in moving successfully and quickly towards establishment of a steel industry.

16. The main solution, therefore, has to aim at finding ways and means of enabling the "newcomer" to fill this deficiency of lack of knowledge and expertise.

17. There has to be a long-term plan for training and development of human resources. This involves the governments of the "newcomers" resorting to a national manpower planning which would cover education and training. Such a plan would take care of not only the steel industry's requirements but also of all other industries which the "newcomer" is planning to establish. For implementation of this plan, assistance will have to be sought from all possible sources like developed and developing countries, international institutions, etc.

18. The above however is planning for future. For immediate results the "newcomer" may have to rely heavily on foreign experts. What are the sources from which such experts could come?

19. Foreign equipment manufacturers could provide advice to the "newcomer" on establishment of the steel industry. Such advice sometimes tends to get coloured by the "keen" desire of the equipment manufacturer to sell his products to the "newcomer". This can result in the "newcomer" making wrong decisions which may ultimately land the project into a serious, irretrievable situation.

20. Then there are the steel producers from developed and developing countries, who could give the technical assistance needed by the "newcomers". Sometimes, if the investment climate in the "newcomer" country is healthy, these producers may even agree to have a financial stake in the venture through equity/loan. In such a case, his advice tends to become even more reliable. Another source is the governments of the developed and developing countries and international institutions like UNIDO for providing expert advice to the "newcomer".

21. The "newcomer" will also have to get a small nucleus of his own men trained in the operation and maintenance of the plant. Such a training will have to be arranged mainly in the steelworks abroad. Some training could be provided locally also by the foreign experts.

22. Two aspects of foreign technical assistar d to be kept in view by the "newcomer".

(a) Obtaining services of foreign experts; and

(b) Arranging for training of local personnel in the training centres abroad.

23. With regard to (a) above, the "newcomer" has to be aware that services of good foreign experts can be obtained provided any constraints that prevent such assistance forthcoming in the required measure are removed. These constraints are generally the absence of satisfactory conditions relating to availability of accommodation, medical facilities, schooling for children, repatriation of income, etc. Removal of such deterrents would encourage the foreign experts to not only agree to serve in the "newcomer's" project for the required period of time, but he would also be able to give off his best.

24. What is emphasized here is the "newcomer" assuring the foreign expert of certain minimum basic facilities which would enable him to work willingly and well.

25. Absence of a stable and long-term economic and financial policy of the government tends to create an atmosphere of constraint to foreign investment and financial assistance. The "newcomer" may, therefore, have to modify his strategic objectives and considerations so as to create the right conditions which would enable the foreign groups to provide, willingly, financial and technical help.

26. Creation of such conditions would also encourage the right type of foreign technical experts coming forth to deal with important problems pertaining to start-up and post-investment period for adequate build up of capacity utilization.

27. With regard to (b) i.e. training of local personnel abroad, there is a certain lack of awareness of the importance of such schemes. Consequently, sufficient financial support is generally not provided by the "newcomer" country for these programmes. Furthermore, arranging for such training in foreign steelworks is not free from problems. Often, the foreign partner in the training centre finds such programmes interfering with his own plant production campaigns and there is thus a tendency to be indifferent to providing adequate training to these persons from "newcomer" countries, unless the "newcomer" is watchful and plans carefully with the foreign partner, such training programmes.

28. Another factor of importance is that very often the local persons, after receiving training abroad, go away to other countries/projects and do not come back to serve the national project. Creation of suitable conditions may help the "newcomer" country in preventing loss of these personnel.

29. What is intended here is to highlight the importance of training of local personnel and the desirability of "newcomers" giving sufficient priority to all aspects of it.

V. Constraint of finance

30. While the foreign experts would be able to advise the "newcomer" on selection of the best alternative for steel development, a major constraint for most of the "newcomers" will be the lack of adequate financing not only for the project itself but also for development of infrastructure facilities like ports, roads, water and power supply, etc. To overcome this constraint, the "newcomer" will have to depend heavily on foreign sources which would include international institutions like the World Bank, foreign export credit agencies, inter-governmental assistance and commercial credit.

31. Economic backwardness is a big handicap to the "newcomer". This is a factor which has a direct bearing on the return on investment for any project. This necessitates special financing arrangements which would ensure that the direct investment on the project itself is kept at the minimum. In other words, the special circumstances of the "newcomer" require a favourable form of financing arrangements through governmental aid, as well as low credit financing for the development of infrastructure.

32. Several of the "newcomer" countries may not find it easy to obtain external credit for financing their projects. The normal financing criteria like total indebtedness, gross domestic saving, export and credit-worthiness might place them in a rather adverse position and the external financial institutions may not agree to provide them with credit. Consequently, these countries would have to depend heavily on external aid and special financial help - institutional and governmental.[2/]

33. This also calls for a review by the international financial institutions like the World Bank of the criteria for evaluating such projects in the "newcomer" countries having low credit rating.[3/]

## VI. Options for "newcomers"

These options could be considered under two headings:

a) Technological option; and

b) Technical assistance and financing option.
(Annex 2)

### a) Technological option

34. It is not necessary for a "newcomer" to set up the complete range of steelmaking facilities as a single project. Instead, considering the limited financial and technical resources of the "newcomer", his entry into the steel producing world in a stage-wise, step-wise manner would not only be highly desirable but also feasible.

35. The "newcomer" could start at the top of the upstream facilities in an integrated project by:

- establishing a galvanizing plant using imported sheets; or
- setting up a wire drawing mill using imported wire rods; or
- establishing a rerolling mill using imported billets.

36. Another way could be establishment of a unit at the bottom of the downstream facilities; for example:

- a pelletization plant using domestic/imported iron ore; or
- a direct reduction plant using indigenous/imported iron ore, pellets, gas/non-coking coal, or
- an electric arc furnace using local/imported scrap producing poured pencil ingots.

In due course, other downstream/upstream units could be established.

37. In case the strategic objective of the "newcomer" requires establishment of an integrated project, the best alternative for adoption could be the mini-steel route involving direct reduction plant, electric arc furnace, continuous casting and rolling mills (long or flat products). This is for reasons of low capital investment; shorter construction period with quicker return on investment; lower requirement of trained manpower and managerial expertise; less sophisticated technology and simpler process route; lower infrastructure requirements; could be built on a modular pattern with smaller capacity units; possesses flexibility in meeting market demand, and creates less problems from the point of environmental pollution.[4/]

38. In special cases a "newcomer" may be in a position to consider the following option too:-

> Adoption of conventional route of BF/BOF for steelmaking using coking coal or charcoal (if abundant natural forest resources exist). This too could be established on a stage-wise basis.

39. Technological option would also get influenced by the strategic considerations of "newcomer" country for development of capital goods industry. Demand for this industry would show if the "newcomer" should go in for long or flat steel products. Technological complexity for producing them vary just as they do for steelmaking routes and processes. An analysis of this complexity based on direct and indirect expenditure/consumption on raw materials, energy, labour, intermediate and final products, can be carried out and this could act as a guidance to the "newcomer" in decision-making.[5/]

b) Technical Assistance and Financing option

40. The "newcomer" will have to depend heavily on outside sources for obtaining technical help which would enable him to plan and implement the steel project. If magnitude of such assistance that is desired is kept at a low level, it would become easier to find the sources from where this help could be obtained. This is another reason why the "newcomer" should give preference to the selection of a lower capacity unit established in a stage-wise manner.

41. Keeping the investment low would also make it more feasible for the "newcomer" to find the required financial resources. A stage-wise establishment of the project would not impose too heavy a burden on the "newcomer's" own budgetary resources. It may also enable the "newcomer" to obtain assistance from foreign governments under their Overseas Development Fund schemes. If the loan amount is not too large, foreign commercial banks may also come forth to provide it, even if the "newcomers'" credit-worthiness is suspect.

42. Developed market economy countries, despite being troubled by problems of recession and unemployment, may not find it too difficult to assist the "newcomers" in their ventures. Additional capacity created in the "newcomer" countries would not have any significant impact on world trade to the detriment of the developed countries. On the contrary, this may even bring two main benefits to the latter through:

- the utilization of some of their surplus skilled workers in these new projects in the "newcomer" countries; and

- fuller utilization of the manufacturing capacities in the capital goods sector for supplying equipment to the "newcomer" countries.[6/]

43. It would, therefore, not be unreasonable for the "newcomer" to expect full technical and financial assistance from this group of developed countries.

44. Another source of help - technical and financial - for the "newcomer" is the centrally planned economy countries who, besides gradually augmenting their own steelmaking capacity, have also been providing increasing assistance to the developing countries.

45. If adequate assistance is forthcoming from these two groups of countries, it would not be difficult for the "newcomer" to establish his own steel industry.

VII. Need for new type of industrial/investment arrangements:

46. The "newcomers" have special types of problems; some have too small an internal market; some have raw materials which are not yet fully developed or are poor in quality; some others possess finance but lack other raw material resources; and practically all of them need sincere advice and guidance.

47. To find a solution to these types of problems, the "newcomer" would have to consider a form of industrial/investment arrangement which would be of a multi-dimensional nature (Annex 3). Partners in this arrangement may be two or more countries, foreign steel/equipment producers and foreign financial institutions. Some of the questions which this type of arrangement would be able to answer are:

- possibility of linking supply of raw materials for construction/operation of the plant with export of steel and other products from the "newcomer" country;

- possibility of exporting intermediate products like sponge iron or ingots for repaying the foreign assistance;

- making advance arrangement for marketing of the final product;

- finding a foreign collaborator who is willing to undertake equity participation and buy back part of the production; all such barter arrangements could, perhaps, also cover other forms of assistance like training, technical advice, etc.

48. It is not easy for the "newcomer" to enter, on his own, into such arrangements and he will consequently have to rely on technical assistance from other sources which may include the governments and enterprises from the developed and comparatively more developed developing countries and international institutions like the UNIDO.

VIII. Help to "newcomers"

49. At every stage the "newcomer" has to bargain with other parties namely;

- the suppliers group comprising steel producers, equipment manufacturers and process technology owners - for technical assistance, technology and plant and equipment; and

- financing groups comprising foreign steel producers, plant suppliers, commercial banks, export credit agencies, international financial institutions and overseas development agencies of foreign governments - for financial assistance.

50. In this bargain, the "newcomer" is obviously at a great disadvantage because of his lack of expertise. To enable him to protect his interest in such bargaining, the international community will have to provide full assistance.

51. While international agencies like the UNIDO have been making available to needy countries services of technical experts, this may need further supplementing through other measures. A closer involvement of the governments of developed countries may help to improve the quality of technical assistance that is sought by the "newcomer". It may also enable a linkage with the problem of surplus manpower available in the developed countries and its utilization by the "newcomer" countries.

52. The comparatively more developed developing countries could play a bigger role in providing assistance to the "newcomer". Since they constitute a "weaker" seller/financial group, the "newcomer" may find them more flexible in their approach. Being anxious for foreign business, they may be more ammenable to the "newcomer's" strategies and objectives.

53. It could also be considered if groups of countries could get together, perhaps on a regional basis, and play an advisory role for helping the "newcomer". Such a group would possess a formidable pool of

knowledge and the "newcomer" may find it a useful and helpful source for guiding him along the right line in decision making, selecting right type of technology, and plant & equipment; locating sources for finance and technical assistance; negotiating agreements, etc.

54. The important question for consideration, therefore, would be as to how a "newcomer" should plan for establishment of a steel industry and in what way the developed countries - market economy and centrally planned economy countries - and comparatively more developed developing countries are willing to provide assistance to the "newcomers"?

Annex I

## LIST OF NEWCOMERS

I. AFRICA (South of Sahara):

1. Angola
2. Cameroon
3. Central African Republic
4. Congo (Repblic of)
5. Ethiopia
6. Gabon
7. Ghana
8. Ivory Coast
9. Kenya
10. Liberia
11. Madagascar
12. Malawi
13. Mauritius
14. Mozambique
15. Senegal
16. Tanzania
17. Togo
18. Uganda
19. Zaire
20. Zambia

II. AFRICA (North of Sahara & Middle East):

1. Abu Dhabi
2. Bahrein
3. Dubai
4. Oman
5. Somalia
6. Yemen (Dem. Rep. of)

III. LATIN AMERICA:

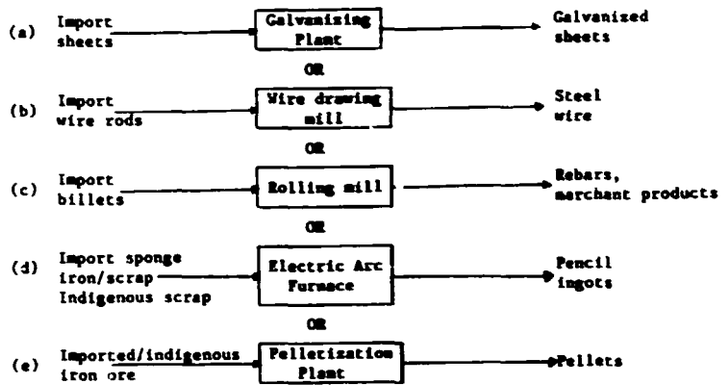
1. Bolivia
2. Ecuador
3. Honduras
4. Nicaragua
5. Paraguay

IV. ASIA:

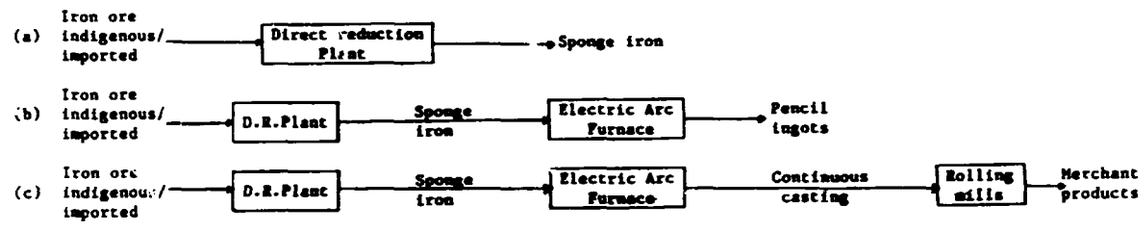
1. Brunei

TECHNOLOGICAL OPTIONS

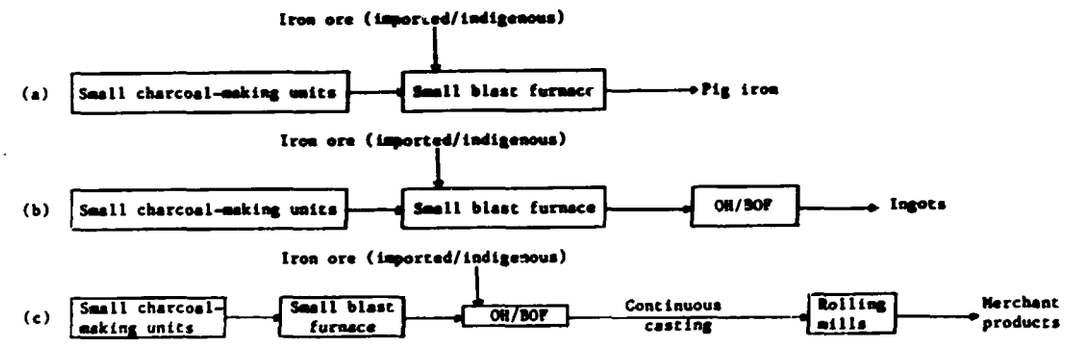
I. Upstream or downstream step-wise facility:



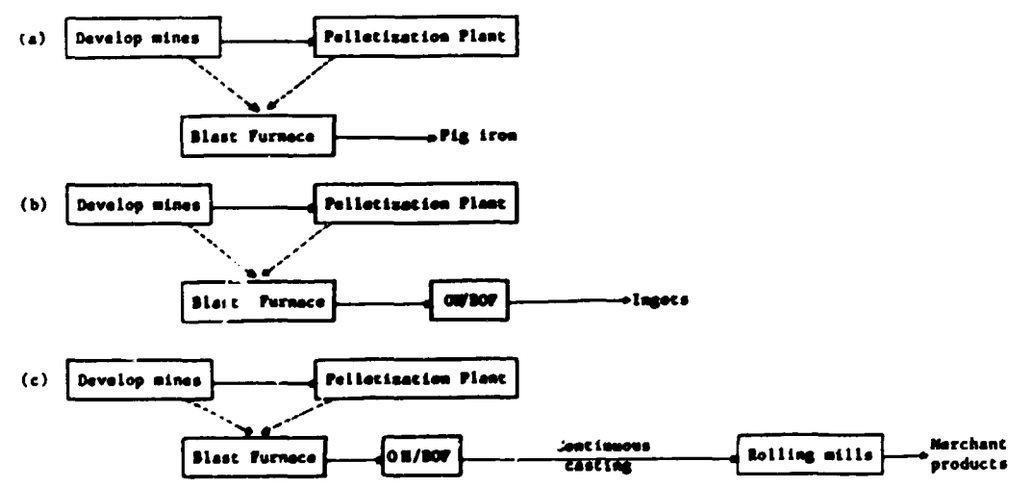

II. If gas/non-coking coal available:




III. If natural forest resources available:

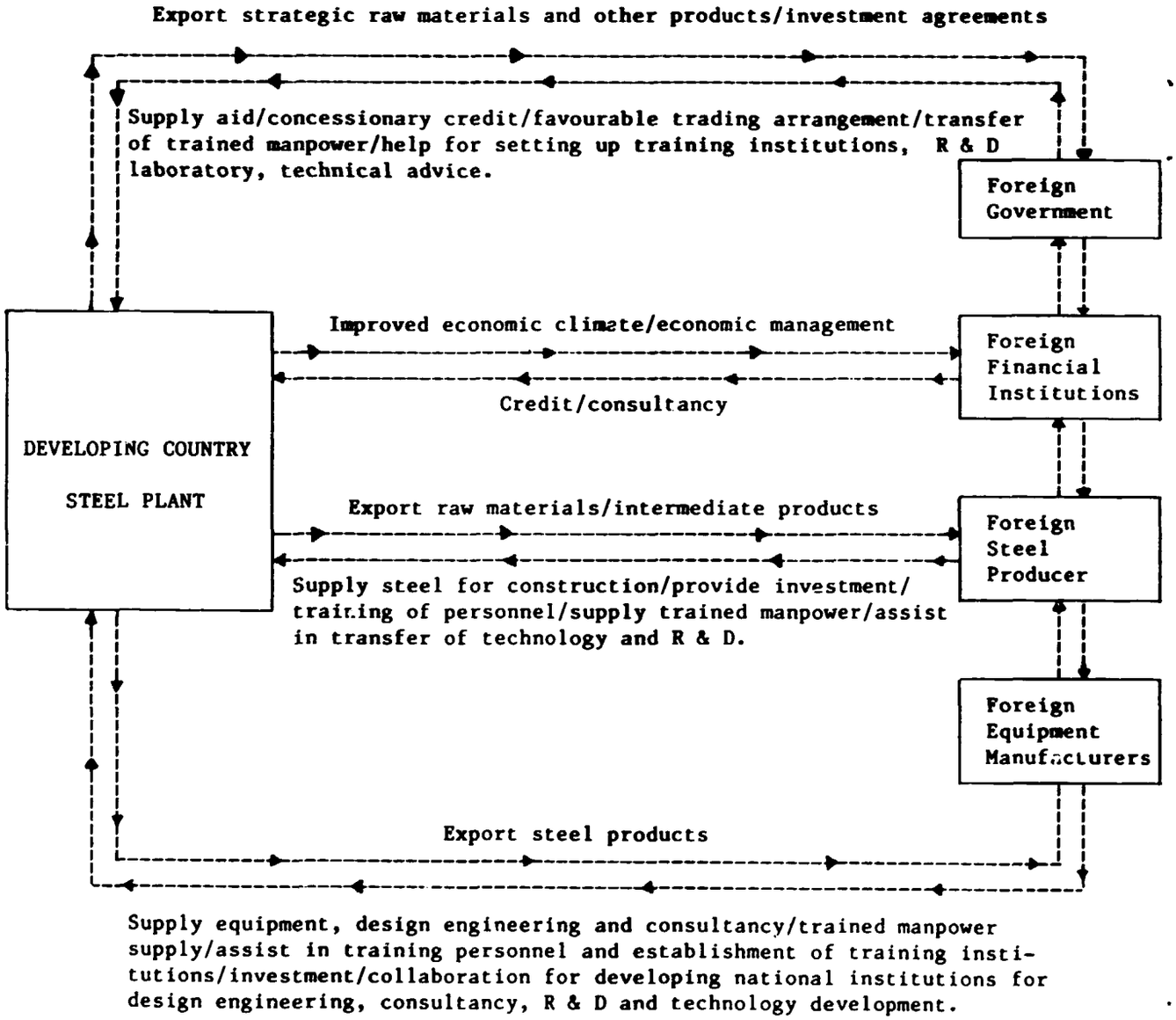



IV. If iron ore/coking coal available:



Annex III

## INDUSTRIAL/INVESTMENT ARRANGEMENTS



## NOTES

1/ Annex to 1990 Scenarios for Iron and Steel Industry (ID/WG.374/2)

2/ Issue Paper No.2 on finance.

3/ UNIDO - Cost benefit analysis for project evaluation and structural changes in developing economy (ID/WG.334/3, 18 December 1980).
United Nations - Guide to practical project appraisal; Social benefit/cost analysis in developing countries (Sale No.78.II.B.3); Guidelines for project evaluation (Sale No.72.II.B.11).

4/ Documents relating to UNEP/UNIDO meeting of experts on the environmental and resource aspects of the direct reduction route to steel making. (28-30 April 1982, Puerto Ordaz, Venezuela).

5/ "Technological complexity of iron and steel industry products" - contribution to the world 1990 iron and Steel Scenarios - Group of Soviet Experts; May 1980.

6/ Impact of development in developing countries of iron and steel industry on the economy of developed countries. (Prof. A. Tiano, University of Montpellier, France).