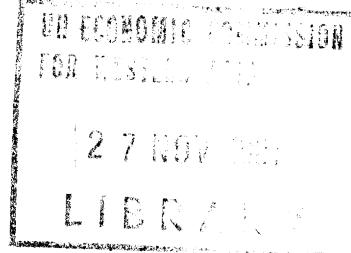




UNITED NATIONS
ECONOMIC AND SOCIAL COUNCIL



C.2

Distr.
LIMITED

E/ECWA/NR/SEM.3/4
31 March 1981

Original: ENGLISH

ECONOMIC COMMISSION FOR WESTERN ASIA
Seminar on Technology Policies in the
Arab States
Organized by ECWA with the Co-operation
of UNESCO
14-18 December 1981
Paris, France

FOREIGN FIRMS AND TRANSFER OF TECHNOLOGY
TO THE ALGERIAN ECONOMY

by

A. Benachenhou*

Research Center for Applied Economics,
Algiers, Algeria

* The opinions expressed in this document are those of the author and do not necessarily reflect the views of the United Nations Economic Commission for Western Asia.



FOREWORD

Algeria has initiated a novel process of economic development. The development policy is based on the following principles: regaining possession of the country's natural resources with complete internal control of economic power; subordination of private interests to state direction of investment for gradually covering the basic needs of workers in town and country; and active participation of these workers in the management of production units.

Such a policy is incompatible with anything beyond a marginal involvement of foreign firms in the capital accumulation process in Algeria. At the same time, however, the choice of sectors to be developed calls for the use on a large scale of foreign technology which is predominantly in the hands of the multinational companies. The challenge is obvious: how to make use of a technology dominated by the multinationals for socialist purposes. But it is also a gamble in which Algeria hopes to make the transition from mere consumption of technology to becoming a producer of its own technology, with the multiplicity of policy decisions that this involves.



CONTENTS

	<u>Page</u>
INTRODUCTION	3
1. A classification of "technological products" .	3
2. Production and consumption of technology	4
 CHAPTER I. ALGERIA'S TECHNOLOGICAL POLICY	
1. Volume, structure and forms of capital formation in Algeria	5
2. Contracts for industrial plant	7
3. Situation and prospects as regards production of technology	10
 CHAPTER II. METHODS USED IN ALGERIA'S TECHNOLOGICAL POLICY	
Section 1. Investment project implementation and foreign firms	12
1. Nationals as general contractors for projects	13
2. Turn-key contracts	15
3. Contracts for plant in production	22
Section 2. Foreign investment in Algeria	32
1. Direct investment	32
2. Investment in mixed enterprise	33
 CHAPTER III. THE EFFECTS OF THE TECHNOLOGICAL POLICY	
Section 1. Technological dependence	37
Section 2. Impact on the balance of payments	40
1. Impact on imports	40
2. Financial effects	45
Section 3. Impact on employment and incomes	48
(A) Employment	48
(B) Impact on income distribution	49
1. Pattern of wage incomes	49
2. Pattern of non-wage incomes	56
 CONCLUSIONS	58



INTRODUCTION

The broadest and certainly the most useful definition of technology for the purposes of this study would be that it denotes the particular way in which workers and machinery are dovetailed into an economic process determined by the type of internal and external organisation in the production unit. In this sense, every investment necessarily involves "consumption" of technology, even if in some sectors the investment itself produces new technology, e.g. in the form of items of equipment. It is then easy to define the different categories of technological products.

1. A classification of technological "products"

If we use the expression "technological products" to cover the various tangible forms in which technology as defined above is embodied, we can break them down as follows:

- equipment, raw materials and semi-finished products, and also patents or manufacturing licences enabling the technology to be used;
- the procedures or methods for using the equipment in production;
- skilled manpower for the design, maintenance and handling of the equipment;
- organisation, management and distribution methods;
- design and installation of production units ("production engineering").

It seems important to identify the last item since it often determines the choice under the other headings. Inability to perform these tasks inevitably leads to lack of control of the consumption of all the other technological products, and this may lead to two dangerous errors:

- slavish copying of the technology employed abroad, regardless of the foreign economic and sociological context;
- failure to develop a country's own potentialities as a result of systematic reliance on technology produced abroad.

So the forms of technological consumption can be classified according to the process by which investment projects are implemented, and analysis of the engineering involved becomes an essential aspect of any analysis of technological consumption.

2. Production and consumption of technology

"Technological production" is used here to mean the ability to originate part or all of the technological products listed above. A country is totally independent technologically when it produces them all; it is partially independent when it only produces part of them, and it is totally dependent when it produces none or very little.

"Technological consumption" refers to the mere fact of utilising technological products produced elsewhere. From this point of view, it is never total because a country at least produces partially skilled labour to make use of the imported capital goods. Very often, however, a low level of technological production is equivalent to high technological consumption. This occurs when a country is not even able to make proper use of means of production brought in from elsewhere.

In the case of Algeria, implementation of the development policy involves large-scale utilisation of technology because of the basic sectoral choices made. We will first consider the background to the country's technological policy.

CHAPTER I. ALGERIA'S TECHNOLOGICAL POLICY

A proper analysis of Algeria's technological policy (consumption and production of technological products) and of the part that foreign firms are permitted to play within this framework must start out from an examination of the background to the policy, i.e. the volume and structure of investment. This is because the tempo and allocation of investments will at the present stage largely determine the extent and forms of foreign involvement in the creation and operation of the production facilities.

1. Volume, structure and forms of capital formation in Algeria

Table 1 shows the rapid growth of public investment in Algeria over the past ten years. Annual investment rose from 3,200 million dinars during the first three-year plan to 8,500 million during the first four-year plan, and is expected to be 27,500 million under the second four-year plan.

The same speeding up of investment is found in the industrial sector with which this study is particularly concerned, since industrial investment rose from 1,800 million dinars during the first three-year plan to 4,750 million in 1970-73 and to 12,000 million in 1974-77, or an increase of 660 per cent.

This rapid increase poses a number of problems. The shortage of resources for the design and implementation of investment projects is becoming more severe. Then there is the shortage of certain strategic goods such as cement, roads, etc., and telecommunication systems, and the need - from a macro-economic point of view - to obtain these very quickly and hence to install plant to produce them rapidly. This decisive factor becomes an argument for particular technological choices and also for adopting the quickest ways of meeting the needs, e.g. in the food industry, building materials, etc.

Table I. Public investment in Algeria
(million Algerian dinars)

	First plan (1967-69)				Second plan (1970-73)				Third plan (1974-77)			
	Forecast	%	Actual	%	% of forecast	% of forecast	%	Actual	%	% of forecast	% of forecast	%
Hydrocarbons	2 265	41.9	2 757	50.9	122	4 573	36.9	3 596	41.2	139	19 500	40.6
Section I	2 536	47	2 202	40.6	87	6 062	48.9	8 884	46.8	147	22 826	47.6
Section II	599	11.1	459	8.5	77	1 765	14.2	1 698	9	96	5 672	11.8
All industry	5 400	48.7	5 418	55.3	106.3	12 400	44.7	18 978	55	153	48 000	48.6
Agriculture	1 869	26.9	1 606	16.4	86	4 140	14.9	4 616	13.4	115	14 590	13.2
Infrastructure	3 812	34.4	2 762	28.3	72.6	11 200	40.4	10 907	31.6	97.3	47 627	43.2
Over-all total	11 081	100	9 792	100	88.4	27 740	100	34 501	100	124	110 217	100

The percentages given for hydrocarbons, Section I and Section II are their shares of the total for industry as a whole, which in turn is its percentage of the over-all total including agriculture and infrastructure.

Section I = capital goods.

Section II = consumer goods.

Turning to the investment structure in industry alone, table 2 shows:

- the importance of the petroleum, natural gas and petrochemicals sector ("hydrocarbons sector") under each of the three plans: 50.9 per cent, 44.2 per cent and 40.6 per cent. This sector is of course a consumer of high-level technology in the prospection, production and processing of natural hydrocarbons;
- the growing diversification of industry with increasingly large investments in iron and steel, in mechanical and electrical engineering, and in chemicals. These sectors all use very advanced technology, as shown by the capital-labour ratios.

All the above factors turn up again when one examines the change in the volume and structure of the contracts for industrial plant concluded by Algeria.

2. Contracts for industrial plant

Table 3 shows the trend in the value by sector of the industrial equipment contracts made by Algeria from 1962 to June 1975. It will be seen, firstly, that there was a very rapid increase in contracts for the construction of plants - with an average of 700 million francs a year from 1962 to 1966, 2,000 million francs a year during the 1967-69 plan, 3,400 million during the first four-year plan, and an amount of the order of 16,000 million a year since 1974. In the 18-month period January 1974 to June 1975, the volume was equal to the volume of the contracts during the preceding ten years.

Secondly, in spite of the great emphasis on the hydrocarbons sector (50.6 per cent), other industries have appeared more recently with increasing investments, e.g. mechanical and electrical engineering and building materials.

From 1962 to 1968, 80 per cent of the contracts were for three sectors: hydrocarbons, iron and steel, and mining. In 1969 and particularly since the launching of the first

Table 2. Structure of public investment
(million Algerian dinars)

Industry	First plan (1967-69)			Second plan (1970-73)			Third plan (1974-77)					
	Forecast	%	Actual	%	% of forecast	Forecast	%	Actual	%	% of forecast	Forecast	%
Hydrocarbons	2 265	41.9	2 757	50.9	122	4 573	36.9	8 396	44.2	189	19 500	40.6
Section I												
Mining	200		152		76	700		609		87	1 100	
Electricity	260		158		61	735		1 484		202	1 525	
Iron and steel	1 200		1 275		106	1 900		1 900		151	5 865	
Mech. and elec. engin.					52	1 275					6 238	
Chemicals	200		104		60	512					4 000	
Building materials	581		463		53	940		1 090		116	4 100	
Total section I	2 536	47	2 202	40.6	87	6 062	48.9	8 384	46.8	147	22 828	47.6
Section II												
Food					66			567		121	1 470	
Textiles					159			470		68	1 420	
Leather, skins					176			515		97	1 170	
Wood, paper, etc.					44			58				
Handicraft industry					30			666		115	1 660	
					108					59		
					108							
Total section II	599	11.1	459	8.5	77	1 765	14.2	1 698	9	96	5 672	11.8
Total all industry	5 400	100	5 418	100	100.3	12 400	100	18 978	100	153	48 000	100

Table 3. Contracts made by Algeria for industrial plant
(thousand francs)

	1962	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	Total
Hydrocarbons	1 463	460	1 806	957	1 161	3 142	337	1 461	10 805	2 555	24 147	
Mining	255	209	77	49	105	85	48	6.5	-	152	975.5	
Electricity	-	5	50	80	217*	12	80	90	-	318	859	
Iron and steel	1 280	70	28.4	320	5	2 276	220	385	271.3	(+235)	(+250)	
Mech. and elec. engin.	-	-	-	600	1 050	520	-	736.8	1 720	1 284	5 234.7	
Building materials	-	-	-	231	102	302	40	438	2 392	1 280	4 785	
Chemicals	25	9.5	62	85	167.5	19	90	1.5	145	1 344	2 266	
Food	100	15	102	55	16	121	4	"	124	204	776.5	
Textiles	298	17	72	-	-	128	42	-	649	600	1 943	
Leather	51	-	23	-	-	-	-	-	100	253	76	
Wood	-	99	6	14	-	-	-	-	-	-	605	
Misc.	3 472	875.5	2 142.4	990.5	2 734	6 479	980	3 350	16 213.3	8 394	47 690.5	
Total												

* Electricity for hydrocarbons sector already included in figures for that sector.

four-year plan, other industries have appeared: building materials, chemicals and especially mechanical engineering.

Parallel with this, the range of projects is broadening in each of the industries, and a single Algerian enterprise may sign a very diversified series of contracts in the course of a year. The size of the plants to be built has also increased. The complex nature and importance of the projects is thus evident. In any case, they indicate the scope for the multinationals to act as intermediaries in carrying out investment projects, when the present weakness of Algeria in the production of technology (and especially in production engineering) is taken into consideration.

3. Situation and prospects as regards production of technology

The economic history of Algeria explains the lack of technological production. It was only in the aftermath of the First World War that France allowed the country to have a somewhat broader educational policy, with vocational training oriented towards building and public works or first-stage processing of metals in order to prepare workers for what really in practice were jobs abroad. Anything in the way of a capital goods industry was incompatible with the colonial situation.

Since independence, the authorities have concentrated on laying the foundations for production of technology by a full-scale effort to provide more schools, and the effect can be judged from table 4.

Apart from the increase in school attendance, there has also been an improvement in quality, due to successive reforms of the system. Concurrently with this, development policy has deliberately aimed to develop production of the means needed for improving labour productivity throughout the economy: iron and steel, non-ferrous metals, machine tools, mechanisation of agriculture, fertilizers, plastic materials, etc. To this extent the development policy followed is itself a technological production policy. Its effects in conjunction with the development of education and training can be expected in due course to lead to effective production of technology.

Table 4. Education in Algeria

	1973-74	1974-75
<u>Elementary</u>		
Population of school age (6-13)	3 429 100	3 512 900
Enrolment	2 376 344	2 499 605
of which, girls (%)	39	39.4
Percentage attending school	69.2	71.2
<u>Intermediate and secondary</u>		
General	293 799	327 039
Polytechnic	48 660	69 799
Technical	23 889	14 966
Teacher training	7 057	7 955
Total	373 405	419 759
of which, girls (%)	31.7	32.9
<u>Higher</u>		
	30 070	35 887
of which, girls (%)	23.4	23.5

Thus, Algeria's policy is a typical example of inter-related production and consumption of technology. To achieve the former it is necessary to accept the latter. But the consumption must develop in such a way that it leads later to production of technology. However, while Algeria can - if it has the financial resources - consume technology from anywhere in the world, it is not in a position to produce a complete technology, ranging from design to the manufacture and utilisation of capital goods. Choices have to be made for local production of technology, both at the sectoral level and as regards partners with whom long-term technological co-operation can be maintained.

CHAPTER II. METHODS USED IN ALGERIA'S
TECHNOLOGICAL POLICY

The most useful way of analysing the different arrangements for foreign enterprises to play a part in the working of the Algerian economy is probably to consider their role when new plants are set up, and then when the plant is in operation. These are the two stages at which the Algerian economy "consumes" technology and foreign firms come into the picture.

Section 1. Investment project implementation
and foreign firms

Table 5 indicates the relative importance of the different arrangements for foreign enterprise involvement in investment project implementation.

Table 5. Methods of executing industrial
projects, 1970-73

	<u>Per cent</u>
Integral turn-key projects	37
Partial turn-key projects (civil engineering work and part of equipment provided by Algeria)	30
Algerian promoter acting as general contractor (process engineering and main equipment coming from abroad)	17
Mixed system (combination of design office, Algerian promoter and foreign builder)	12
All engineering provided by Algerian promoter assisted by foreign design office	4
Total:	<u>100</u>

Let us consider in turn the situation as regards general contractor functions in Algeria, then the "turn-key" arrangements, and finally the more recent and increasingly frequent solution of "plant-in-production" contracts.

1. Nationals as general contractors for projects

We have already noted the importance of production engineering and have seen that Algerians perform this function in about 4 per cent of projects. The situation at the end of the first four-year plan and the prospects for expansion should now be considered.

It is generally agreed on the basis of the available statistics that Algeria's production engineering needs for the industrial sector are as given in table 6. A breakdown of the estimated personnel needs is given in table 7.

Table 6. Needs for production engineering

	<u>First four-year plan</u>	<u>Second four-year plan</u>
Annual volume of investment (million dinars per year)	4 000	12 000
Cost of production engineering (million dinars per year)	432	920
Personnel required	3 240	1 250

Table 7. Breakdown of production engineering personnel needed

	<u>First plan</u>	<u>Second plan</u>	<u>Per cent (second plan)</u>
Engineers, architects, middle management	907	2 553	28
Other technical	1 782	5 016	55
Administrative	551	1 551	17
Total	3 240	9 120	100

The sectoral distribution of personnel for the second four-year plan period has been estimated in table 8.

Table 8. Production engineering personnel for Second Plan

Sector	Annual investment (million dinars)	Personnel	Cost (million dinars)
Hydrocarbons	4 875	3 710	485
Consumer goods	1 418	1 068	145
Capital goods	5 707	4 342	570

At present the available personnel are estimated at 50 for the hydrocarbons sector, 450 for the capital goods sector, and 350 for the consumer goods sector.

A comparison of these figures with the table shows how serious the situation is. Many foreigners are unfortunately still needed, especially engineers and skilled personnel, and the number of administrative personnel is still disproportionately large. Let us now examine two cases that are contributing to Algeria's production engineering needs.

(a) The National Corporation for Industrial Project Design and Execution. This includes an Economic Research Directorate for making feasibility studies, which is mainly concerned at present with analysis of projects in the food and textiles industries. A small unit of industrial architects was set up at the same time to study part of the project execution process. The very rapid development of projects in the last few years forced the Corporation, however, to return projects that it was examining to the client corporations, and to concentrate in the architectural field on the sectors just mentioned. The Corporation is continuing to develop its resources, and is trying to improve its methods by creating technological design institutes, etc.

(b) The National Iron and Steel Corporation has developed production engineering at two levels: a "new projects" department at the El-Hadjar iron and steel complex, which is the Corporation's main development centre, and an engineering department at corporate headquarters. Young Algerian engineers, draughtsmen and architects are included in teams detailed by the foreign partners with which the Corporation has technical assistance contracts. This arrangement has been very effective from the training point of view where the foreign building contractor (generally Soviet or French) is willing to co-operate fully. But obviously the Corporation bears the cost of managing the whole operation in such cases as it benefits from the experience gained by the participants.

Future prospects in the Corporation depend on a number of factors. In the first place, much will depend on the volume of investment. When this was low, the Corporation could meet the engineering needs by calling upon foreign companies for support. This is becoming more difficult with the increased rate of investment, and the problem is to find Algerian participants as well as foreign partners ready and able to join in such arrangements. Secondly, the demands made on the Corporation have increased with greater investment, and the pressure from the production engineers is for wider responsibility to be assumed by the contractor (i.e. towards the "plant-in-production" method) since the engineer wishes to be certain that the plant is completely run in. Thirdly, there are obvious material problems in the arrangement, since the general contractor bears all the costs of project management. Each party may blame mistakes on poor management. This increases the cost of the investment but is undoubtedly useful in providing experience.

2. Turn-key contracts

As noted, the faster rate of investment in 1970-73 led to wider adoption of turn-key contracts, especially of the integral type where the foreign contractor is responsible for all aspects of the project.

(a) Design and planning. As a rule, the contracts make the contractor responsible for all engineering work, and this firm prepares the plans for the building, installations and construction work. There is usually provision for consulting the client company in order to avoid any dispute later, but the time allowed is normally very short, e.g. two weeks, after which "the documents are considered to be approved".

However, some contracts provide for greater participation by the client - for example, a clause providing for "detailed allocation of duties as between client and contractor in regard to planning, construction, supply of equipment, materials and other items". But these are exceptions that may call for more assistance by the Algerian partner than it can provide, since it is resorting to the turn-key formula.

(b) Equipment. Here again, the turn-key formula is very restrictive. Equipment is chosen by the contractor even where the Algerian client (when it is able) asks for a particular process with the corresponding equipment. A contract may run as follows: "The contractor is responsible for the choice of equipment and for ordering the same", or "The contractor is responsible for orders for supplies and equipment and contracting for the work needed for constructing the plant", or "The contractor is responsible for ensuring that schedules for the manufacture of equipment are adhered to, for supervising their manufacture and checking them when received at the plant". However, there are cases where the client has a greater say in these matters, e.g. "The contractor undertakes to facilitate any inspections desired by the owner at suppliers or subcontractors ... Such inspections shall be solely to enable the owner to acquaint himself with the main items of equipment and judge their technical quality". In many cases, the client's consent to the list of subcontractors and suppliers is required where "equipment is not manufactured by the contractor".

Nevertheless, some contracts are more favourable than others in this respect. For example: "The contractor is required to subcontract to Algerian enterprises all manufactures that can be produced locally". Even so, "the contractor may make reservations on technical grounds or on grounds of price and deliveries" - which, in Algerian conditions, is a major obstacle in practice to the potential downstream and upstream effects of the investments, since the contractor can always object on one of these grounds.

Thus, a clause such as this: "Other things being equal (i.e. quantity, price, date of delivery), the contractor undertakes to give preference to Algerian industries and especially to national corporations" simply begs the question. Similarly, a few contracts have provided that "the contractor also undertakes to subcontract to Algerian enterprises a substantial part of the assembly work that can be done with local labour".

Sometimes, but not always, "the client may visit and observe the manufacture of the different items of equipment" or "may assign persons or bodies specialising in the type of operation to supervise the manufacturing process".

(c) Semi-finished and raw materials, spare parts.
As a rule the decision on these is assigned in contracts to the contractor, e.g. "The contractor will prepare lists of the spare parts required for ensuring continuous operation of the plant" or "The contractor will prepare with the proprietor a list of the other spare parts required. The contractor will supply such parts when instructed by the proprietor".

In some contracts there is provision for more integration in the local economy: "The contractor will also supply manufacturing specifications for spare parts that could be produced in Algeria". Generally, this provides scope for the making of new contracts for smaller production units.

As regards supplies of raw or semi-finished materials, the contracts rarely specify that they shall be supplied by the contractor, but the equipment is often so specialised that the materials must inevitably be provided by the contractor.

(d) Transfer of technology. The contractor generally provides the patents, licences and fabrication processes required for the operation of the plant. Thus, "the contractor will provide the client with all technical details, specifications, plans, diagrams and other necessary information". Or, "In the light of its own experience and that of its subcontractors, the contractor will make recommendations giving reasons regarding the anticipated utilisation of the maintenance shop". Or again: "The contractor will hand over to the owner of the plant all technical documents prepared in the planning and building of the plant ... He is bound under the contract to supply a plant that is in conformity with professional standards and international practice in matters of engineering and construction".

Similarly, "the contractor will indemnify the client for any action brought for breach of patent, registered trademark or copyright". Or "the contractor guarantees the proprietor against any third party claim - by the owner of a patent, licence, design, model, trademark or brand name - in respect of the supply of processes or materials. It shall be for the contractor to take all necessary steps to obtain the authorisation of such owners and to pay their royalties or fees".

At the same time, some contracts safeguard the secrecy of industrial processes for a specified period: "For a period of eight-and-a-half years from the effective date of this contract, the proprietor shall not divulge the technical details of the plant or processes without the contractor's prior consent in writing".

(e) Vocational training. This is the weak point in all turn-key contracts, since it has no official status within the provisions relating to the construction and operation of plants, but is mentioned in passing. For example: "The contractor undertakes to require his suppliers to receive representatives

of the client at their factories and offices so as to enable such representatives to become familiar with the equipment and to be present at the main stages of assembly and testing ... The contractor also undertakes to receive trained or trainee personnel of the client, e.g. by including them in joint teams, and to allow them to take part in the starting-up operations". But the contractor is responsible neither for training nor for using such trained personnel in operating the plant.

(f) Starting-up and provisional acceptance. The contracts provide that the contractor shall be responsible for starting up and provisional acceptance. "Normally the starting-up operations are performed by the contractor. He is responsible for starting up, operating and maintaining the plant up to the time of provisional acceptance. Starting up will be done by teams consisting of management and operational personnel provided by the contractor and of personnel of the owner provided by the latter".

From that point onwards, the client is responsible: "As from provisional acceptance, the owner shall be responsible for the running of the plant, and the contractor shall provide technical assistance for such time as is agreed upon, by detachment of skilled personnel to reinforce the owner's personnel and make up operational teams".

(g) Guarantees. The contractor normally provides a guarantee for the period between provisional and final acceptance. Thus: "During the said period, the contractor guarantees the plant and equipment against defects due to bad mechanical design or poor materials, whether these are attributable to the production engineering, to manufacturers or to the enterprise undertaking assembly".

(h) Long-term technical assistance. This is generally very limited. Few turn-key contracts provide for substantial assistance, but the following is an example of a provision: "Assistance in operating the plant will cover a period of not more than five years from the date of provisional acceptance. As the owner's personnel acquire practical experience, he will gradually reduce the assistance required, in a manner to be decided by mutual agreement".

(i) General evaluation of turn-key contracts. The advantages of these contracts have often been listed, the main ones being that they:

- provide a better guarantee of completion dates and of quantitative and qualitative performance;
- make it possible to progress more rapidly in industrialisation without mastering the engineering involved;
- avoid dispersion of effort by the client faced with a large number of suppliers, so that he can concentrate on essential points.

In practice, the experiment with turn-key arrangements has led to some extremely worrying contracts from the point of view of cost and transfer of technology. It is now accepted that they are expensive, do not guarantee production and do not ensure transfer of technology.

In the first place, the excessive cost of projects is supported directly or indirectly by the client.

It is borne directly where the contractor quotes a lump sum for the project. He alone knows and negotiates the prices of the different components of a turn-key plant and these cannot be checked since the contract is for an inclusive figure. He is thus free to inflate the prices, while making all possible savings later. The basic defect of the system is that the client does not participate in price negotiations. He cannot hope that competition will bid down the figures because, with this type of contract, the bid made normally covers all the contractor's expenses in relation to contracts for which he may have bid without success.

In one particular case, it was found that the contractor set very costly safety standards. The safety arrangements and equipment involved increased the cost by an amount in the region of 15 per cent of the whole investment project. There were also very costly increases in regard to civil engineering and building work and for infrastructure that was not at all needed for production. Extra cost is also involved indirectly where the client is required to obtain supplies of semi-finished or raw materials for the factory from the contractor.

In the second place, there is a clear lack of guarantee of production. With a turn-key contract, the contractor undertakes to provide the production unit rather than the product, and there are several factors which are not conducive to smooth operation in the long run.

The client's lack of control over the execution of the project allows the contractor to make all possible savings on the different components. As price is often the deciding factor in negotiations, the contractor will tend to supply cheap equipment when the contract does not specify the equipment. It is rarely possible for the client to prepare a very detailed invitation for tenders since, to do this, he would have to have adequate knowledge of all stages of construction. Even where he can, defects will probably be noted after starting up and often after final acceptance. This takes place on a given date but the tests made are not meaningful because they relate only to quantities and not to quality. Even as regards quantities, tests may not be revealing since the supplier has accurate machines and trained personnel for testing, which are not likely to be available to the client's personnel and when the maintenance unit is not yet operational.

It has also become sadly evident that the guarantee does not necessarily cover all risks. During the guarantee period up to final acceptance, there are penalties for production defects as regards quantity or quality, but there are also penalties for consumption in excess of the norm. But penalties make no sense where the contractor has calculated exact prices and added a comfortable margin. Moreover, if the penalties ceiling is exceeded, the contractor can get away with any mistake and this leads to delay and extra expense. A provision for deduction of 5 to 10 per cent of the value of the contract is not enough to cover the loss actually suffered by the client, especially if (as in Algeria) investments are inter-related and cannot be isolated from the over-all development process once they are begun.

In the third place, the lack of effective transfer of technology is regrettable. The role of the client's company in a turn-key contract is much reduced; it takes no real part at any critical moment in the planning or execution, but is limited to administrative tasks and reporting on progress in different areas of the work. In practice, little experience is gained by the client, as worker training takes place elsewhere under other management. The turn-key operation is thus a chance encounter between two factors of production: the factory itself and the workers. This uncertainty is later penalised by technical and economic problems when production starts.

3. Contracts for plant in production

Apart from the disadvantages of turn-key arrangements, already noted, three factors have operated in favour of this new type of project: the increased pace of investment, the fact that investments were to be made in what were entirely new industries for the investor (mechanical and electrical engineering), or the need to obtain rapidly supplies of intermediate goods required by all sectors (such as cement, caustic soda or concrete bars) in order to avert delays and extra cost for investments generally.

In the following analysis we will consider project planning, the choice of equipment, training, supplies, types of management and long-term technical assistance.

(a) Project planning. As a rule, this is left entirely to the contractor. A common arrangement is as follows: "The contractor is responsible for undertaking all studies needed for implementing the project and constructing the factory, and for the specification, choice and installation of the production plant, equipment and ancillary installations needed for the proper functioning of the factory."

This formula assumes that the client has practically no role in the matter. The foreign firm, being subject to deadlines, generally refuses to associate the purchaser with any of the stages of engineering. True, the Algerian partner may have a say in the choice of production process since it is notified of

progress at the different planning stages. However, the fact that the client takes no direct part in the planning makes it difficult for the Algerian company to seek out local subcontracting possibilities, and this naturally increases the external cost of the operation.

(b) Choice of equipment. The contractor has total freedom of choice, as can be seen from the usual clauses, e.g. "The contractor is responsible for supplying the production equipment, materials and installations, and for assembling, testing and rendering them fully operational ... It is responsible for ordering them ... the list is made up according to the established programme, known technology and existing suppliers and manufacturers."

In most cases the contractor is a general contracting company that can choose the firms that are to supply particular items. The contracting firm will normally give preference to firms in the group to which it belongs, unless this is impossible. It is therefore uncommon for a firm of one nationality to call in an enterprise of another nationality unless they both belong to the same international group.

It should be noted, however, that where the Algerian enterprise has a say in the choice of production process, it also has a say in the choice of supplier where the two are closely related. In some contracts the client also has a say in the choice of suppliers under a clause such as this: "The client has the right to object to the choice of a given subcontractor where he has reasonable grounds for doing so".

As regards the equipment itself, the general provision is that the contractor gives a guarantee that the plan and design meet current technical standards for that type of plant or factory, and that the machinery, equipment and installations are of a recent design, newly constructed and of top quality. Some contracts provide that "the contractor shall inform the client, without charge, of any innovation in the area so that the client can decide whether a change should be made in the current contract".

It is the general policy of Algeria in industrial development matters to give preference to newer techniques. However, unless the client enterprise takes a close interest in the choice of process, it is unlikely to gain acceptance for its view where the contractor prefers, as a matter of precaution, to install equipment that has already stood the test of time, even if this does not altogether meet Algeria's development requirements.

(c) Transfer of "know-how". The possibility of using a particular type of equipment is subject to the constraints of patents or licensing and obtaining the "know-how". The contractor is generally responsible for dealing with the owners of patents, licences, trademarks, brand names, etc., and for paying royalties or other compensation. In addition, "the contracting company undertakes to provide the client with all its knowledge and know-how in relation to the management of the factory and production of the products envisaged". The types of information to be provided are usually listed in the contract. Where the construction of a factory involves more than one contractor, the over-all contractor assembles the information needed for proper use of the plant. It is understood that "all technical documents, including specifications and special rules, conveyed to the client company shall remain in the latter's hands"; otherwise payment becomes necessary.

In practice, the choice of equipment and supply of information only makes sense in relation to the training possessed by the workers who will use the equipment. The novel feature of this type of "contract" is the explicit provision for training by the contractor. A common clause may be as follows: "The contractor undertakes to select personnel, to give them theoretical and practical training and to assign them to work positions ... all types of collaborators needed for the proper operation of the factory will be covered by the training given". To this end, "the contractor will develop training programmes, including periods of complementary training with the firms manufacturing the equipment". Thus, the contractor will "organise and manage the personnel training proper in Algeria and abroad".

Some contracts contain specific indications on local training opportunities; others do not do this. But all contracts normally provide that "the contractor shall train a team of Algerian testing and monitoring personnel, who will become part of the training department when the factory starts operations".

Thus, the contractor is responsible for (i) training all personnel on the factory premises up to the standards of the supplying country; (ii) extending this by setting up a training department.

It should be noted that the training takes place concurrently with the construction of the plant and that action is accordingly taken to ensure that the training is related to the type of equipment installed.

(d) Supplies. The rules governing supplies are an important point in any analysis of the contracts, since they determine how the equipment can be maintained in future.

The subject arises both during construction of the factory and in relation to its subsequent operations. We have seen that, at the former stage, contracts are in principle favourable to Algerian subcontracting, but that the "plant-in-production" formula with deadlines for the contractor makes it less favourable in practice on grounds of delay and price, especially as no control can be exercised over the actual prices negotiated by the contractor.

As regards supplies during plant operation, a common clause is as follows: "The contractor will submit to the client a list of recommended spare parts, indicating unit prices ... The client will provide the contractor with the final detailed list of parts to be supplied under the contract." Naturally, the initial choice is binding for the future where any commitment is given: once a given type of equipment is selected, this will govern the supply of spare parts, raw materials and semi-finished products thereafter.

The latter obviously depend on the type of equipment chosen, and so a dependent commercial relationship is established. However, some contracts reduce this by providing for the supplies

to be produced locally, generally by the client company itself. Thus, there may be a clause stating that "The contractor shall plan for the manufacture of as many subgroups of product as possible even if these are not manufactured by the contractor." Greater integration of the factory of course reduces dependence on foreign assistance but involves greater financial cost.

(e) Management arrangements. Unlike the turn-key contract, the contract for plant in production makes the contractor responsible for organising production and administering the factory. This culminates in the phase of "initial management".

The contractor's responsibility generally covers the following: over-all management of personnel, productivity studies, design and application of safety measures, production management and organisation of maintenance.

Some contracts also provide for a cost-analysis system, while others emphasise marketing: "The contractor will make proposals as to the organisation of after-sales services and will establish such services."

These various responsibilities culminate in a period of "initial management" by the contractor, designed to show how well the factory performs from the economic and technical points of view. This follows "provisional acceptance", signifying that the machinery of the factory and its various departments is functioning correctly.

The aim of the initial management arrangement is "to demonstrate that the factory is capable of carrying out the production programme contracted for ... inter alia, with the Algerian personnel trained for this purpose".

What has to be done is to combine workers and equipment effectively so as to achieve a given level of productivity. The aim is to reach a "cruising speed" of the equipment within a given lapse of time. This is reached when 95 per cent of the programmed production has been achieved continuously for two months.

During the initial management period "the contractor undertakes to appoint and maintain a management staff trained at the contractor's plants", to manage the works and gradually hand over to Algerian management personnel. During the period, all personnel is allocated to the production process under the contractor's supervision "until the Algerian personnel has reached the requisite level of competence".

The client company's responsibility during the period is limited to over-all, non-technical administration of the factory, personnel management and purchasing, financial and sales services. "Final acceptance will take place at the end of the speed-up period with the Algerian personnel trained for the purpose, when the contractor can show that the factory has operated normally at full capacity for two months"; or, in other contracts, "in three shifts to reach 95 per cent of the volume foreseen in the contract". After final acceptance, most contracts provide for long-term technical assistance.

(f) Long-term technical assistance. Two types of long-term technical assistance are generally provided for. One involves the continuing presence of the contractor's employees, and the other is for help to be given from time to time.

The normal clause is as follows: "The contractor undertakes to maintain the staff necessary for maximum output in quantity and quality for a period of two years after final acceptance." This period, which may in some cases be three years, is a kind of additional guarantee, since it means that the contractor will be present for a total of four or five years (including the initial management period) from the time when the plant started up. Finally, most contracts provide also for longer-term technical assistance.

All this should help to develop and improve production. There is usually provision for:

- establishing a quality control system to ensure that standards are maintained or, if need be, improved;
- establishing an equipment maintenance department;
- assistance in preparing the annual production plan;
- the possibility of expanding production on a "sound economic basis" up to double the original figure.

The commonest clause runs as follows: "For a period of five years from the date of final acceptance, the contractor undertakes to provide the client company, at its request, with technical aid, advice and assistance in developing and improving its factories. The contractor will help the client in drafting and finalising the annual production plans assigned to the factory after final acceptance."

(g) A final point in relation to "plant-in-production" contracts is that the whole system is based on two principles that are understood in all the clauses that we have mentioned.

The first is respect for deadlines - precise dates are set for provisional acceptance after technical performance tests, and for final acceptance after attainment of cruising speed with the help of the initial management stage. Failure to meet these dates involves penalties for the contractor. The penalties are, however, usually limited to 5 per cent of the contract price, and this takes away a good deal of their effectiveness in competitive conditions, as will be seen below.

The second principle is that the volume contracted for must be reached. Final acceptance takes place only when the contractor can prove that maximum production of the requisite quality is obtainable with Algerian personnel. In this case also penalties are applicable, which overlap those for lateness.

(h) General comments on "plant-in-production" contracts. Experience with these contracts is too recent for definite conclusions to be reached, so we shall merely make some hypotheses as regards future trends. Two criteria seem appropriate, i.e. effectiveness as regards production, and effectiveness in transferring technology.

On the first point, "plant-in-production" contracts have certain advantages, e.g. a contractual guarantee of full utilisation of production capacity and the possibility of checking the final output and not merely the plant. There is also the contractual guarantee as regards deadlines subject to penalties, though the latter are relatively light.

However, effectiveness as regards production is achieved at a relatively high cost in financial terms, for the following reasons:

- with the constraints imposed by the deadlines, the contractor tends to include a fairly large price margin for subcontracting;
- the contractor tends to make allowance for possible penalty payments in the global contract price, unless the competition in particular circumstances prevents him;
- the construction company being a general contractor, it tends to give preference to suppliers in the same country or group regardless of the prices bid by other firms or countries.

Arrangements are under consideration which would avoid these disadvantages by paying the general contractor only a fixed percentage on the total actual costs. Engineering functions would then be paid for as such.

But even assuming that the "gross price" is the price of development, is there any certainty that technology will be transferred in the sense of enabling Algerians to install, use, copy and later design the same type of equipment? This point needs careful examination.

In the engineering area, the experience gained is fairly limited owing to the nature of the contract. Being tied to deadlines, the contractor is disinclined to accept young Algerians for training in the production engineering techniques involved at each stage.

It is common knowledge that the persons directly engaged in the planning, design and execution of an investment project and those who develop the methods of fabrication know the completed plant better than anyone else. In this respect, it must unfortunately be admitted that the "plant-in-production" formula is ineffective in comparison with the admittedly slower system of Algerian general contractors.

It seems unfortunate that the contracts give the Algerian client enterprise little to do beyond administrative matters arising out of the building of the factory, e.g. obtaining permits, authorisation, import licences, etc. The division

of work under the contract seems unfavourable to the acquisition of technical experience proper. The heads of projects in the national corporations are too often taken up with tasks of administration, even when they have much wider qualifications.

The learning effect obtained when choices of equipment are made is very slight. Now, this kind of knowledge is essential for those who must choose equipment to meet actual conditions in Algeria. Without going so far as to say that there is great flexibility in the choice of techniques for producing a given good, there are nevertheless alternatives which would minimise cost or increase the utilisation of local resources in manpower or natural wealth. A foreign firm cannot be expected to give enough attention to this aspect.

It is difficult to judge the impact on worker training. Where the contractor is required to use Algerian workers in operating the factory after training them for the purpose, he must obviously give them a genuine apprenticeship. A question remains, however, as to whether instruction given for working in a factory is at the same time instruction in the running of a factory, i.e. organised knowledge of the nature of the equipment and processes used, etc. On this point, the experiment of training abroad needs following up.

It is generally agreed that manufacturers (or even users) of equipment to whom workers are sent for training by the contractor are not interested in a transfer of technology.

The Head of the Algerian State clearly indicated his point of view on this when he said: "When the factories paid for at the full price are in operation, they are often found to be deficient as regards design and supplies, with production well below the standards provided by the contractor, in spite of all the service contracts accompanying them. Then, the management personnel that we send abroad are sometimes kept away from those who are the mainspring of industrial activity and development - namely the technical and technological specialists - on the pretext of industrial secrecy. All these things suggest that

some of the industrialised partners constructing some of our factories are inclined to make our technical, financial or technological dependence (or all three together) worse by intentionally prolonging it ..." "They hope in this way to make it difficult or impossible for our industrial goods to compete with those of the developed countries, which thus benefit from all the difficulties facing the developing countries ..."

An official document presented by Algeria contains the following passage: "Experience has shown that the trainees are systematically restricted to narrow technical areas for training in the tasks that are strictly necessary in a simple production operation. In the factories which accept them, they are only admitted to parts of the plant and are kept away from anything that might make them look beyond the simple operation with which they are concerned. As a result .. they only acquire fragments of the technology."

It is clear, moreover, that maintenance of long-term technical assistance is to some extent incompatible with an effective transfer of technology by foreign firms. Where this is so, the ability of firms to hold back technological information ensures more frequent need for help and consequently additional income.

The contract between training about and training for the operations in a factory is even more significant in matters of maintenance. The ability to maintain plant and equipment is a first step on the way to becoming able to reproduce them. The "plant-in-production" contract is not very clear on this point. The contracts provide as a rule for the establishment of a maintenance service, but this is given less attention than it deserves because an efficient service is incompatible with a developing market for spare parts or replacements from the co-operating firm or its associates. Now, the immediate need in Algeria is for maintenance workshops and services within each corporation or group of corporations.

Moreover, suppliers insist on being the sole source of intermediate and semi-finished products - and, in some cases, raw materials. They will only agree to supply the quantities and quality needed for production if the intermediate and semi-finished products are supplied from their works or from works chosen by them. This naturally limits local subcontracting and the industrialisation effect of the contract. The supplies may also give rise to overcharging that is difficult to prove. By and large, subcontracting is very much a matter of chance with these contracts - with the requirements as to deadlines, quantity and quality, the supplier is unwilling to take any risk.

Section 2. Foreign investment in Algeria

This section will consider the extent to which foreign investment contributes to a transfer of technology. In principle, a transfer can take place through two channels: through direct investments made by foreign firms, and through the mixed (Algerian-foreign) companies.

1. Direct investment

The basic principle of Algerian policy is to exclude foreign capital from the vital sectors of capital formation and from holding control over other sectors. Nevertheless, foreign investment occurs either through companies wholly controlled abroad or through joint ventures including private foreign capital.

Thus, out of 258 applications received between 1970 and 1974 by the National Investments Commission for prior authorisation, 122 came from foreign promoters and 72 from Algerian promoters with foreign participation. So the number of foreign firms involved is considerable, even if the value of the investments carried out is not great.

According to a recent inquiry, private firms are still on the whole fairly small: 94.3 per cent of them have less than 100 employees and account for 61.7 per cent of the total employees in the sector; and 5.7 per cent of the private firms have over 100 employees and account for the remaining 38.3 per cent of employees. Most of the firms are small establishments producing consumer goods and located in the large urban centres.

Thanks to the intervention of foreign firms, private enterprise has been very go-ahead in some industries. In food and clothing it is in competition with the public enterprises. In others, particular branches are entirely under private enterprise since the national corporations have not entered the field, e.g. cosmetics, household goods, articles made of plastics. Foreign firms are playing an important part in the development of the private sector in these fields. Out of 12 enterprises questioned in these branches, ten said that they intended to continue investing in view of foreseeable growth in markets.

Technology in the areas in which private enterprise is developing is relatively simple and the processes have long been in the public domain. Most new investment uses a technology that is already widely used elsewhere. In the building and public works industry where the market is very buoyant, the largest firms with the heaviest equipment are foreign, and are gaining ground in the major markets of government spending.

2. Investments in mixed enterprise

These are joint investments by foreign firms in conjunction with Algerian private capital or Algerian public enterprises.

(a) Mixed enterprise involving private Algerian capital.
In this case, the technology brought in by the foreign firms may be in the form of:

- machinery provided or sold to a mixed mechanical engineering company;
- patents or licences and manufacturing processes;

- 24 -
- high-level technical personnel for launching production and long-term technical assistance;
 - regular supply of raw materials.

The inquiries showed that nearly all the private Algerian entrepreneurs were former businessmen with practically no industrial experience. Hence, joint ventures with foreign firms (which are strictly controlled) or simply a long-term technical assistance agreement will enable a private capitalist to transform his savings into productive investment. While the Algerian investor becomes very dependent on his foreign partner, such arrangements are the only way in which he can participate in capital formation in a particular industry. It is the job of the Algerian Government to control such linkages between national and foreign private capital, as soon as it becomes aware of it.

(b) "Hired economy" companies. The development of companies formed by foreign firms and Algerian public enterprises is bound up with the need for greater mastery of technology in all fields.

Since 1966 the number of these companies has grown, with a very sharp increase since 1972, particularly in the hydrocarbons sector where the volume of investment and the wide range of techniques involved in prospection, production, processing and marketing made the use of such mixed-economy companies or partnership arrangements necessary. But the trend is also reflected in other sectors, as can be seen from table 9.

As regards the partnership arrangements with foreign countries, after the nationalisation of petroleum and natural gas, Algeria needed to develop its ability in the fields of prospection and exploitation. The partnership system made it possible to call in experienced foreign companies and to improve the national corporation's ability in these fields through the experience gained.

Similarly, in the mixed-economy arrangement, the foreign partners' insignificant financial contribution compared with the over-all investment shows that access to technology was the motive for their creation. The need for rapid results from investment may also have been the reason for foreign mixed

Table 9. Mixed companies in the public sector

Industry	Foreign partner	Percent of stock held by Algerian company	Main activity	No. of companies
Hydrocarbons	USA: 8, Italy: 6, France: 10	51-80	Prospection, civil engineering, drilling	24
Iron and steel	France: 2	51	Design, plant, construction	2
Building materials	FNG: 1, Switzerland: 1	51 and 75	Engineering and inspection	2
Building and construction	France: 1	51	Engineering and building work	2
Transport	France: 1	51	Design and infrastructure work	1
Engineering design	FNG: 1, Switzerland: 1, Yugoslavia: 1, Britain: 1	51 70	Engineering and execution	4
Mechanical engineering	PRG: 1	75	Machinery and tools	1
Power	Yugoslavia: 1, Spain: 1	75 100	Design and infrastructure work	2

companies in civil engineering, etc. It is difficult to judge the effects of the experiment, as most of the companies are very recent. Certain trends that are appearing should however be mentioned.

The partner company normally tries to profit from the arrangement by steering purchases of capital goods towards the group or parent enterprises to which it belongs - or at least towards the country of origin. As regards transfer of knowledge, the experiment has proved expensive in practice (salaries of staff sent in by the foreign firm, fees for licences or know-how, payment for training assistance, and especially for certain types of occasional aid). This is particularly striking when one finds that the partner receives a substantial payment for operations that have long been standardised.

Finally, it may happen that the foreign partner fails to associate the Algerian personnel regularly with the work in the different operational fields. Nevertheless, there is no doubt that experience is being gained in some areas, e.g. site management, technical problem-solving, training abroad, etc.

A great deal still remains to be done in matters of housing, pay and responsibility bonuses to improve the stability of Algerian personnel in the companies, so that training is a continuing process. It is not desirable that Algerian personnel should be systematically restricted to the company's administrative and financial management areas, while the foreign partner retains a monopoly of the knowledge needed for setting up and operating plants. Vigilance is also appropriate in order to prevent the partner or its affiliates from profiting from short-term business fluctuations.

The mixed-company arrangement has also been used when a building contractor was interested in producing the equipment locally, e.g. in mechanical and electrical engineering. However, the fact remains that the arrangement only leads to a proper transfer of technology if the foreign company has accepted the principle and the Algerian partner keeps a keen watch.

CHAPTER III. THE EFFECTS OF THE TECHNOLOGICAL POLICY

This chapter will consider in turn the effects on technological dependence, on the balance of payments, and on employment and incomes.

Section 1. Technological dependence

A country is technologically dependent when it will for a long time be unable to use, maintain, copy or invent capital goods and the related organisational methods. Its state of dependence is due to lack or shortage of qualified personnel, ranging from those needed for basic research in laboratories to those needed for production jobs in the workshops.

In Algeria, the recent process of capital accumulation has led to expansion and diversification of the pattern of investment, with the result that technological dependence has actually increased through the wider utilisation of equipment and semi-finished goods coming from abroad, increased purchases of manufacturing licences and know-how, greater employment of foreign workers for installing, operating and maintaining the equipment.

Apart from the increased dependence in terms of quantity, there is also a qualitative aspect that must be brought out. Diversification has led to new investments in the fields of electronics, precision engineering and petro-chemicals, in which the technology is of course more difficult to master than in the older industries such as textiles or food products.

The speeding up of investment has actually made the state of dependence more glaring by complicating the decision as to which fields should be mastered first. From January 1974 to June 1975 the total value of contracts made in the industrial sector was 24,000 million, which was equivalent to the whole

investment over the 11-year period from 1963 to 1974. This sudden acceleration forced Algerian enterprises to associate more closely with foreign companies for the supply of equipment and its installation, operation and maintenance. Let us see how the situation looks in the different industries.

There is a high degree of dependence on the Federal Republic of Germany as regards mechanical and electrical engineering: 50 per cent of the contracts were with German firms, which recently made a breakthrough in liquified gas and in iron and steel processes.

More specifically, dependence on the Federal Republic means dependence on a particular firm, DIAG. This firm turns up in all mechanical and electrical engineering projects either as the only partner or as leader in a German group formed to carry out the contract. On the technological plane, for example, DIAG is responsible for constructing a, electronic complex for the manufacture of lighting and household appliances, with seven German licensees and a German subcontractor for the buildings and public works. DIAG is thus becoming the sole channel for the transfer of technology in a very important sector.

In the hydrocarbons sector, the magnitude of the operations excludes any monopoly by one country or firm. France leads with one-third of the contracts, followed by the United States and Great Britain. In processing, France again leads, as it also does for sea transport equipment. In the pipelines subsector, Britain alone is undertaking 50 per cent of the work. But in the liquified gas area, the United States is holding its own and expanding. In the production of fertilizers and plastics, France easily leads the field.

As regards materials, France leads followed by Japan and the Federal Republic of Germany. Japan is improving its position through its competitive prices and the Japanese Government's credit facilities.

In the iron and steel industry, the USSR is the leader with 45 per cent of the total value of the contracts, in a sector where Soviet experience is considerable, i.e. basic metallurgy. Moreover, the USSR provided finance for implementation at a time when the financial tensions were sharp (1971).

It is noticeable in the case of France that a relatively small number of companies play a major role, whether individually or as part of a group. The main contracts are concentrated in the hands of a few companies. Six companies account for 50 per cent of the contracts for industrial plant and 50 per cent of the infrastructure projects, i.e. Creusot-Loire, Krebs, Berliet, Technip, CMIM, Chantiers de l'Atlantique. These companies of course arrange for much subcontracting to be done in France. Twenty-two other companies account for one-third of the industrial equipment contracts and also subcontract for a considerable number of other French firms.

Thus, the large number of French firms involved in Algeria is due to subcontracting. For the construction of a nitrogen fertilizer plant at Annaba, for example, the contract was won by Krebs but this company brought in 22 other firms of which 18 were French. For the ammonia plants at Annaba and Arzew, Creusot-Loire brought in 15 other companies of which 12 were French.

These examples show that implementation of contracts leads to a dense web of technological dependence of which the Algerian partner was not always informed when the contract was made, and which is obviously growing with the negotiation of "plant-in-production" contracts.

The degree of technological dependence can be measured in financial terms, and it is important to identify the cost of imported technology. It is difficult to isolate this as it is often included in the price of the machinery. An attempt can be made, however, by adding the amounts paid for technical assistance (as they appear in the balance of payments) and the salaries transferred from Algeria, while remembering that this total is probably too small as only part of the salaries are paid locally to foreign personnel and not all payments for technology are transferred. The result is shown in table 10.

Table 10. Payments for technical co-operation,
wages and salaries ('000 million dinars)

	1969	1970	1971	1972	1973
Technical co-operation	279	302	436	487	581
Wages and salaries	157	162	173	194	196
Totals	436	464	609	681	777

It can be seen that there has been a substantial increase in the cost of importing technology. This represented a little over 10 per cent of the receipts from exports of goods and services in 1973. The second four-year plan provides for an increase of 114 per cent in payments under this heading.

Section 2. Impact on the balance of payments

The technological policy of Algerian and the involvement of foreign firms have had a considerable effect on the structure of foreign trade by commodity and by country, and on the trend in terms of trade.

1. Impact on imports

The structure of imports by user groups developed as shown in table 11.

A certain "inelasticity" in the pattern of imports can be seen, which is due to the proportion of purchases of raw materials and semi-finished products needed for the production structure built up.

As regards the future, it is generally agreed that, in spite of import substitution possibilities, the increase in investment and consumption and the needs of the production structure must lead to a substantial expansion of the latter. The second four-year plan expects the need for commodity imports to increase (at constant prices) by 120 per cent between 1973 and 1977, while an increase of 140 per cent is anticipated for capital goods and an increase of 150 per cent for raw materials and semi-finished products.

Table 11. Algeria's imports by commodity
(million dinars)

Imports	1971	1972	1973	1974
Food, drink, tobacco	775	1 076	1 323	3 740
Power, lubricants	210	125	139	246
Raw materials and primary products	428	450	481	1 256
Semi-finished products	1 608	1 774	2 422	4 925
Finished products:				
Capital goods	2 264	2 368	3 162	5 560
Consumer goods	743	874	1 447	2 006
Miscellaneous				
Total	6 028	6 694	8 875	17 786

This inelasticity in imports will gradually be reduced as industrial integration progresses, and it is not a danger since the solvency of the country is fully secured.

The technological policy has also led to a significant change in the pattern of imports by country of origin (see table 12).

Table 12. Algeria's imports by origin
(percentages)

Country of origin	1966	1970	1972	1974
France	68.5	42.0	30.2	27.4
Federal Republic of Germany	2.0	10.0	12.9	13.3
Italy	2.0	7.0	10.3	8.5
United States	3.0	8.0	7.0	9.9
Japan	1.0	1.0	2.4	4.1
Other socialist countries of Europe	2.0	6.5	6.4	5.6

Table 13 shows the growing role of the countries that made their technological entry into Algeria at the time of the increase in the total value of contracts discussed earlier and the relative decline of France and the socialist countries.

The trend is even more evident if we consider more specifically the changes in the shares of Algeria's partners in the value of the contracts made in recent years. France's share declined gradually - from 60 per cent of contracts between 1962 and 1966, to 45 per cent during the first plan, to 12.7 per cent during the second four-year plan (owing to the Franco-Algerian oil crisis), and finally to 35 per cent from 1974. From 1969 to 1972, diversification developed, with Italy, the Federal Republic of Germany, the United States and Great Britain advancing to much the same extent. From the latter year, the Federal Republic of Germany made a leap forward (to 21 per cent of all contracts during the last 18 months), followed by the United States (8.4 per cent) and Italy (12.3 per cent). Moreover, diversification is increasing with the larger number of projects in a given industry.

In iron and steel, for example, the number of partners rose from three in 1965 to 13 in 1975. The near-monopoly of the Federal Republic of Germany in the electrical equipment industry was challenged in 1974 by a new entry of American firms. France progressively lost its monopoly in building materials.

The relatively small and declining part played by the socialist countries is also apparent. This moved from 30.4 per cent between 1962 and 1966, to 10 per cent during the first plan, to 18.1 per cent during the second four-year plan, and to 1.4 per cent during the last 18 months.

The role of the western European countries is still preponderant: 67 per cent of all contracts for France, the Federal Republic of Germany, Italy and Great Britain. The United States, the USSR and Japan each accounted for between 10.1 and 5 per cent of the contracts.

Table 3. Volume of contracts (in million dollars)

If one analyses the effect of prices at the balance of trade level, an interesting fact emerges, i.e. that the closer links between Algeria and certain technologically advanced countries is forcing her to obtain supplies from a zone of increasingly high inflation (as shown in table 14).

Table 14. Growth in cost of imports

Increase in cost of imports in 1969-72	Increase due to price rises	Increase due to volume
l 712.5	300	912.20
100%	46%	54%

A detailed breakdown shows even more clearly that the greatest annual rise in prices was for capital goods (see table 15).

Table 15. Percentage average annual rise in prices, 1969-72

Consumer goods	Intermediate goods	Capital goods
7.1%	5.3%	7.2%

More recent and probably more reliable calculations give the results shown in table 16. These figures show how the inelasticity of Algeria's imports has obliged it to face the full force of world inflation, and how much justification it had for its action on the petroleum front because of this.

Apart from the inelasticity of imports, the way in which investment projects are carried out makes it easier for foreign firms to adopt administered prices. At one tractor plant, 44 per cent of the total value of purchases related to mechanical and electrical elements that were mostly bought from the licensing company. It may be wondered whether this high percentage was not due to the high prices set by the firm.

Table 16. Inflation imported by Algeria

From all countries			From OECD countries		
1973/72	1974/73	1975/74	1	2	3
110	136.8	121.5	109.6	132	117.7

1 = Consumer goods. 2 = Intermediate goods.

3 = Capital goods.

2. Financial effects

Owing to the foreign exchange content in the equipment chosen and the raw and semi-finished materials needed in using the equipment, the technological policy involves large-scale recourse to foreign financing, at the same time changing the geographical pattern of indebtedness and the types of equipment involved.

Owing to the technology used and the involvement of foreign enterprise, large amounts of foreign exchange are needed for the execution of investment projects and for the running of the factories set up. Tables 17 to 20 are revealing in this respect.

Table 17. Impact of expenditure on technology

Reading	Per cent	Impact disregarding building and construction work inputs		Impact including estimated building and construction work inputs	
		Algeria	Foreign	Algeria	Foreign
Design and engineering	10	5	7	2	9
Construction work and building	40	32	3	20	20
Equipment	31	3	28	2	29
Tool stock	4.5	2	2.5	2	2.5
Training and technical assistance	7.5	2	5.5	2	5.5
Other	7	5	4	5	4
Totals	100	45	55	51	69

Table 18. Percentage of imported intermediate products

State corporation	1970	1971
SNS	61.6	58
SONACOME	70.9	61
EPA	53.9	62
CINTA	65.0	47
SNIB	100.0	37
SONITEX	91.0	99

As regards the running of the factories, the position is hardly encouraging, as can be seen from table 18 which shows the trend in the proportion of imports in the total quantities of intermediate products used by the factories.

More recently, the trend has probably been reinforced by the increased investment and the scarcity of domestic producers or suppliers of semi-finished materials, though there have been definite improvements in some sectors, such as hydrocarbons, where the trend has been somewhat reversed.

In view of other import requirements and the magnitude of the investment programme, the foreign share of total investment in public enterprises moved during the first plan as shown in table 19.

Table 19. Breakdown of financing of investments planned by public enterprises (per cent)

Type of credit	1970	1971	1972	1973	Total
Long-term	74.5	47.8	41.4	47.6	51
Medium-term	10.0	25.2	33.3	28.4	26
Foreign	15.5	27.0	25.5	34.0	23

It can be seen that 51 per cent of the finance was provided by long-term credits allocated by the Development Aid Bank from funds made available by the Treasury, that 26 per cent were medium-term credits allocated by the regular banks from 1971 onwards, and that 23 per cent were credits from abroad obtained by the banks or foreign companies.

During the period there was an increase in the proportion of foreign credits, which became more marked from 1974 onwards, particularly in the hydrocarbons sector where there is large-scale and growing investment. The movement of investment in this sector is shown in table 20.

Table 20. Financing of investment in the hydrocarbons sector

	1974	1975	1976 (forecast)
Domestic credits	41.2	59.4	60
Brought in by foreign partner firms	1.3	0.7	1.7
Suppliers' and purchasers' credits	22.3	26.3	19.5
Other foreign loans	35.2	35.6	18.8

Table 20 brings out (i) the very small size of the share of foreign partner companies in total financing, which confirms the hypothesis that their help is primarily in the field of technology; (ii) the relatively high proportion of foreign financing (about 40 per cent), due to the scale of investment and the ability of the sector to attract foreign funds in view of its solvency.

This brings us to an important point, i.e. that the choice of partner in matters of technology may be affected by financial considerations. Algeria needs credit facilities - often for large investment projects - which most countries cannot provide even if they are able to supply the equipment required. Similarly, the fact that some countries which are large buyers of gas and petroleum carry out the prospection makes them almost automatically partners.

Taken together, these movements affect the level and composition of foreign indebtedness. As of 31 December 1973 the total outstanding was estimated at \$3,200 million or 12,000 million dinars; this included \$1,200 million for suppliers, \$1,100 million

on bank loans and \$900,000 on official loans. The outstanding indebtedness is expected to rise to \$8,000 million or \$9,000 million in 1980. Debt servicing payments would in that case rise from 11.3 per cent in 1973 to 18 or 19 per cent in 1980.

Section 3. Impact on employment and incomes

(A) Employment

It is difficult to limit the analysis of the human effects of technological policy to the strictly economic field, since every technological policy represents a choice of a productivity function for the society as a whole. If one analyses the human effects, one is in fact expressing an opinion on the social productivity function chosen and on the corresponding type of civilisation. We shall merely attempt to identify some immediate human effects without expressing any opinion on the long-term effects.

Without taking sides in the useless debate on the choices of technology for underdeveloped countries - which disregards the problems of sectoral choice, nature of economic power and the gap between the short term and the long term - we will simply recall that Algeria's chosen policy, sensible as it may be, poses problems of reducing short-term unemployment that are made worse by the involvement of foreign firms.

The present structure of investment is obviously unfavourable to large-scale employment creation in proportion to the growth in the manpower supply. Moreover, this structure leads to regional pockets of unemployment side by side with areas of overemployment. There are also surpluses of labour with certain skills and shortages of others.

The presence of foreign firms for the execution of investment projects, directly or through mixed companies, is certainly making this phenomenon - one that is inherent in the chosen development strategy - more extensive.

When projects are carried out under "turn-key" or "plant-in-production" arrangements, the foreign companies do not explore all possibilities of using local manpower directly or through subcontracting in Algeria, in spite of the very specific provisions for such subcontracting in the contracts. Working to deadlines but also looking for maximum profit, the foreign companies make little effort to concentrate in Algeria the employment effects induced by their operations. The clauses on subcontracting lay down conditions as to price and delivery date which in practice hinder participation by local enterprise. In some cases, the only reason given for using foreign personnel is that this will enable the foreign firm to form homogeneous teams, which of course holds back the learning process on the Algerian side.

(B) Impact on income distribution

The technological policy and the use of foreign enterprises to carry out investment projects - and sometimes to operate the plant - interact to push the incomes pattern in a direction which, while it is inevitable in the short term, will call for corrective action in the middle term if its bad effects are to be prevented.

1. Pattern of wage incomes

This pattern is affected by the technological policy through the changed distribution of skills that the latter requires, the presence of foreign workers in Algeria and the change in the structure of payrolls.

(a) Distribution of skill levels. The techniques used have forced Algerian enterprises to recruit more highly skilled workers and to establish training programmes to produce others. Tables 21 and 22 show that between 1966 and 1973:

- (i) The proportion of totally unskilled employees in the public sector declined considerably, but increased substantially in the private sector, indicating the extent of activity requiring much unskilled labour in the latter.

Table 21. Distribution of skill levels - public sector

Level	30.4.68		30.4.69		30.4.70		30.4.71	
	No.	%	No.	%	No.	%	No.	%
I. Unskilled	44 112	34.3	39 509	28.4	57 736	32.1	43 480	27.0
II. Semi-skilled	27 779	21.6	31 301	22.5	31 656	17.5	34 300	21.3
III. Skilled	44 369	34.5	60 516	43.5	76 442	42.5	71 916	44.1
IV. Foremen and junior staff	7 974	6.2	5 008	3.6	9 722	5.4	7 406	4.6
V. Managerial staff	4 373	3.4	2 782	2.0	4 317	2.4	4 831	3.0
Total	128 607	100.0	139 116	100.0	179 863	100.0	161 035	100.0

Level	30.4.72		30.4.73	
	No.	%	No.	%
I. Unskilled	50 765	26.4	56 916	24.2
II. Semi-skilled	40 323	22.3	52 054	22.1
III. Skilled	56 438	29.4	74 322	31.6
IV. Highly skilled personnel	22 490	11.7	25 894	11.0
V. Foremen and junior staff	14 526	7.4	16 632	7.1
VI. Managerial and higher technical	7 334	3.8	9 186	3.9
Total	192 276	100.0	234 984	100.0

Source: Enquête sur l'emploi et les salaires, 1968-73.

N.B.: Level III from 1968 to 1971 = levels III + IV in 1972 and 1973.

Table 22. Distribution of skill levels - private sector

Level	30.4.68		30.4.69		30.4.70		30.4.71	
	No.	%	No.	%	No.	%	No.	%
I. Unskilled	26 462	31.1	31 951	35.6	40 981	38.8	54 115	36.8
II. Semi-skilled	16 975	20.0	20 118	22.4	21 821	20.7	31 242	20.9
III. Skilled	32 269	38.0	31 659	35.3	36 739	34.8	55 458	37.1
IV. Foremen and junior staff	5 031	5.9	3 581	4.0	3 525	3.3	4 933	3.3
V. Managerial staff	4 291	5.0	2 447	2.7	2 517	2.4	3 737	2.5
Total	85 028	100.0	89 756	100.0	105 583	100.0	149 483	100.0

Level	30.4.72		30.4.73	
	No.	%	No.	%
I. Unskilled	57 583	37.9	63 018	40.2
II. Semi-skilled	30 881	20.3	27 730	17.7
III. Skilled	49 047	26.3	42 868	27.4
IV. Highly skilled	15 756	10.4	15 091	9.6
V. Foremen and junior staff	4 213	2.8	4 300	2.7
VI. Managerial and senior technical	3 608	2.4	3 594	2.3
Total	152 105	100.0	156 601	100.0

Source: Enquête sur l'emploi et les salaires, 1968-73.

NB: Level III from 1968 to 1971 = Levels III + IV in 1972 and 1973.

Table 24. Public sector payroll

(MS = No. of jobs by skill level x monthly wages)

Level		30 April 1972		30 April 1973		
	MS (dinars)	% (dinars)	MS (dinars)	% (dinars)	MS (dinars)	
I. Unskilled	26 926	22.9	21 088	18.3	26 855	17.9
II. Semi-skilled	18 424	14.6	20 889	19.1	24 677	16.4
III. Skilled	60 007	47.6	56 193	48.7	65 702	43.7
IV. Foremen and junior staff	10 722	8.5	8 667	7.5	19 254	12.8
V. Managerial	8 077	6.4	8 396	7.3	13 847	9.2
Total	126 156	100.0	115 143	100.0	150 335	100.0
30 April 1972						
Level	No. of jobs	% of jobs	Average MS monthly	% of jobs	Average salary monthly	
I. Unskilled	50 765	26.4	529	26.55	17.9	
II. Semi-skilled	40 923	21.3	603	24.67	16.4	
III. Skilled	56 438	29.4	782	44.13	22.1	
IV. Highly skilled	22 490	11.7	259	21.56	14.3	
V. Foremen and junior staff	14 326	7.4	1 344	19.25	12.6	
VI. Managerial and senior technical	7 334	3.6	1 038	13.84	9.2	
Total	192 276	100.0	895	150 335	100.0	
30 April 1973						
Level	No. of jobs	% of jobs	Average MS monthly	% of jobs	Average salary monthly	
I. Unskilled	50 765	26.4	529	26.55	16.5	
II. Semi-skilled	40 923	21.3	603	24.67	18.3	
III. Skilled	56 438	29.4	782	44.13	31.2	
IV. Highly skilled	22 490	11.7	259	21.56	25.57	
V. Foremen and junior staff	14 326	7.4	1 344	19.25	11.4	
VI. Managerial and senior technical	7 334	3.6	1 038	13.84	9.3	
Total	192 276	100.0	895	150 335	100.0	

(MS = No. of jobs by skill level & monthly wages)

Level	MS (dinars)	% (dinars)	MS (dinars)	% (dinars)	MS (diners)	% (diners)	MS (diners)	% (diners)
I. Unskilled	24 507	26.3	35 011	25.1	36 741	28.9	33 337	26.6
II. Semi-skilled	18 002	19.4	25 119	18.0	21 740	17.1	18 995	15.2
III. Skilled	40 356	43.2	61 503	44.1	54 777	43.1	58 434	46.7
IV. Foremen and junior staff	5 154	5.5	8 726	6.2	6 804	5.4	7 112	5.7
V. Managerial representatives	5 193	5.6	9 203	6.6	7 075	5.6	7 271	5.8
Total	93 014	100.0	139 567	100.0	127 137	100.0	125 149	100.0

Level	No. of jobs	% of jobs	Average salary monthly	MS monthly	No. of jobs	% of jobs	Average salary monthly	MS monthly
I. Unskilled	57 588	37.9	638	36 741	28.9	63 018	40.2	529
II. Semi-skilled	30 881	20.3	704	21 740	17.1	27 730	17.7	685
III. Skilled	40 947	26.3	904	56 202	28.4	42 868	27.4	928
IV. Highly skilled	15 768	10.4	178	18 575	14.6	15 691	9.6	136
V. Foremen and junior staff	4 913	2.8	615	6 804	5.4	4 300	2.7	654
VI. Managerial and senior technical	3 608	2.4	3 61	7 075	5.6	3 524	2.3	2 023
Total	132 105	100.0	101.1	127 137	100.0	156 601	100.0	125 149

- (ii) The proportion of skilled and highly skilled employees rose in the public sector (from 34.4 to 42.6 per cent) and fell in the private sector, so confirming the trend.
- (iii) The number of foremen, junior salaried staff and managerial staff increased noticeably in the public sector (from 9.6 to 11 per cent). In the private sector the number fell (from 10.9 to 5 per cent) but this partly reflects the nationalisation process, which affected the private sector during the period and led to a transfer of the more "technical" branches of industry to the public sector.

The over-all trend towards higher skill levels has been accompanied in Algeria by a growing number of foreign workers with skills naturally above the average level. The number of these is given in percentages in table 25, and the distribution of managerial and technical staff by industry in table 26.

Table 25. Foreign workers - distribution of skill levels, 1973 (per cent)

Managerial and senior technical	Technicians and foremen	Supervisors	Skilled	Semi-skilled	Unskilled
56.5	21.5	9.4	9.4	1.5	1.5

Table 26. Sectoral distribution of managerial and senior technical staff (per cent)

Hydrocarbons	Iron and steel	Metal processing	Building and construction
20.5	5.4	8.5	24.9

Table 26 indicates a high concentration of highly qualified foreign personnel in the rapid growth sectors using high-level technology.

(b) Trend in the structure of payrolls. A few comments should be made on tables 23 and 24, showing the trend in the structure of payrolls in the public and the private sectors:

- (i) In 1970, unskilled workers accounted for 22.9 per cent of the total payroll in the public sector but 32.1 per cent of the public sector's workforce. In the private sector they accounted for 26.3 per cent of the payroll but 31.1 per cent of the workforce. In 1973 the differences became greater: in the public sector they accounted for 24.2 per cent of the workforce but only 16.5 per cent of the payroll, and in the private sector 40.2 per cent of the workforce but only 26.6 per cent of the payroll.
- (ii) On the other hand, skilled and highly skilled workers improved their relative position in each of the two sectors.
- (iii) The position of foremen, junior salaried and managerial staff improved considerably in both sectors. In the public sector they accounted in 1970 for 7.8 per cent of the workforce and 14.9 per cent of the payroll, while in 1973 they accounted for 11 per cent of the workforce and 20.7 per cent of the payroll. In the private sector they accounted in 1970 for 5.7 per cent of the workforce and 11.7 per cent of the payroll, while in 1973 they accounted for 5 per cent of the workforce and 11.5 per cent of the payroll.

Overall, the position for all sectors in 1973 was as indicated in table 27.

Table 27. Workforce and total payroll

Level	Per cent of workforce	Per cent of payroll
Unskilled	30.5	20.4
Skilled or highly skilled	40.4	45.3
Junior salaried and managerial staff	8.6	17.0

The position shown in table 27 is due to the fact that the annual growth rate in wages for skilled workers and salaried staff has been greater than for less skilled or unskilled workers.

It should also be noted that the scarcity of skilled labour in conjunction with the technologies chosen led to a certain amount of competition between enterprises in recruiting needed personnel, with resultant disparities between industries in wages for the same skill level.

The effects of the relative concentration of wage incomes are difficult to analyse at the present stage. It may be that they reflect a pattern of consumption and tastes that are incompatible with the requirements of austerity and the selective goals of investment. The disparity between wages for a given skill level makes for greater turnover of labour and a consequent reduction in the acquisition of technological knowledge at all levels.

Lastly, there is the concentration induced by the presence of foreign workers. In 1975, these made up 1.9 per cent of the workforce in the cities, but 11 per cent of the total payroll. As we have seen, part of these earnings are exported although received in Algeria, and this sets a standard of comparison that is conducive to attitudes and behaviour incompatible with austerity.

2. Pattern of non-wage incomes

The involvement of foreign firms is changing the pattern of non-wage incomes in two ways, in both cases in an upward direction:

- (i) Directly, where a foreign firm appropriates income in Algeria when helping to carry out investment projects or to operate the plants, or where a foreign firm by introducing technologies increases the incomes of private Algerian companies.
- (ii) Indirectly, the firms increase non-wage incomes when they develop subcontracting in Algeria and private Algerian firms are able to obtain short-run profit from the increased demand.

CONCLUSIONS

It is difficult to spell out all the over-all development implications of resources to foreign firms for technology. There are two effects from this to which attention should perhaps be drawn so that they can be corrected before it is too late.

In the first place, it must not be forgotten that Algeria's planning requires a subordination of the logic of the enterprise to the logic of the State and of development. This means that the close relations between a public enterprise and its foreign partners must not be allowed to encourage the latter to develop their own logic of investment, production and marketing to the detriment of the objectives laid down by the State for the sector in question. Algeria's development is not compatible with any system of pressure from abroad.

In the second place, the choice of techniques implies, as noted, a certain degree of concentration of incomes owing to the present shortage of skilled workers and local subcontracting enterprises, and this concentration in turn implies a certain kind of consumption model and demand orientation unless high incomes are drained off by an active savings policy. In this even production itself is turned towards the durable consumer goods sector in which the technology is very difficult to master. Similarly, the structure of investment would be adversely affected. Lastly, visits abroad for training may encourage workers to imitate foreign consumption models and to look for higher incomes comparable with those of workers in developed countries.

In short, all consumption of the products of technology is a form of dependence. This dependence must be reduced by home production of technology. As it cannot be done in all directions at once, there is a need to choose. Two complementary criteria, one negative and the other positive, can be used in doing this.

First, it is useless to try to master the technologies in the mass export sectors, since capital formation in these sectors is mainly intended to produce means of financing and is consequently transitory in character. It is also useless, or at least not urgent, to master the technologies in the sectors manufacturing goods liable to rapid obsolescence, since the speed of technological change is likely to render the process of acquiring knowledge too discontinuous.

Second, and this is the converse of the foregoing criterion, the technologies must be mastered in the sectors where investment is repeatable and domestic production can continue to expand without being dependent on the ups and downs of foreign markets. Hence, the choice of a production function at a preferred level of technology is the result of the choice of a long-term social consumption function. In view of this, Algeria will concentrate on developing its engineering skills, training workers for the different levels, and choosing partners that accept progressive control by Algeria of its own technology, without imposing restrictions to obtain new sources of profit.

Hence, choice is essential as regards the partners. These will have to agree to investment projects being carried out under a contract for services, with participation of local engineering bodies at the earliest stage. This is an extremely important matter for Algeria, as its industrialisation is intended to create a capital goods and intermediate products sector. Such industry in conjunction with availability of local engineering competence will be the best means of producing its own technology, which is an essential condition for economic independence in the long run.



COMPENDIUM OF WORKING PAPERS
ON MULTINATIONAL FIRMS
(WEP 2-28)

WP 1

Yves Sabolo and Raúl Trajtenberg

THE IMPACT OF MULTINATIONAL FIRMS ON EMPLOYMENT AND INCOMES IN THE DEVELOPING COUNTRIES - METHODOLOGICAL NOTE

WP 2

Record of the FIRST MEETING OF THE STEERING GROUP (14 and 15 February 1975)

WP 3

Yves Sabolo

QUELQUES REFLEXIONS SUR LES INVESTISSEMENTS PRIVES ETRANGERS ET LE DEVELOPPEMENT ECONOMIQUE ET SOCIAL DU GABON (under revision)

WP 4

L.G. Franko

MULTINATIONAL ENTERPRISE, THE INTERNATIONAL DIVISION OF LABOUR IN MANUFACTURES, AND THE DEVELOPING COUNTRIES

WP 5

Charles-Albert Michalet

LES FIRMES MULTINATIONALES ET LA NOUVELLE DIVISION INTERNATIONALE DU TRAVAIL

WP 6

Y. Sabolo and R. Trajtenberg, in collaboration with J.P. Sejkau
THE IMPACT OF TRANSNATIONAL ENTERPRISES ON EMPLOYMENT IN THE DEVELOPING COUNTRIES - Preliminary results

WP 7

Juan V. Sourrouille

EL IMPACTO DE LAS EMPRESAS TRANSNACIONALES SOBRE EL EMPLEO Y LOS INGRESOS: EL CASO DE ARGENTINA

WP 8

Norman Girvan

THE IMPACT OF MULTINATIONAL ENTERPRISES ON EMPLOYMENT AND INCOME IN JAMAICA - Preliminary Report

WP 9

Bernard Founou-Tchuiogoua

THE IMPACT OF MULTINATIONAL FIRMS ON EMPLOYMENT AND INCOMES: A CASE STUDY OF PHOSPHATES IN SENEGLAL

WP 10

A . Benachenhou

FOREIGN FIRMS AND THE TRANSFER OF TECHNOLOGY TO THE ALGERIAN ECONOMY

WP 11

C.V. Vaitasos

EMPLOYMENT PROBLEMS AND TRANSNATIONAL ENTERPRISES IN DEVELOPING COUNTRIES: DISTORTIONS AND INEQUALITY (with particular reference to Andean Pact countries)

WP 12

Sung-Hwan Jo

THE IMPACT OF MULTINATIONAL FIRMS ON EMPLOYMENT AND INCOMES: THE CASE STUDY OF SOUTH KOREA

WP 13

Víctor Manuel Bernal Sahagún con la colaboración de Angelina Gutiérrez Arriola y Bernardo Olmedo Carranza

EL IMPACTO DE LAS EMPRESAS MULTINACIONALES EN EL EMPLEO Y LOS INGRESOS: EL CASO DE MEXICO

UNESCWA LIBRARY



20006077