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

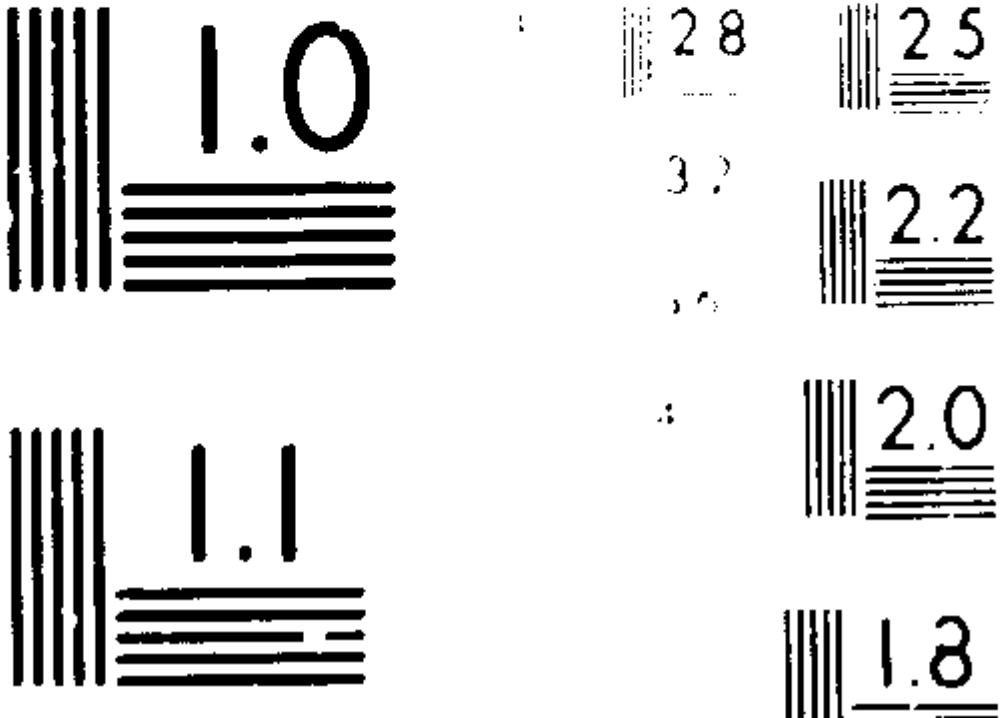
FAIR USE POLICY

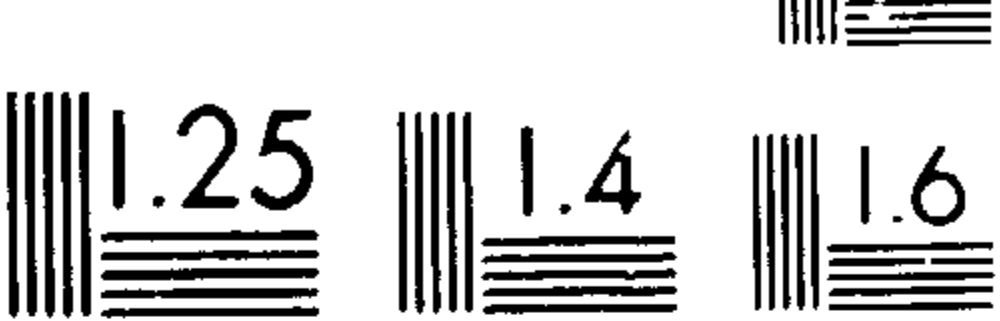
CONTACT

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


1.0
1.1
2.8
2.5
3.2
2.2
2.0
1.8


1.25
1.4
1.6

09919

Distr.
LIMITED

ID/WG.324/6
2 September 1980

ENGLISH
ORIGINAL: FRENCH

United Nations Industrial Development Organization

Global Preparatory Meeting for the First
Consultation on the Capital Goods Industry

Warsaw, Poland, 24 - 28 November 1980

LONG-TERM CONTRACTUAL ARRANGEMENTS FOR THE SETTING UP OF CAPITAL GOODS IN THE IRON AND STEEL INDUSTRY *

by

A. Benbouali**

* The views expressed in this paper are those of the author and do not necessarily reflect the views of the secretariat of UNIDO. This document has been reproduced without formal editing.

** Consultant of UNIDO

80-43239

CONTENTS

CONTENTS

ANNEXES

FOREWORD

The international debate on the establishment of a New International Economic Order is an achievement of the most recent development decade, opening the way for negotiations on the imbalance in relations between North and South.

This attempt at dialogue has as its goal international co-operation for a more balanced world development. It is naturally coming up against displays of scepticism and selfishness and against various obstructive manoeuvres, and must face the danger of simplification, haste and apathy. But this initiative has already made it possible, through efforts of analysis and dialogue, to reject the fatalist theory of the phenomenon of under-development, to demonstrate - despite their diversity - the similarity of the forms of dependence of the South, to highlight the role of the multinationals, to dissect the process of capital accumulation in the North, to unmask the huge wastage taking place throughout the world and, lastly, to propose the framework and ways and means for restoring a balance in North-South relations.

Industrial relations between developed and developing countries are the subject of studies and research, usually proceeding from a global or international standpoint.

Little of this work has dealt with ways of restoring a balance at the level of one sector in one country of the South. This document reflects that concern and tries to formulate a methodology for the conclusion of industrial arrangements.

We have chosen the iron and steel sector to illustrate this method, because it occupies a special place in the developing countries' industrialization process. But the method proposed would be applicable to any industrial sector, with certain adjustments.

INTRODUCTION

Industrial relations between developed and developing countries are changing rapidly and are characterized by complexity, diversity and a degree of imbalance. The contractual instruments used initially had been designed for developed partners and could not be adapted to such relations. In fact, the nature of the partners and the expansion of trade led to the formulation of new standard instruments. These were designed for use by a country which wanted to have a factory built by an industrialized partner, when it did not itself have any competence in that area. Because of the varying degrees of success achieved by this formula, these new instruments were first blamed and an attempt was made, without much success, to introduce improvements of form. A later and more correct approach consisted in extending the contractual obligation to provide a better guarantee of results. This first alarmed the legal experts in industrialized countries and resulted in a substantial increase in costs without any greater degree of success. Subsequently, emphasis was placed on the idea of transfer of technology and an attempt was made to modify the forms of guarantee and arbitration by suggesting:

(a) That a government guarantee be provided by the industrialized country;

(b) That a new international arbitration institution be established; and

(c) That payments be made conditional on results.

In view of the results obtained, we may wonder whether a new approach is not desirable in industrial relations between North and South.

The idea is not to reject the various instruments mentioned above, which have achieved some success, but to explore new avenues in the light of experience and to avoid a single arrangement applicable to each and every country of the South. In this connexion, it is important to stress the diversity of the countries of the South, whose situations vary according to the following criteria:

- Level of development attained by the country;
- Financing possibilities and mineral wealth of the country;
- Degree of political determination to promote self-centred and autonomous industrialization;
- Ability of the individual and of the community to become integrated in an industrialization process.

An approach which disregarded these considerations would produce wrong solutions, and our aim is therefore to propose a method and not to draw up a list of standard solutions.

Reference must also be made to the length of time covered by industrial relations, compared with the conventional limits set by contractual relations. For it appears that industrial relations between developed and developing countries cover a long period which contractual forms do not so far respect.

To prove the practical usefulness of our approach, the iron and steel sector will provide the best testing ground, because of the strategic place which it occupies in the industrialization phenomenon.

We shall therefore adopt the following principles for our study:

(a) An objective: a case-by-case approach;

(b) A time-span: the long term;

(c) A sector of application: iron and steel.

FRAMEWORK OF THE STUDY

In order to illustrate the complexity of the problem and to pin-point our approach, it seems important to specify at the outset the different kinds of industrial situation found in countries of the South, in order subsequently to clarify the scope of the industrial arrangements. One concept must first be explained: an industrial arrangement is an agreement between two or more partners at different industrial levels, designed to enable the least advantaged to receive from the more advantaged partner(s), on certain terms, industrial assistance previously and jointly defined by the partner(s).

As we shall demonstrate, the industrial situations of the countries of the South are dependent on the countries of the North and therefore require, for their future development, technological inputs from the North. Moreover, the dependence of the South is offset by a dependence of the North, principally with regard to raw materials, export outlets, etc. This inter-dependence makes it possible to envisage the restoration of balanced North-South relations at the world, multilateral and bilateral levels, and augurs well for a possible South-South co-operation, as a complement or an alternative to North-South relations.

It is important at this stage to evolve new forms of industrial arrangements as solutions to the imbalance problem, applicable at the level of a particular country.

This type of solution will make it possible to consolidate any achievements resulting from a North-South dialogue or, conversely, to limit the effects of a failure. In addition, the methodology used will reveal possible areas for South-South co-operation and for planning of the South's industrial efforts.

Lastly, if world political and economic developments seem to force us to choose between two scenarios - the scenario of confrontation and the scenario of international co-operation - is it realistic or Utopian to visualize pragmatic instruments with which we can avoid one and achieve the other, through a national initiative restricting the number of actors but bringing them closer together in the long term, because of their complementary interests?

METHODOLOGICAL ASPECT

In the case of one specific industrial sector, we shall establish levels of industrial dependence, trace the technological decision-making process, illustrate the system of factors in decision-making, identify external influences, analyse ways of controlling these influences, study the pattern of these controls, assess the relative situation of the sector, draw up a list of factors in negotiation, imagine bases for solutions at different levels, locate the trump cards of possible partners and construct industrial arrangements from a long-term viewpoint.

This will be the underlying method of our study, which will reveal the shortcomings of the existing arrangements.

1. Levels of industrial dependence

We shall classify the forms of industrial dependence by level in the iron and steel sector, assuming that each level corresponds to a degree of expertise and therefore of reduced industrial dependence. This scale has the advantage of pin-pointing the stages of development; it by no means constitutes an exhaustive catalogue of situations of dependence. It is possible on this basis to imagine the objectives of industrial arrangements, within the meaning of the term given above. The most common forms dealt with in standard types of industrial arrangement concern the transition (see table 1):

From level 2.1 to level 3.1: working of ore to manufacture of long products;

From level 3.1 to level 3.2: manufacture of long products to manufacture of flat products;

From level 3.2 to level 4.2: manufacture of flat products to manufacture of capital goods.

2. The technological decision-making process

The nature of the iron and steel sector determines the principal routes on the basis of raw materials, requirements to be met and market size. The principal limiting factors are the availability of raw materials, the cost of investment and the type of production.

We can see (from table 2) that the classical route (based on ore and coal) opens up wide technological possibilities, whereas the routes based on a different source of energy are at present limited as regards technological development and production possibilities. Furthermore, the level of technological dependence is also one of the elements in the decision-making process.

3. The system of factors in decision-making

The reality of decision-making is different for the developing countries, particularly in the iron and steel sector, because of financing requirements, the choice of type of industrialization and the type of demand to be met. We can dissect the decision-making process by studying the interrelationship between internal factors and external constraints. We can then appreciate the importance of external influences and the diversity of their impact.

Financing requirements and the cost of investments are at present the most restricting elements of manipulation (see table 3).

The global interactions do not reveal the real forms of dependence and the pattern which they follow. In order to obtain protection against external influences over a long period and thus construct new industrial arrangements, the analysis must be pursued in greater depth and more systematically at the level of the external influences.

4. External influences

4.1 Basic materials:

In the iron and steel industry, the basic materials are traditionally divided into three groups:

- The raw material: iron ore, scrap iron and prereduced ore;
- The reducing agent and energy: coking coal, low-grade coal, wood, hydrocarbons, nuclear energy, etc.;

TABLE 1

Level 0	Total dependence
Level 1	Primary dependence
	1.1 Foreign working of the ore without conversion
	1.2 Foreign working of the ore with local conversion into semi-manufactures
	1.2.1. cast-iron stage
	1.2.2. ore stage
	1.3 Foreign working, locally integrated at the finished product stage
	1.3.1. for export
	1.3.2. for the domestic market
Level 2	Secondary dependence
	2.1 National working of the ore without local conversion
	2.1.1. with foreign marketing
	2.1.2. with marketing controlled from abroad
	2.2 National working of the ore with local conversion into semi-manufactures
	2.2.1. with foreign marketing
	2.2.2. with marketing controlled from abroad
	2.2.2.1. through costs
	2.2.2.1.1. capital
	2.2.2.1.2. production
	2.2.2.1.3. on the international market
	2.2.2.2. through barriers
	2.2.2.2.1. quotas
	2.2.2.2.2. technical standards

TABLE 1 (continued)

Level 3 Tertiary dependence

3.1 National working integrated as far as the finished product for basic needs, with imported foreign equipment

3.1.1. with external financing to be obtained

3.1.1.1. with foreign equipment supplies limited

3.1.1.1.1. by the range

3.1.1.1.2. by the technology

3.1.1.1.3. by the size

3.1.1.1.4. by the cost

3.1.1.1.5. by subsequent elements of dependence: maintenance

3.1.1.2. with limitation of transfer of technology

3.1.2. with domestic financing

3.1.2.1. with extra "deterrent" cost

3.1.2.2. with the same limitations as for 3.1.1.

3.2. National working integrated as far as the finished product for more sophisticated needs, with imported foreign equipment

3.2.1. limitation through financing

3.2.2. limitation through cost of investment

3.2.3. limitation through control of the spread of technology

3.2.4. limitation through control of production costs

3.2.5. limitation through control of key sectors with innovation and research

3.2.6. limitation through control of export markets

3.2.7. limitation through trade barriers

TABLE 1 (continued 2)

Level 4 Quaternary dependence

4.1. National working integrated as far as semi-manufactures for capital goods

4.1.1. limitation through production technology

4.1.2. limitation downstream: spread of capital goods technology

4.2. National working integrated as far as the capital goods sectors

4.2.1. limitation of the spread of software

4.2.1.1. through subject

4.2.1.2. through cost

4.2.1.3. through access to developments

4.2.1.4. through fragmentation of the market

4.2.1.5. through fragmentation of the range

4.2.1.6. through engineering capability

4.2.2. limitation of expansion

4.2.2.1. through the complementary electrical, electronic and data-processing sectors

4.2.2.2. through research and development capability

TABLE 2

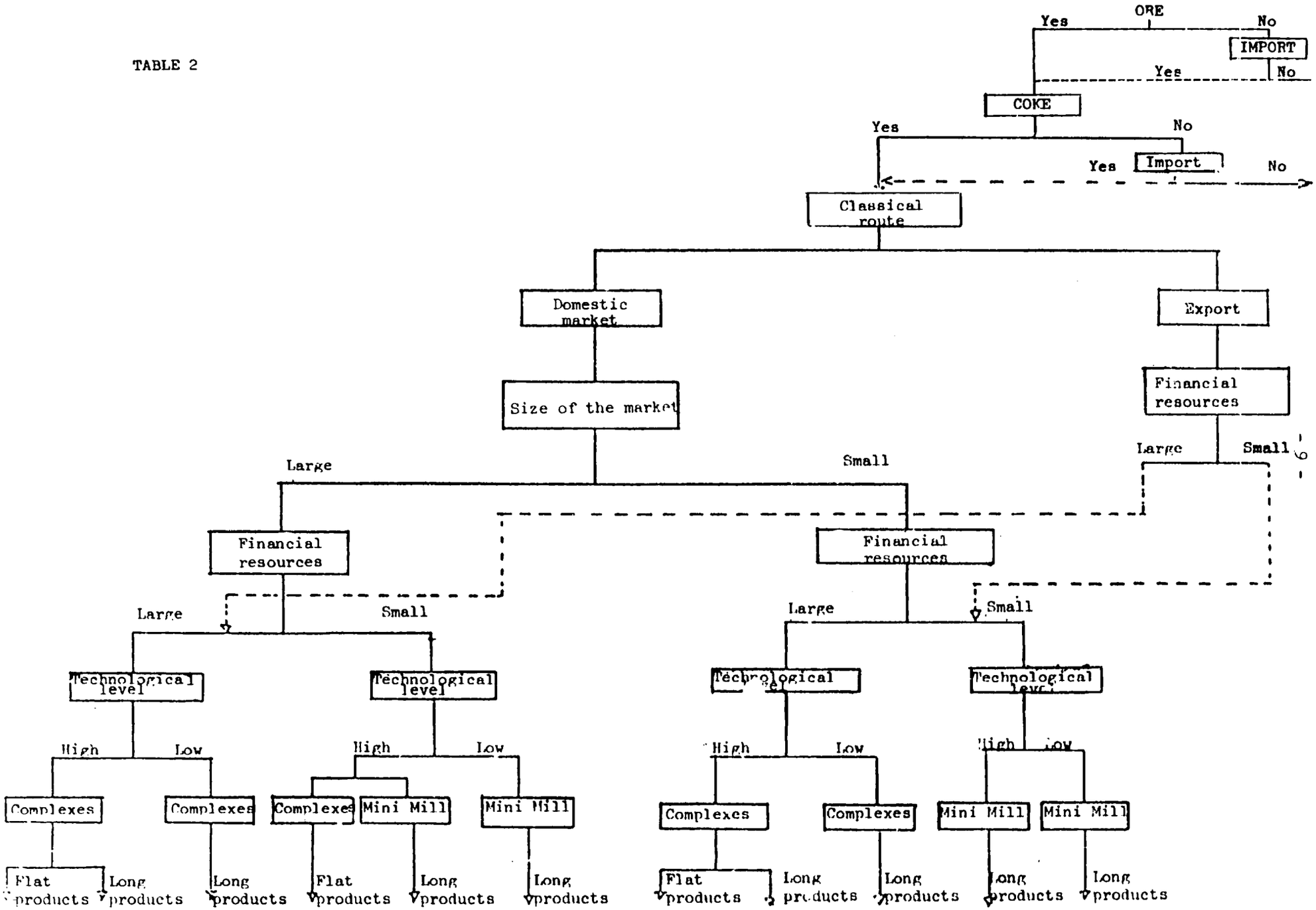
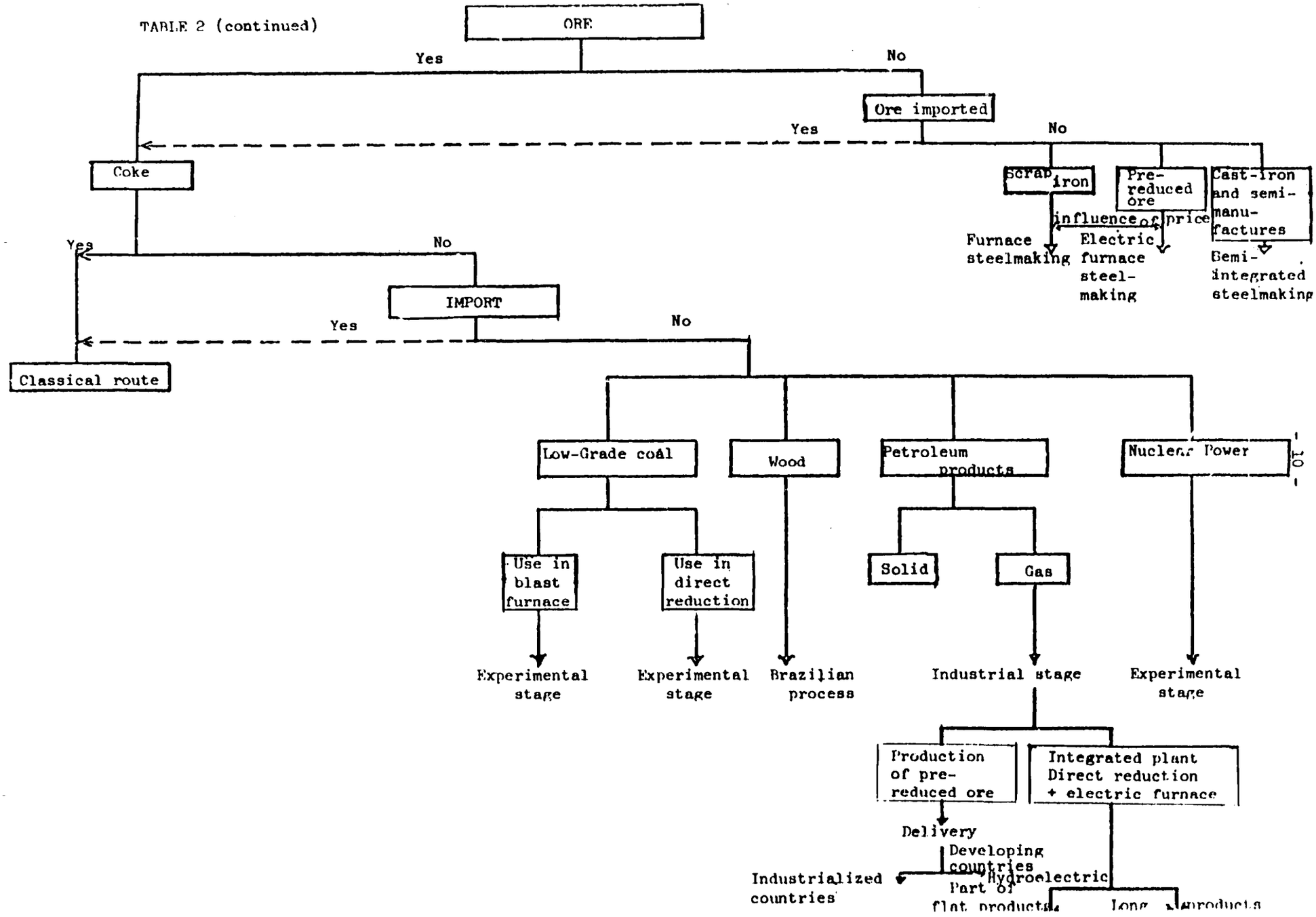

ORE
Yes
No
IMPORT
Yes
No
COKE
Yes
No
Import
Yes
No
Classical route
Domestic market
Export
Size of the market
Financial resources
Large
Small
Large
Small
Financial resources
Financial resources
Large
Small
Large
Small
Technological level
Technological level
Technological
Technological
High
Low
High
Low
High
Low
High
Low
Complexes
Complexes
Complexes
Mini Mill
Mini Mill
Complexes
Complexes
Mini Mill
Mini Mill
Flat products
Long products
Long products
Flat products
Long products
Long products
Flat products
Long products
Long products
Long products
Long products

TABLE 2 (continued)



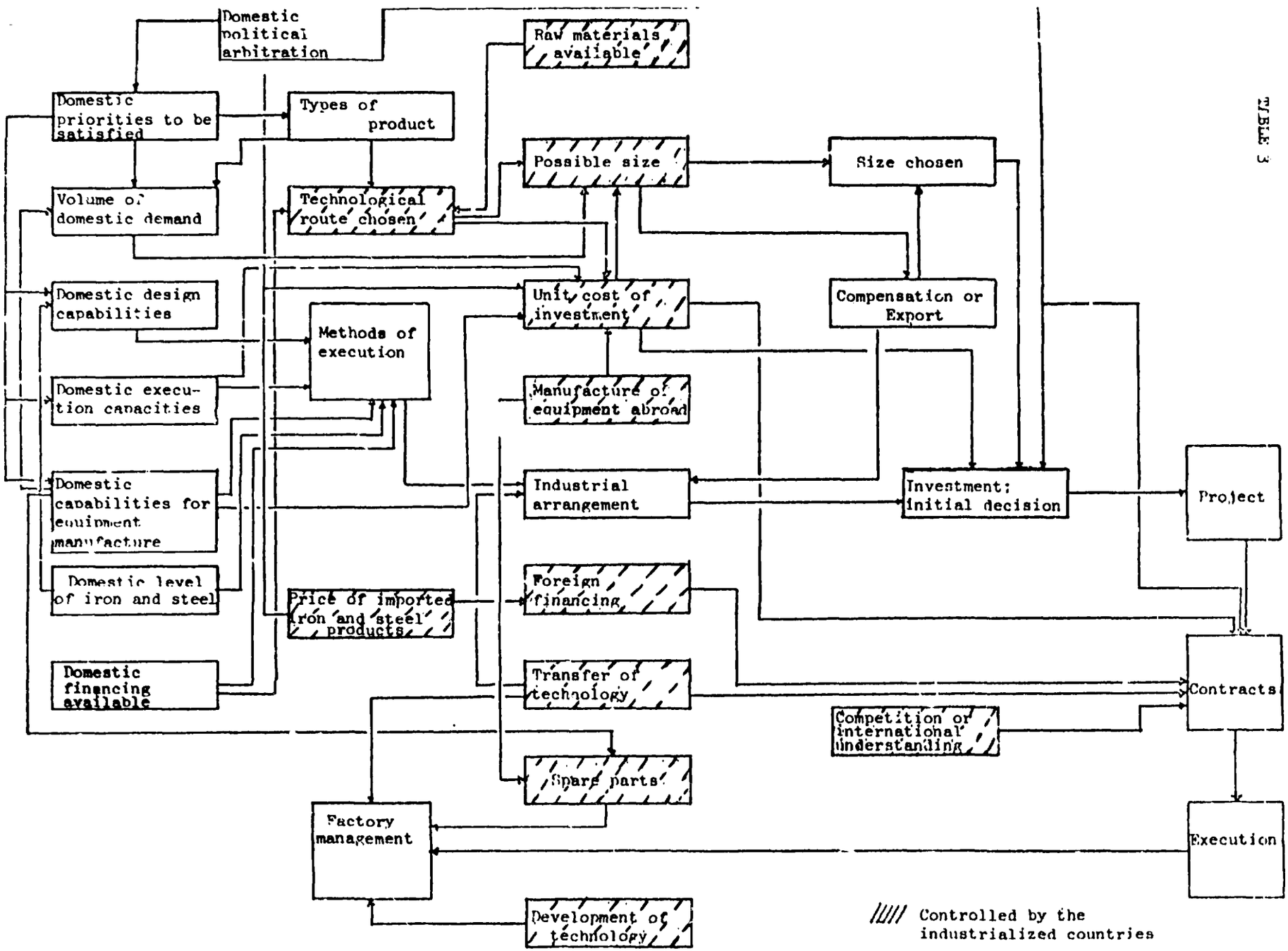

Domestic political arbitration
Raw materials available
Domestic priorities to be satisfied
Types of product
Possible size
Size chosen
Volume of domestic demand
Technological route chosen
Domestic design capabilities
Unit cost of investment
Compensation or Export
Methods of execution
Domestic execution capacities
Manufacture of equipment abroad
Domestic capabilities for equipment manufacture
Industrial arrangement
Investment: initial decision
Project
Domestic level of iron and steel
Price of imported iron and steel products
Foreign financing
Domestic financing available
Transfer of technology
Contracts
Competition or international understanding
Spare parts
Factory management
Execution
Development of technology
//// Controlled by the industrialized countries

TABLE 3

- Non-ferrous materials included in the composition of special steels.

Analysis of these different groups shows the differe forms of dependence:

- Control over supplies: location, possession, management of reserves;
- Control over production: working of the deposit and conversion;
- Control over exports: export prices, long-term contractual arrangements;
- Control over technological development: substitution, reduction of consumption, selection, improvement.

These various forms of control are mainly exercised by the industrialized countries, except in the case of the ore and gas. But ownership of the ore and gas does necessarily mean expertise in their industrial use. Each of the materials subjected to the various forms of control is influenced most strongly by one particular variable, which thus demonstrates the tangible fact of the control (see table 4).

The industrialized countries' strategy with regard to basic materials for the iron and steel industry consists in:

1. Stabilizing prices of ores originating in the developing countries, giving them preference because of their richness and managing the reserves of the North in the long term.

2. Increasing the price of coke, because of its energy value and because the industrialized countries have a monopoly of this resource. In this connexion, one may compare the pattern followed by prices of coke and of petroleum and draw very interesting conclusions about the impact on steel prices over the past decade.

3. Gambling on the relative prices of scrap iron and pre-reduced ores.

4. Dominating the non-ferrous metals market all along the conversion route, because of the strategic role of these resources in the manufacture of special steels.

There are, however, two special cases: the original approaches adopted by BRAZIL and MEXICO, which have developed technologies based on wood and gas, respectively.

Their application unfortunately remains limited: in one case, by the general inadequacy of wood resources in the South and, in the other, by the North's control over the transfer of technology based on the use of gas.

4.2 Technology

Iron and steel technology can be broken down into:

(a) Classical route, with standard production of flat products and long products, on the basis of blast-furnace processing of ore;

(b) Direct reduction route;

(c) Size reduction route;

(d) Special steels production route.

This classification allows us to locate the forms of control for each of the routes, to identify the principal influence variable(s) and, lastly, to note the type of influence exerted (see table 5).

For example:
- possession and control of spread;
- control through costs of transfer of technology;
- control of possibilities of multi-product production in the route and economical size reduction; and
- control of technological developments (research and development capability), anti-pollution measures, energy saving and reduction of specific uses of steel are the basic technological controls.

In this area, the basic strategy is to guide the South's technological choice into a predetermined international division of labour. This strategy is pursued through:

(a) Orientation of countries of the South wanting to create an iron and steel industry towards the long-products route by means of an easier and less costly spread of technology;

(b) Orientation of the flat-products route towards large plants suited for very sizable markets;

TABLE 4

Basic materials	Control over supplies	Control over production	Control over export	Control over technological development	Influence variable	Use of the variable
Ore	North - South	North - South	North	-	Cost	North - stabilization
Pre reduced ores	-	North - South	-	North	Technology and scrap cost	North
Scrap iron	North	North - South	North	-	Cost	North - instability
Coke	North (East)	North (East)	North (East)	North	Cost	North - link with the price of oil
Lignite	North - South	-	-	North	Technology	North
Wood	Brazil	North South	North	Brazil	Spread of the process	None, little possibility of spread
Gas	South (East)	South (East)	South (East)	North + Mexico	Technology cost	North - control over technology and spread
Nuclear power	North - South	North	North	North	Technology	North - control over research
Non-ferrous metals	North - South	North	North	North	- technology - strategic aspect - access to special steels	North - liaison between political and economic centre

(c) Orientation of the poorest countries of the South towards a more self-centred and less costly iron and steel industry, using mini-mills;

(d) Introduction of a technology better suited to the South's resources but with controlled spread, taking the form of ore conversion using an available resource - gas;

(e) Compartmentalization of production routes preventing multi-product production; long products and flat products;

(f) Control of the spread of special steels technology and, in general, of more economic technologies for steel utilization (e.g. welded tubes and special steels).

As stated previously in the chapter on raw materials, only MEXICO has developed an original technology based on direct reduction, which unfortunately has not as yet spread to any degree.

4.3 Execution

The analysis of the execution function is not specific to the iron and steel sector and may be undertaken with a view to identifying forms of control and locating those exercising the control. This method has the advantage of revealing the nature and volume of the operators' responsibilities.

It will then permit a more logical structuring of industrial arrangements, while illustrating the variety of execution formulas and the interrelationship of the ensuing responsibilities.

The scope of the decision-making responsibilities, and thus of control at the level of an operation of execution, is reflected in table 6. Execution is understood to mean all the operations of design, purchasing, manufacture, construction, assembly, transfer of technology, etc., resulting in a production mechanism conforming to an objective previously defined by the contractor. Since the execution function and the production function are separate, it may be interesting to show, in our analysis, the role of the producer as manager of the future production mechanism (table 6) and as holder of the production technology (table 6 bis).

T A B L E 5

Technology	Possession and control of spread	Control through costs	Control of multi-production and of the route	Control of development of technology	Influence variable	Use of the variable
Classical route flat products	North	North	North	North	- cost - financing - technology	North: deviation
Classical route long products	North	North	North	North	- cost - financing	North: orientation of rich countries of the South
Mini-mills	North	North	North	North	- low cost - spread	North: orientation of countries of the South
Direct reduction	North	North	North + Mexico	North + Mexico	- possibility of exporting pre-reduced ores - cost - multi-product operation	North: highly controlled except if export of prereduced ores
Special steels	North	North	North	North	- spread of technology - cost	North: high degree of control

In the quality and efficiency of the work, the basic controls are exercised by the designer and the supplier of process equipment; on the other hand, in the quality of execution, the time-table and the final cost, the constructor shares this responsibility with them. Lastly, in the transfer of technology, producer, designer and supplier are those mainly involved, with the producer exercising greater responsibility.

On the basis of this detailed analysis, we can, in a dialectic of North-South relations, present the scheme of the essential forms of control in the same manner as before (see table 7).

The domination of the industrialized countries is therefore considerable, even if some countries of the South can boast of special results. Despite some pseudo-contradictions of interest between engineering firms, producers and constructors, the industrialized countries' strategy consists in:

1. Developing exports of goods and services for the iron and steel sector;

2. Limiting the spread of technology;

3. Forcing the South into a state of inferiority by high investment costs and, consequently, high production costs. The only exceptions in this regard are the countries of the South which have managed to cease being dependent as regards execution by establishing capital goods industries and engineering capabilities - e.g. the Republic of Korea and India.

4.4 Financing

The financing question is very important in the iron and steel sector, because of the high investment costs and the small margins for self-financing.

For the South, lacking extensive financial resources, the provision of international financing is a necessity and creates a dependence on the lending organizations and countries. As shown in table 8, the forms of control are numerous and enable the North to exercise selectivity.

TABLE 6

Execution	Control over choice parameters	Control over degree integration	Control over degree of reliability	Control over choice of process	Control over adaptation to resources	Control over adaptation to the market	Control over degree of sophistication	Control over volume of supplies	Control over origin of supplies
Designer	X	X	X	X	X	X	X	X	X
Purchaser				X				X	X
Supplier of process equipment	X		X	X	X	X	X		X
Supplier of general equipment			X				X		X
Constructor	X		X						X
Producer	variable	variable	variable	variable	variable	variable	variable	variable	variable

TABLE 6 (continued)

Execution	Control over effects of environment	Control over supplies of spare parts	Control over initial organization of maintenance	Control over unit consumption	Control over production forecasts	Control over quality and time-tables of execution	Control over quality of future production	Control over level of employment	Control over costs
Designer	X	X	X	X	X	X	X	X	X
Purchaser		X	X			X			X
Suppliers of process equipment	X	X	X	X	X	X	X	X	X
Suppliers of general equipment			X			X			X
Constructor	X		X		X	X	X		X
Producer	variable	variable	variable	variable	variable	variable	variable	variable	variable

T A B L E 6 b i s

Execution (Transfer of technology)	Control over spread	Control over creation of supports	Control over adaptation	Control over development	Control over cost
Individual training	producer + supplier	designer + supplier + producer	designer + supplier + producer	designer + supplier + producer	supplier + producer
Group training	producer + supplier	designer + supplier + producer	designer + supplier + producer	designer + supplier + producer	producer
Transfer of production techniques	producer + designer	designer + supplier + producer	designer + supplier + producer	supplier + producer + producer	producer
Transfer of maintenance techniques	producer + supplier	designer + supplier + producer	designer + supplier + producer	supplier + producer	supplier + producer

T A B L E 6 b i s (continued)

Execution (Transfer of technology)	Control over spread	Control over creation of supports	Control over adaptation	Control over development	Control over cost
Transfer of reproduction techniques	designer + supplier	designer + supplier + producer	designer + supplier + producer	designer + supplier	designer + supplier + producer
Transfer of management techniques	producer + designer	designer + supplier + producer	designer + supplier + producer	designer + supplier + producer	producer
Transfer of improvements	producer + designer + supplier	designer + supplier + producer	supplier + producer	designer + supplier + producer	supplier + producer

TABLE 7

Execution	Control over function	Control over export capacity	Control over costs
Design	North + some exceptions in South	North + very few exceptions in South	North
Supply of process equipment	North + some exceptions in South	North	North
Construction	North + South	North + South	North + exceptions in South. Developing activity of South consists of exports. Sub-contracting activity for North
Production technology	North + South (within limits)	North + South (very limited)	North

Influence variable	Specific use of the variable	Use of all the variables
Exports	North - to promote the country's exports of goods and services	North Balancing of oil bill by developing exports of capital goods integrated in package arrangements involving assemblies of equipment, relying on the limitation of spread of technology and extra costs to avoid export competition from South
Exports	North - to promote exports - to regularize labour costs and profits through exports	
Exports	North - to promote exports - to promote activities of small and medium-sized enterprises - to regularize domestic activity through exports	
Spread	North formal conflict of interests between iron and steel producers and constructors of plant for export: attributed to diffusion	

Depending on the nature of the credits, the result is a strategy enabling the lenders to select the recipients, to vary financing terms, to limit the volume of financing and to link the granting of financing to the origin and nature of services and supplies.

In addition, the financing rules place obligations on the lender, in the case of export credits, with regard to insurance, transport and guarantees.

In general, moreover, they limit the possibility of subcontracting, and hence of obtaining a better level of high-performance technology or similar equipment at a lower cost.

4.5 Market

Generally speaking, the South's industrialization poses several types of problem for the North - an immediate loss of export potential by the North, in a phenomenon whereby the South's imports are replaced by its local products; or, in an additive process, a loss on export markets following the entry of products from the South (a relatively limited phenomenon); or, lastly and in an even more limited fashion, the commercial offensive launched by the South against the North.

These three types of situation may coexist in the iron and steel sector and so far we have studied the means whereby the North can protect itself from the first two situations. When a country of the South succeeds in meeting its own needs and exports iron and steel products to the North, there is a sliding scale of possible barriers, ranging from standardization to anti-dumping measures and quotas. In fact, at present only the first two situations exist and, in view of the controls over financing and investment cost, it is unlikely that new competitors for the North will emerge from the South.

5. Pattern of controls

The range of controls available to the industrialized countries enables them to influence iron and steel development throughout the world with flexibility. Thus, at the global level, it is not necessary for the North to make use of all these possibilities; much can be left to the specific initiatives of States or firms, restricting the world-wide strategy to the most essential level.

TABLE 8

Financing	Control over advisability	Control over global volume	Control over selectivity by country	Control over selectivity by nature of operation	Control over amount per operation	Control over terms, duration	Control over international rules	Influence variable	Use of the variable
Export credits	North	North	North	North	North	North	North	- advisability - amount per country - terms	promotion of exports
Private credits	North	North	North	North	North	North	North	- greater solvency - terms	investment financing
Official development assistance	international organizations + North + petroleum countries	international organizations + North + petroleum countries	international organizations + North + petroleum countries	international organizations + North + petroleum countries	international organizations + North + petroleum countries	international organizations + North + petroleum countries	international organizations + North + petroleum countries	- selectivity - nature of operations	- political impact - aid often tied except (LDC) - compensation for poorest countries

At this last level, it is therefore possible to envisage a two-tiered pattern of controls: at the investment stage and at the production stage, where the most effective forms of control exist (see table 9).

The need to obtain financing and the high cost of investment constitute sizable handicaps, which few countries of the South are able to overcome. Those whose financial capacity enables them to be free from the need for external financing will be forced by their lack of engineering capability and of facilities for manufacture of equipment to incur large extra investment costs. Assuming that these countries have a strong enough political will to maintain their project for development of the sector, pressure from the holders of technology will orient them towards production of long products. On the flat-products route, to be envisaged only in a process of self-centred integration of industrialization, there will be obstacles deriving from the size of the market, from the need to obtain technologies for the manufacture and use of products, and from the acquisition of capital goods technology.

However, possibilities do exist: mini-mills reducing the volume of investments but designed to meet basic needs; and direct reduction, which is applied on a limited scale and controlled for the time being.

At the production stage, the control of trends in coal prices, the increase in real terms in investment costs, the weakness of transfer of technology; the economies of scale and the existence of potential capacity available for exports requiring low investments are leading the industrialized countries to envisage industrial redeployment in the iron and steel sector with equanimity and in a relatively orderly manner.

There are few examples of iron and steel experts in the industrialized countries being worried about the South exporting or introducing products into the North.

In fact, the only example(s) remain(s) net importers of iron and steel products. At the moment, the EEC and the United States are more worried about the aggressivity of the Japanese iron and steel industry. In a way, therefore, this would be a possible area for North-South co-operation, because of the relatively small production in the South compared with the huge potential needs.

To the extent that we are witnessing a marked disengagement by the North from iron and steel investment, we can imagine that, over a long period, the South will become increasingly able to meet its own steel needs. If this course of industrial redeployment is not to result in excessive earnings for the North, it must be organized in such a manner that the links of mutual dependency between North and South lead to a more equitable balance.

6. Relative situation of the countries of the South

However, as stated above, the situations of the countries of the South and North vary considerably. This will be seen from table 10, which shows the countries in a privileged position with regard to each of the factors.

Latin Ameri . and certain Asian countries have a considerable potential for iron and steel development, followed by some African countries:

- In Latin America: Brazil, Mexico, Argentina, Venezuela;
- In Asia and the Middle East: India, the Republic of Korea, Iran, Iraq;
- In Africa: Algeria, Egypt, Morocco.

In order to evaluate possible solutions and test their validity, we must take into account both the forms of influence and the existing situation of the partners, so as to explore the types of solution realistically. In addition, if our judgement is not to be purely qualitative, it must be accompanied by an attempt to assess the impact of external factors.

7. Evaluation of the South's dependence

7.1 Existing trends

Current data reveal that:

- Japan and the EEC have excess iron and steel capacity;
- The United States is halting investments;
- The socialist countries are meeting their requirements from their production.

TABLE 9

	Control over sources of raw materials	Control over technologies	Control over technological development	Control over execution costs	Control over financing	Control over origin of supplies	Control over export markets
Investment	Coke (coal) Scrap iron Iron ores Non-ferrous metals	Classical route Mini-mills Direct reduction Special steels	Polyvalence of routes Exports of prereduced ores Reduction of energy Reduction of pollution Improvement of steel grades	Economies of scale Supply of industrial assemblies Supply of equipment or firms or engineering Financing cost	Advisability Amount Terms Control over international financing organizations	Financing Engineering capability Subcontracting agreements	Limitation of size of investment through financing and cost of investment Orientation towards long-products markets

TABLE 9 (continued)

	Control over raw material costs	Control over effective provision of technology	Control over production costs	Control over spread of improvements	Control over quality and cost of maintenance	Control over export markets
	Coke Ore Scrap iron Non-ferrous metals	Technical aspects of production and maintenance Management aspect Transfer of collective know-how	Investment cost Financing Raw material cost Limitation of technology transferred Availability and cost of spare parts Quality of programming Degree of information Existence of under-utilized capacities requiring little investment	Energy savings Technological development Recovery of by-products Improvement of productivity Reduction of consumption of special steel Gains in consumption and programming Substitution of materials	Cost of spare part Availability of spare part Quality of after-sales service Continuity of manufacture of original equipment Limitation of subcontracting	Product quality Standardization Taxation Quotas Production costs Technological evolution of demand Quality of commercial service Protection of flat-products markets

TABLE 10

Factors		North	South
Basic materials	Coking coal	USSR, USA, FRG, UK, Poland	China, India, Colombia, Mexico
	Low-grade coal		India, China
	Iron ore	USA, Australia, Canada, Sweden, USSR	Brazil, India, Liberia, Venezuela, China, Korea, Mauritania, Chile, Peru
	Wood	USSR, Canada, Northern Europe. France	Brazil, India. South-East Asia + tropical African countries
	Gas	Canada, Northern Europe, USSR	Mexico, Middle East, Iran, Algeria
	Hydro-electric potential		Central, East and West Africa
	Non-ferrous metals	Industrialized countries	Malaysia, Peru, Mexico, Indonesia, Zaire, Brazil, India, Philippines
Technology	Classical route - flat products	Industrialized countries	Latin America, India, Korea, Iran, Egypt, Algeria
	Classical route - long products	Industrialized countries	Widespread, except in Africa
	Mini mills	Italy, USA, United Kingdom, Spain, Japan	
	Direct reduction	USA	Mexico, Venezuela, Brazil, Iran, Iraq, Indonesia, Korea
	Special steels	Industrialized countries	Latin America, India, Korea, Iraq, Egypt, Algeria
	Ability to transfer technology	Industrialized countries	China, India
	Design capability	Industrialized countries	China, India, Brazil, Mexico, Algeria, Argentina, Republic of Korea

TABLE 10 (continued)

Factors		North	South
	Equipment manufacturing capacities	Industrialized countries	China, India, Brazil, Mexico, Algeria
	Capacity to export iron and steel products	EEC, Japan, Eastern countries	India, Republic of Korea
	Capacity to execute industrial assemblies	Industrialized countries	China, India
	Financing capacity	Industrialized countries	Oil countries

In addition, because of their productivity and iron and steel potential requiring little investment, the Japanese will be the leaders on export markets for many years to come. There is some uncertainty about the developing countries' projects, but on the whole forecasts indicate an increase in their imports which will be greater than the increase in their production between now and 1985. Thus the industrialized countries' worries about the developing countries concern competing investments, particularly in the area of flat products. It seems that a strategy of the industrialized countries is being evolved, taking into account all these elements.

Because of its surplus capacity and low costs, Japan would corner the markets for exports more specifically to the United States, South-East Asia, Latin America and the Middle East; the European countries would keep certain Middle East and African markets which were traditionally theirs. Since these markets cannot absorb the excess capacity in Europe and since the European countries cannot compete with Japanese products on the other markets, these countries would try to integrate their iron and steel production at the capital goods stage.

Industrial redeployment in Europe would therefore mean specialization in industrial capital goods and maintenance of politically and economically influential markets in Africa and the Middle East. Europe considers itself more likely in this way to offset its energy dependence by supplying capital goods to the oil countries. The area of competition remaining between the industrialized countries would consist of Latin America (Brazil) and the Middle East.

During the period of industrial redeployment, all the elements of dependence concerning technology, materials and financing would benefit the North, so as to avoid a sizable increase in the South's iron and steel production. This scenario therefore leaves the door open for the South to create a local iron and steel industry mainly intended to satisfy basic needs. For more sophisticated needs, the procurement of financing and the investment cost would constitute quite a strong deterrent in an initial phase of redeployment which would extend until 1985.

Beyond that date, when the North's internal problems connected with redeployment would have already been solved, the need to sell the maximum amount of industrial goods and the cost of iron and steel products would lead North and South to co-operate in the creation of large iron and steel capacities in the South.

This interpretation of the future has the advantage of fitting the existing performance by the various actors into a plausible scenario and provides a clearer insight into the past and future evolution of external factors for the South.

As for the countries of the South, their situation would evolve as follows:

In Latin America, movement towards autonomy in respect of iron and steel appears to be feasible, with the exception of Brazil, which is encountering financing problems.

In Africa and the Middle East, the existing iron and steel capacity and the most promising prospects for development do not enable the countries concerned to envisage self-sufficiency in the medium term.

In South-East Asia, requirements will expand and will be met partly by imports.

In general, these forecasts seem to be accepted for 1985, but uncertainty remains about levels of production and it is generally expected that there will be a steel shortage by 1985, despite the increase in world production.

7.2 Impact of external factors

7.2.1 Basic materials

The slow decline in hydrocarbon prices as compared with coal prices between 1960 and 1970 has influenced technology by favouring the use of fuel oil and gas. In addition, the rise in oil prices has led coal producers to increase their prices. Taking 1970 as the base year (100), this gave a ratio of oil price to coal price equal to 104 for the United States in 1975. If one studies the impact on the price of steel, the World Bank estimates show the following trend:

In 1975 dollars	Coke price in the USA	Impact per tonne of steel	Oil price in the USA	Impact per tonne of steel
1970	$22.81/t	$13	$4.67/barrel	$5.4
1975	$54.19/t	$30.9	$11.63/barrel	$13.4
Difference between 1970 and 1975 in constant dollars		$17.9		$8

The price of energy in the form of oil therefore represents 3.5 per cent of the cost of steel, compared with 10 per cent for coke.

Over this same period, gas prices changed less, while ore prices rose very slightly. These changes were felt in all countries to the same extent, and the correlation of oil and coal prices gives a multiplier effect of 3, which is wrongly blamed exclusively on rising oil prices. In fact, these are responsible for only one third of the increase.

7.2.2 Changing cost of equipment

Several overlapping phenomena are involved in the cost of equipment: diseconomies of scale, excess cost caused by absence of infrastructure and varying excess cost depending on the investing country.

Our own estimates in this area reveal the following costs, when P is the investment per tonne in an industrialized country.

The cost in developing countries would be:

$$2\,P = P \times 1.5\ (\text{coefficient of scale})^{*/} \times 1.33\ (\text{coefficient of underdevelopment and excess cost}).$$

To all these factors must be added the change in prices of capital goods since the beginning of the 1970s, which exceeded the considerable monetary erosion.

This confers an additional advantage on the existing export capacities of the industrialized countries and constitutes a defence against a possible invasion of products from the South.

---

*/ On the basis of an average capacity of 400,000 tonnes/year in the South and 3 million tonnes/year in the North.

7.2.3 Changing cost of financing

Effective interest rates have risen since 1974, and currently amount to between 8.5 and 9.5 per cent a year, which is an increase of between 1 and 2 per cent a year compared with the preceding decade.

Moreover, the differentiation of rates, depending on the risk criterion, discourages loans to the South, particularly loans in Eurodollars.

7.2.4 Transfer of technology

Analysis of rates of utilization of capacity reveals a considerable difference between North and South. For example, the rate may be more than 90 per cent for Japan, and less than 50 per cent for some countries of the South. This lack of production represents both a specific penalization as regards manufacturing cost and a global penalization because the amounts not produced have to be imported. When one thinks of the importance of fixed charges in the cost price of iron and steel, there is no need to stress the very considerable impact of poor technological expertise on the final cost price.

In addition, successive operating deficits result in high cash charges, which also influence costs.

Lastly, the influence of the low wages in the South does not compensate for the difference in productivity. Paradoxically, the wages cost per tonne of steel is higher in the South than in the industrialized countries.

Efficient technological co-operation between North and South could lead, through an improvement in the rate of utilization of production capacity, to an increase in production in the South, on the basis of existing installations, amounting to about 10 million tonnes per year by 1985.

7.3 Present economic effects of dependence

If one wishes to sum up the present situation in terms of its effects, the best criterion would be the comparison of production costs. For this purpose, we have consulted various sources of information in order to draw up a table showing the different costs in the North and South.

The calculations were based on the 1975 dollar and do not claim to indicate anything more than orders of magnitude (see table 11).

But the various costs provide a striking illustration of the dependence of the South and, to some extent, the failure of industrial co-operation in the past. There are therefore grounds, on this basis, for envisaging other possible solutions.

7.4 Types of solution

The analysis of elements of dependence and their effects enables us already to envisage certain solutions such as the improvement of productivity in iron and steel plants in the South, the regionalization of certain flat-products projects in the South, the development of mini-mills and direct reduction, the development of technology for the use of low-grade coal, the development of capacities for design and manufacture of capital goods in the South, but also the improvement of the type of industrial arrangement. These solutions may be formulated:

(a) At the international level between North and South and between South and South;

(b) At the regional level;

(c) At the bilateral level.

8. Bases for solutions

We shall first concentrate on identifying the elements of rebalancing and neutralization of elements of dependence, and then study the ways of achieving these results (see table 12).

By "balancing" we understand the procedure consisting, in the medium term, in balancing elements of dependence through reciprocity. "Neutralization" would consist in eliminating a series of factors of dependence. The final objective for the South would be, in the long term, to avoid:

(a) Maintaining interdependence on the existing bases; and

(b) Thus creating a form of long-term dependence.

Table 12 below shows a possible framework for such a procedure and the bases for a solution. This reveals three levels of relations for the search for solutions, namely the North-South level, the South-South level and the level of one country in isolation.

8.1 At the level of North-South relations

The topics for such a dialogue, as regards iron and steel, could be:

- Financing: procurement, terms, etc.;
- Reduction of investment costs: excess cost, risks, arbitration, guarantees, etc.;
- Development of new technologies adapted to the South's needs: direct reduction, mini-mills, low-grade coal;
- Liberalization of choices, for the South, of technological routes involving flat products, long products, special steels, capital goods;
- Improvement of ore prices;
- Assistance in improving the rate of utilization of production capacity;
- Assistance in the creation of design capabilities and capacities for the manufacture of capital goods in the South.

These topics could be linked up with the negotiations on energy, raw materials and the development of the other sectors, in order to achieve a global balance, or could be the subject of sectoral negotiations.

8.2 At the level of South-South relations

At the level of South-South relations, the topics would be the same, but they would be approached from a different angle. The negotiations, which would not be contentious in nature, would relate to a co-operation programme under which countries in more advantageous positions in given sectors would be entrusted with specific undertakings by all the countries having material means originating in the South. The results of this co-operation would accrue to the community of countries of the South.

TABLE 11

Cost price per tonne of rolled steel in US dollars (classical route)	Farmer factory in North	Extension of existing factory in North	New factory in North	New factory same size as in North but in South	New small factory in South	New small factory, 50 to 60 per cent efficiency in South
Ore	36	36	36	50	50	50
Coke	40	33	33	40	40	40
Other materials	35	33	33	35	35	35
Manpower	123	90	90	70	100	135
Others	13	11	11	30	40	40
Amortization of costs	20 to 40	90	120 - 180	200	325	440
Total	$270 to 290/t	$290/t	$320 to 380/t	$415/t	$590/t	$740/t
Unit cost of investment per tonne of steel	$200/t to $300/t	$550/t	$700 to 1,000/t	$1,170/t	$1,700/t	$1,700/t

TABLE 12

		Balancing	Neutralization
Coke		Iron ore (sales) Non-ferrous metals (sales) Gas (sales)	Gas Low-grade coal
Non-ferrous metals		Iron ore (sales) Non-ferrous metals (sales)	South-South agreements
Financing		Payments in materials Payments in products (compensation)	- OPEC - International financing (modified) - International funds
Technology	Classical flat-products route	Gas (sales) Oil (sales) Uranium (sales) Strategic non-ferrous metals (sales)	- Design and manufacturing capacity of the South - Purchases of equipment
	Classical long-products route	- Purchases of equipment - Purchases of flat products	- Design and manufacturing capacity of the South - Purchases of equipment
	Mini-mills	- Development towards the manufacture of flat products by the North	- Development towards the manufacture of flat products by the South
	Direct reduction	- Development by the North of technology in return for gas supplies	- Development by the South of technology for prereduced ores, flat products, etc.
	Special steels	- Energy (sales) - Non-ferrous metals (sales) - Capital goods (purchases)	- Design, research and construction capacity in the South
Execution		- Local risks assumed by the South - Link between extra cost and results - Intervention of local firms	- Design, manufacturing and execution capacity in the South
Manufacture of process equipment		- Supplies of materials - Agreement on range specialization - Reciprocal subcontracting agreements	- Research experience and capacity

TABLE 12 (continued)

Design	- Establishment of a national engineering capability, with foreign technical assistance from various countries	- National design capability
Transfer of production technology	- Integration of the producer from the industrialized country in the execution, by giving him a financial interest through new arrangements	- Success of the transfer of technology from North to South and from South to South

The topics could be the following:

- Acquisition and development of direct reduction technology;
- Research and development of techniques for the use of low-grade coal;
- Research on technologies to permit the export of prereduced ores;
- Institution of an investment programme in the South, formulated on a regional basis and covering all production of flat products, long products and special steels;
- Establishment of an organization for financing by the South, recycling petrodollars and permitting the financing of industrial operations;
- Establishment of a programme for the extension and creation of capacities in the South for the design and manufacture of equipment and for execution of industrial assemblies;
- Creation of structures, at the level of the countries of the South, to deal with insurance and transport;
- Establishment of a programme for the working, conversion and marketing of iron ores and non-ferrous ores by the South;
- Organization of a transfer of production and management techniques from the most successful to the least successful countries.

The above programme may complement North-South co-operation or, in the event of the failure of a North-South negotiation process, provide a possible alternative.

8.3 At the level of one country of the South

We are considering the operational level, where the successes of a North-South negotiation process and the chances of South-South co-operation can be exploited. In the absence of such conditions, however, it is possible at the level of one country of the South to implement a programme of relations with the countries of the North and South, in the light of that country's particular situation and potential and with the goal of developing its iron and steel industry.

This formulation of agreements with one or more partners would take the form of industrial arrangements balancing inputs with reciprocal elements of dependence, voluntarily approved by the partners. All the key problems of iron and steel development would then be solved by the country of the South, with varying degrees of elegance, in the light of its particular situation.

It would be understood that the industrial arrangement would optimalize the chances of success but would not make up for the potential inadequacies of the country.

9. The new type of industrial arrangement

Since this new type of industrial arrangement is not specific to one particular country, its general underlying principles should first be identified.

9.1 General principles

It should first be recalled that the subject of this study is the iron and steel branch and that we are concerned more specifically with the section relating to intermediate goods (the sections relating to means of production and consumer goods are excluded from the scope of this study).

In addition, in view of the volume of financing required, the low profitability and the special place occupied by the iron and steel industry in the industrialization process, iron and steel firms in the South are generally in the public sector. For the sake of argument, we shall henceforth assume that this situation prevails throughout the South, while it is much less common in the North (with the exception of the socialist countries).

Lastly, we assume that industrial commitments are mainly of interest to partners wishing to display:

- A desire for independence;
- A desire for diversification;
- A desire for mutual benefit in their foreign relations;
- A desire for balance;
- A desire for stability.

In the case of countries belonging to the same political bloc, the industrial arrangement has a different scope: it is part of concerted planning (e.g. the socialist countries) or of a strategy of firms or of States (e.g. the capitalist countries).

The methodology which we shall use will be more general and will therefore encompass these particular cases.

9.2 Different forms of industrial arrangement

We shall consider the most common forms and define the content of a new industrial arrangement, which could be called an "expertise in hand" arrangement.

Table 13 recapitulates the content of agreements, between two or possibly more partners, for the execution of an industrial operation. There seem to be two contrasting standard formulas:

- Execution by an engineering firm with, possibly, a package arrangement for supplies;
- Package execution entrusted to a partner or to a consortium.

In fact, these two formulas have advantages and disadvantages. In the case of the engineering firm formula, there are difficult problems of finding financing and contractors for all the operations to be carried out. In the case of the other formula, it is difficult to find a partner competent in all the areas, and the consortium solution in practice poses problems of co-ordination and of responsibility. In addition, this global formula is usually more expensive.

Our proposal is that the content of the industrial arrangements should be extended to all the functions mentioned in table 13 and that each of these areas should be considered as a possible subject for one or more agreements. The main difference from the engineering firm formula would be the range of expertise provided but also, and above all, the construction of these agreements would be governed by a logic envisaging the balancing of elements of dependence and retaining the advantage of being able to choose the best partner in each area.

Compared with the package formula, this type of arrangement is more comprehensive and allows a relationship in each area with the best partner, while providing a network of elements of mutual dependence, which alone can guarantee the attainment of the goals set.

With such an approach, for example, it would be possible to imagine the following model agreement between two States:

Industrialized country A would undertake:

1. To execute an iron and steel plant;

2. To effect the necessary transfer of technology, sufficient to enable developing country B to acquire industrial expertise;

3. To provide adequate after-sales service;

4. To provide financing;

5. To provide materials to country B.

In return, country B would:

1. Pay for facilities and supplies;

2. Provide gas and/or purchase complementary goods and/or purchase certain types of capital goods.

It would be understood that the contractual balance would be reflected in:

(a) Fair remuneration of the parties for their services rendered;

(b) A bonus or a substantial premium, if the objectives were attained;

(c) The principle of balanced readjustment of prices over a period of time.

This type of agreement would be implemented, on each side, by the most efficient operators, guaranteeing the success of the operation.

There are other possible examples, without direct intervention by the authorities, between a firm from a country of the South and one or more partners from countries of the North. With this method, moreover, it would be possible for execution in respect of part or all of one or more areas to be carried out by firms from the same country or from different countries.

9.3 Iron and steel objectives

If we are not to study all the possibilities, we must revert to the analysis of the impact of external factors (paragraph 7.2) and in particular to the conclusions which will enable us to describe the main uses of this type of arrangement in the iron and steel industry.

TABLE 13

	Engineering company formula	Design and supplies formula	"Turn-key" formula	"Product in hands" formula	"Market in hands" formula	New industrial arrangement
Raw materials						f_1
Design	a_1	b_1	c_1	d_1	e_1	
Execution	$a_2 \cdots a_n$	$b_2 \cdots b_n$	c_1 "cost + fee"	d_1	e_1	
Supplies	$a_{n+1} \cdot\cdot a_t$	b_1	c_1	d_1	e_1	
Transfer of production techniques				d_1	e_1	
Transfer of management techniques				theoretical	theoretical	
After-sales service						
Market			possible compensation agreement	possible compensation agreement	e_1	
Financing	$a_{t+1} \cdot\cdot a_t$	b_1	c_1	d_1	e_1	f_n can be equal to 1

By classifying the conclusions according to the nature of the handicap, we can evolve four hypotheses, to which must be added the hypothesis of imports of iron and steel products (see table below). We then find considerable differences in costs, which provoke various types of reaction.

	Case 1	Case 2	Case 3	Case 4	Case 5
Wrong utilization of production capacity	x				
High cost of investment due to under-development	x	x		x	
High cost of investment due to size	x	x	x		
Particular case of imports					x
Cost per tonne of rolled steel (in 1975 dollars)	$740	$590	$440	$415	$300 to $350

Thus the following approaches are common:

1. Not to build an iron and steel plant, in order to benefit from low import prices;

2. If an iron and steel plant is built:

   - To increase the production capacity utilization rate;
   - To construct large units by means of regional co-operation;
   - To reduce unit investment costs in the South;
   - To ascertain trends in raw material costs;
   - To reduce the cost of financing;
   - To recommend solutions involving direct reduction and mini-mills;
   - To make production specialize in long products, which are easier to produce.

All these trends coexist in developing countries, but we shall concentrate on the problems of the countries which want to create an iron and steel industry.

In industrial arrangements, attention should initially be given to:

(a) Better use of production capacity;

(b) Lower investment cost;

(c) Financing facilities;

(d) Guarantees of raw material supplies.

9.4 Foundations of the new industrial arrangements

9.4.1 Role of the producer

In the past, contractual forms only partially met requirements, because they were not designed to confer a substantial role on the real holder of the technology.

They attracted constructors and suppliers of equipment, who offered to provide the technology in addition to their speciality, using this package offer to justify an increase in the cost of their supplies and services.

As a simplification, we may consider that the following economic flows take place through the existing contractual formulas:

- Profits for constructors;
- Loss of outlets for producers in exporting industrialized countries;
- Financial losses (investment and production) for the developing countries.

With these flows, producers certainly do not want the third world to industrialize and are submitting to this trend, while the South is lamenting the absence of transfer of technology. It is interesting then to note the success of the agreements with the socialist countries or with Japan in this area, because their internal division of labour does not, where external markets are concerned, prevent the grouping and mobilization of firms needed for a successful operation involving the export of iron and steel plants. A solution of this kind in the Western countries would undoubtedly have given

the South, for the same cost, a better transfer of technology and a transfer of the excess cost to the producer, who had facilitated partial reconversion of his activity without social upheaval. Constructors, who would then no longer benefit from these situational earnings, would compensate for this by increasing the volume of their export sales because of the greater success achieved with this form of co-operation. Lastly, the South would have more success in its industrial efforts and would therefore be able to increase its imports of goods of every kind.

In the new industrial arrangements, the producer should therefore emerge more clearly as the holder of the technology.

9.4.2 Special role of the State in the industrialized countries

In the Western countries, the State plays an important role in exports of industrial goods by: provision of financing, support of firms in international competition and guarantees granted to its firms.

In practice, the State and the firms act separately, in relations with purchasing countries, except within the framework of governmental co-operation agreements. This separation penalizes the South, to the extent that it is given no real guarantee in the event of non-performance by foreign firms. In addition, the South's resource assets are expressed in financial terms. But the benefit of its raw material exports is not reflected in the development sphere. The fiction of the private status of firms enables the industrialized countries to leave their industrial operators to rake in earnings at the expense of the South and therefore to increase the national wealth, without obliging them to co-operate at the government level.

It is true that, in the case of an industrialized country, if the State is to become involved in industrial relations, the political or economic stakes must be high. But at present energy or mineral dependence facilitates relations at this level.

One may imagine a South country proposing to an industrialized country an energy guarantee: large-scale supplies over a long period or agreement on price rebates over x years, provided that the industrialized country guarantees the industrial success of bilateral operations.

Its interest in the energy problem will lead the industrialized country to:

1. Insist that firms honour their commitments;

2. Monitor firms' fulfilment of their commitments;

3. Urge producer firms to provide their best services.

The new industrial arrangements can make the role of the State in industrialized countries more explicit.

9.4.3 Special role of the State in the South

Two important ideas must be taken into account by the South. The first is that one of the reasons invoked by the partners of the industrialized countries to justify extra cost is their contractual responsibility with regard to local risks.

It is clear that, in this area, the South must assume its responsibilities by providing foreign partners with guarantees against economic risks. For it is difficult to make them bear the brunt of national decisions and to ask them to integrate their activities perfectly into the national socio-economic system.

In addition, the South must realize that the problem of the acquisition of technology is far from being solved by the signing of a contract, however perfect it may be. By domestic political mobilization, it must endeavour to promote collective and individual capacities to pursue a development policy without any demagogy, without any complex and without any weakness.

The new industrial arrangements should provide an opportunity for the South to have a clearer picture of its area of responsibility.

9.4.4 Role of the supplier of raw materials

In the iron and steel sector, and particularly for the classical route, coke supplies pose a problem for the South. Long-term agreements must therefore be developed between suppliers and users, which can involve the counterpart provision of energy or minerals so as to guarantee stable supplies and costs.

The new industrial arrangements must give some attention to solving the problems of raw material supplies.

9.4.5 Special role of the time element

Industrial relations are established for a lengthy period, and existing contractual forms do not take this fact into account, despite considerable progress in this direction in recent years. In the areas of supply, transfer of technology or after-sales service, this time element must be clearly reflected in the new industrial arrangements. But, in order to sustain the interest of the parties concerned, it is necessary to envisage counterpart agreements over this period.

The new industrial arrangements must be conceived over a long period.

We shall not dwell on the importance of the other parameters already taken into account in the existing industrial arrangements, and we shall study some examples of new arrangements.

10. Examples of new industrial arrangements

From all the foregoing analyses there emerges a methodology for construction of the new industrial arrangements which respects the diversity of situations in the South.

It is, of course, impossible to envisage all the possibilities for industrial relations, but in order to illustrate the use of this method, we shall consider some examples based on the following model:

Let us take a country of the South, B, which possesses gas and iron ore and which wants an iron and steel plant producing flat products or long products following the classical route or long products using direct reduction.

In addition, country B is hesitating between a package arrangement with one partner and/or several arrangements with different partners.

First case: Choice of classical route, flat products with one partner.

The basis of the industrial arrangement covers a long period, between country B and industrialized country A, and involves inputs from both parties.

Country A inputs: supplies of coke

+

supplies of technology for iron and steel production

+

supplies of equipment and after-sales service

+

execution or supervision at normal cost

+

provision of financing

Country B inputs: supplies of energy

+

direct responsibility for local costs

+ perhaps

priority purchases of special steel products from country A

+ perhaps

possibility of business flow with equipment suppliers in country A (with a view to preparing the next stage of industrial expertise)

+ payment

+ price rebates in respect of gas supplied during the lifetime of the agreement, if the co-operation objectives have been attained.

The advantage of this type of agreement is that responsibility is incurred at the government level and that the fruits of successful co-operation are shared nationally in country A.

This country may thus assume responsibility for the financial and social consequences of a possible reconversion of its producers. For country B, there are much greater guarantees of success.

Second case: Choice of classical route, long products, with several partners.

The basis of the arrangement consists of various agreements with partners from different countries and the duration of the agreements depends on the subject matter.

The contractual provisions may be as follows:

First contract: agreement on delivery of coke and arrangements for payment

+

agreement on delivery of gas and arrangements for payment, with balance to be negotiated as regards quantities and correlation of prices over a period varying from the medium to the long term.

Second contract: agreement on design and supply of production technology and arrangements for payment

+

agreement on purchase of iron and steel products, flat products route, manufactured by country A, depending on the attainment of the objectives

or

agreement for sale of iron ore at preferential rate by country B over a medium-term period.

Third contract: agreement on supplies of equipment, execution, after-sales service, with arrangements for payment

+

agreement on assumption of local risks by country B and on the provision of a broader guarantee by country A suppliers over a period varying from the medium to the long term.

Fourth contract: agreement for financing with international organizations, combining cash requirements for the first years of production and arrangements for repayment.

These different contracts are designed to achieve diversification, while respecting a rule of partial balancing of elements of dependence.

Third case: Choice of direct reduction with several partners. The construction principle is the same as before, plus:

(a) Process guarantee: better coverage to be obtained from the licensee (for example, preliminary tests at the industrial stage of the use of ore from country A);

(b) Transfer of production technology: a careful choice of partner, permitting subsequent development of the technology towards different lines of production.

There are many possible combinations of relationships in the model which we have imagined, but the goal is not to formalize them all in order to draw up a comparative table, because the criteria would be purely subjective at this level.

It will suffice to have shown how the method can be used in practice and adapted to all kinds of situation.

11. Conclusion

Economic relations between industrialized and developing countries appear to be influenced by two tendencies. The first concerns the form of international trade. Although this trade has evolved from barter to a monetary form, the present situation penalizes the under-developed countries, which do not enjoy the same conditions as the industrialized countries. For it is not enough to have resources in order to make successful purchases; it is also necessary to know how to buy, use and maintain. A tendency thus seems to be emerging towards a mixture of barter and money which is more favourable to the developing countries, because of the stability and balance provided by this kind of formula and because of the ability to react in the event of unsuitable exchange. In the iron and steel industry in particular, the market-economy countries' dependence on the developing countries for iron ore varies from 15 per cent in the case of the United States to 3 per cent

in the case of EEC and over 50 per cent in the case of Japan. This, together with the coke dependence, provides an area for confrontation or co-operation between North and South, where a two-way exchange of service is more useful than monetary exchange.

The second tendency is the emergence of political awareness. Now that the decolonization process has been completed, nationalist feelings have been able to evolve towards principles of non-alignment and interdependence. The South has demonstrated its outward-looking awareness by stressing interdependence and necessary solidarity for a better development in the world.

It has thus understood the need for economic ties with the most highly industrialized countries, while safeguarding its independence by diversification of its trade. The expansion of trade consequently presupposes the observance of simple principles: balance, respect and mutual advantage.

The method described above is part of this evolution and permits a better definition of North-South relations, while respecting the political principles of each country.

ANNEX 1

Cost of iron and steel industry investments in developing countries

Unit investment costs in developing countries are affected by two factors:

(a) The handicap of economies of scale;

(b) Excess costs arising from the method of execution and the lack of infrastructure.

For example, a comparison based on the classical route (blast furnace/oxygen steelmaking) illustrates the relationship described in paragraph 7.2.2 between unit investment costs in an industrialized country and those in a developing country. The trends in capital costs in relation to unit capacity*/ and average scale in the iron and steel industry in developing and developed countries (400,000 tonnes/year and 3 million tonnes/year respectively), show the following ratio between unit investment costs:

I 400,000t = 1.64 I 5,000,000t

I 3,000,000t = 1.10 I 5,000,000t

therefore: I 400,000t = 1.50 I 3,000,000t

While this ratio takes into account the capital savings obtained through economies of scale, we must still demonstrate the impact of excess costs. The literature throws little light on this subject, and information is rather hard to come by. However, cross-checking by various means indicates an excess cost co-efficient of 1.33; this figure is justified mainly by the need to allow for the special risks involved in execution and for financial guarantees to the contractor, and also to provide for an extra profit margin. In the sale of an industrial plant, this excess cost figure of 33 per cent would be distributed as follows:

---

*/ The World Iron and Steel Industry (Second study), UNIDO/ICIS.39, 20 November 1978, p. 95.

I. Excess costs arising from additional guarantees provided by the constructor:

Additional mechanical guarantees:	1 per cent of the value of the contract
A financial risk guarantee:	1 per cent of the value of the contract or more, depending on the degree of risk in the country concerned
A production guarantee (overdimensioning of the main production equipment):	5 per cent of the value of the contract
A technical guarantee:	3 per cent of the value of the contract
Delivery-date guarantees (delivery dates fixed in the contract):	3 per cent of the value of the contract
Total:	13 per cent of the value of the contract

II. Excess costs linked to a statistical assessment of unforeseeable risks and of compensation for the contractor:

Ceiling on the total sum of security paid:	10 per cent of the value of the contract

III. Extra profit margin:

This is normally limited to 10 per cent of the value of the contract. Therefore, the excess cost figure of 33 per cent does not reflect the earnings of the foreman; it is the contractor's financial handicap.

To sum up, unit investment costs in developing countries are twice those in industrialized countries.

$$I_{DC} = 2I = 1.5 \times 1.33\ I_{IC}$$

This relationship bears out the information contained in the second UNIDO study on the world iron and steel industry (UNIDO/ICIS.89, November 1978).

ANNEX 2

Legal relationships under present industrial arrangements

Contractual relationships under industrial arrangements continue to show an imbalance, arising from the situation of legal ascendency operating to the detriment of the developing countries. This in fact merely reflects the economic and organizational dependency of the countries of the South. The idea that a balance of contractual relationships can be achieved through the existing industrial arrangements is therefore illusory, as it in practice assumes partners having reached the same level with respect to development or technology.

International law should be up-dated to take account of the legitimate interests of the developing countries in pace with or, as far as possible, in anticipation of, political and economic developments in those countries, without merely ringing the changes on the current state of dependency.

The existing inequality is especially glaring in the arbitration procedure. The magnitude of the financial stakes, the nature of the partners, the complex nature of the dealings between the partners, the disparity in technological level between the partners, the composition of the arbitration board and the rules of arbitration militate against genuine arbitration, and in favour of maintenance of the existing dependent relationship under the guise of application of the rule of equity. Moreover, a customer from a country of the South, lacking a command of the technology and an adequate economic, legal and technical base, will be frightened off by the expense and slowness of arbitration proceedings. Furthermore, if, armed with a file substantiating the existence of prejudice, he refers his case to arbitration, the contractual guarantees cease to provide equitable assurances, because, through interpretation and manipulation, his partner can produce a rejoinder and induce the arbitration board to reach a decision based on the rule of equity. Finally, embarking on arbitration proceedings often implies a rather abrupt change of partners under commercial terms offering little scope for negotiation.

Arbitration therefore remains a last resort for partners of equivalent technological level, and provides an opportunity to make negative publicity for the defaulting supplier. Experience shows that when one of the partners belongs to a country of the North and one to a country of the South, the entrepreneurial community in the industrialized countries has always blamed the customer, regardless of the failings of the supplier in the industrialized country. All these observations justify a re-examination of existing industrial arrangements, in order to shift the real debate to a system which would be more equally balanced from the outset.