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REPORT
ON THE EXPLORATORY MISSION
TO THE
UNITED STATES OF MEXICO
ON PROGRAMMING THE DEVELOPMENT
OF THE CAPITAL GOODS INDUSTRY
(16 August - 2 September 1970)

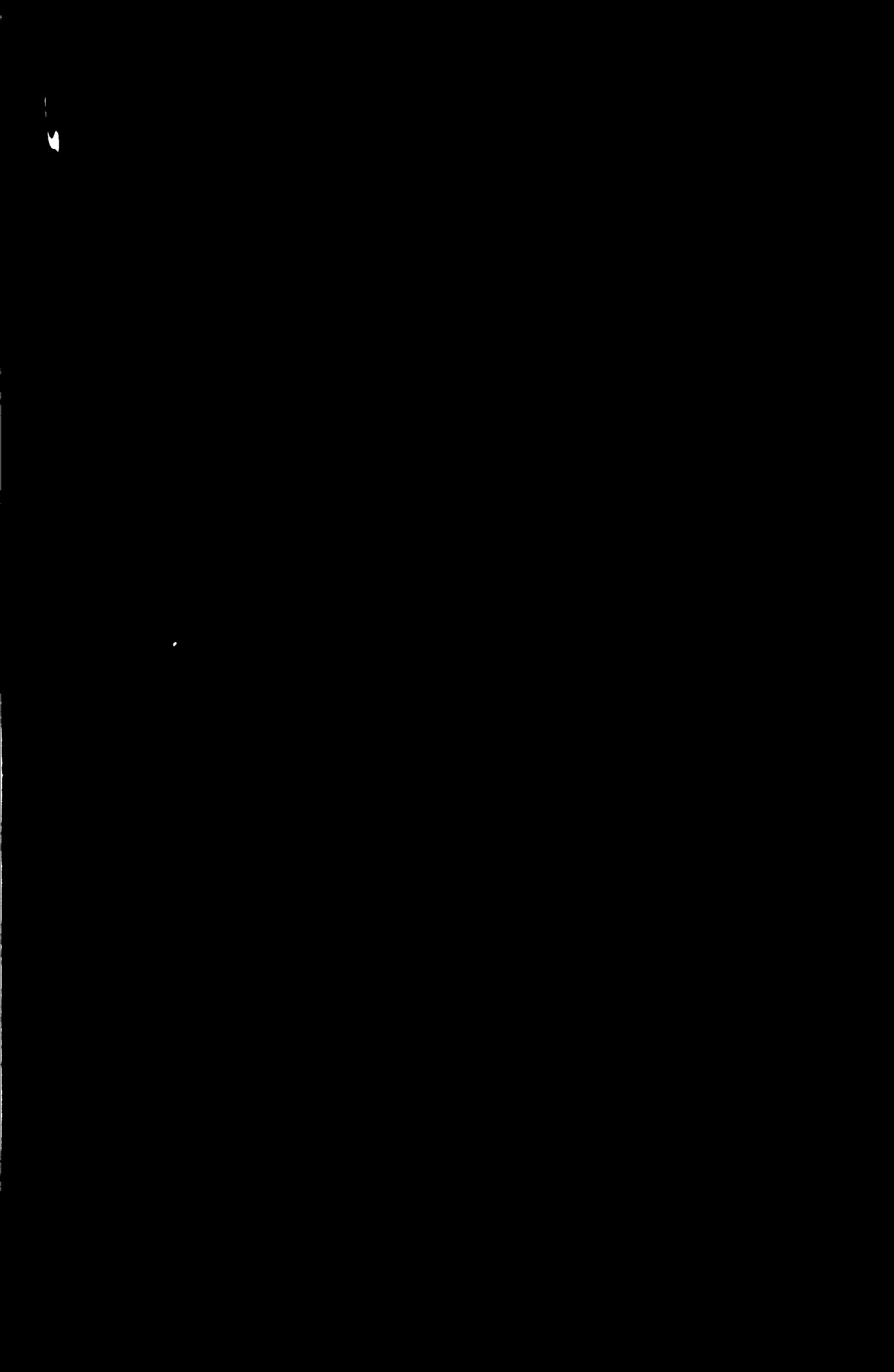


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INTRODUCTION

1. The Government of Mexico requested the United Nations Industrial Development Organisation (UNIDO) to assist Nacional Financiera, S.A., the Government's industrial development bank in programming the development of the capital goods sector with a view to improving the country's industrial structure and its balance of payments in terms of both export promotion and import substitution. For the purpose of the project, the capital goods sector was defined by the Government to cover the production of both electrical and non-electrical machinery, equipment and apparatus (excluding the manufacture of transport equipment)

2. In accordance with the Government's request, a short-term exploratory mission was sent to Mexico by UNIDO under the Special Industrial Services Programme. The terms of reference for the mission were defined as follows:

- (a) To consult with responsible authorities on the most effective ways of assessing technological needs and potential role of the capital goods sector in improving the country's industrial structure and its balance of payments in terms of both export promotion and import substitution, and
- (b) On the basis of these consultations, to assist the Government in the formulation of a request for a long-range technical assistance project and in setting out its required scope and components.

3. The mission was composed of the following members:

Jaroslav Schejbal, Export Industries Section,
Industrial Policies and Programming Division, UNIDO.

Herman Muegge, Industrial Programming Section,
Industrial Policies and Programming Division, UNIDO.

Ronald G. Anderson, Engineering Consultant to the
Engineering Section, Technological Division, UNIDO.

4. During its stay in Mexico, the mission held discussions with Government officials and representatives of various institutions active in the field of industrial development and foreign trade. The mission also visited a number of industrial plants in the capital goods sector as well as in the iron and steel sector. Finally, the mission reviewed

various studies previously prepared for two branches of the capital goods industry. A list of the persons and plants visited appears in Annex I. A list of studies on the above mentioned branches of the capital goods sector as well as of other relevant documentation material is presented in Annex 2.

5. The mission wishes to express its sincere gratitude to the Government and other officials for the most useful information and orientation given by them. It is on the basis of these discussions that the mission was able to formulate the recommendations contained in the last chapters of this report.

6. The mission is especially grateful to Lic. Gerardo H. Bueno, Manager, Industrial Programming Division of Nacional Financiera, and to Ing. Hector Castro Ulloa, Deputy Manager of the same Division, who acted as Government counterparts to the mission. Consultations and continuous working contacts with them as well as with other staff of the Division made it possible to accomplish the tasks of the mission in the short period of time allocated.

7. The mission would also like to express its gratitude for the overall orientation given and support extended by the UNDP Resident Representative in Mexico Dr. Flores Zorrilla and the Deputy Resident Representative Mr. Juan Ribó-Cebrián.

8. Broad outline of the UNIDO/Nacional Financiera project for the Mexican capital goods sector was also discussed with Lic. David Ibarra, Director, UCLA office in Mexico and the mission is grateful for the comments it received from him.

9. Consultations prior to the arrival of the mission to Mexico were held in New York. The mission wishes to express its thanks for the comments made by Mr. A. Aisenstat, Director, UNIDO Liaison Office in New York and by Prof. T. Victorias and Mr. R. Liszak who worked in Mexico on a related assignment by the IIRD. The mission is also indebted to Mr. K. Vyasulu, former UNIDO Field Adviser in Mexico for the preparatory work carried out by him prior to the mission's arrival to Mexico.

I BACKGROUND

10. Planning for the development of capital goods industries represents a rather complex process due to their extensive linkages with other sectors of the economy. The principle forward linkage is the demand for investment goods; the main backward linkage is basic metals, especially iron and steel sector. The development of the capital goods sector must be seen in the framework of the economic structure as a whole, in its relationship to the external sector and within the framework of respective industrial policies. The present chapter is therefore intended to give basic background information on broader environments of the capital goods sector in Mexico.

1. Past development and present situation of manufacturing industry in Mexico

11. The Mexican economy has experienced a considerable growth during the post war period. In the period 1951-1958 GDP increased at an average annual growth rate of 13.8 % (nominal). The growth rate in the years 1959-1967 was 10.4 %. In 1967 GDP reached a level of 301 billion pesos (about 324 billion) at current prices.

12. The growth of the Mexican economy was accompanied by a substantial increase in population as well as in prices. The average population growth was 3.2 % per annum for 1951-1958 and rose to 3.4 % in the period 1959-1967 (see also table 1). The prices showed considerable increases (8 %) during the period 1950-1957. This period of inflation was followed by a period of stabilisation 1957-1962 during which the yearly increase was 3.9 %. In a period of relative stability 1962-1969 prices went up by 3.4 % yearly. As a result of these price movements, GDP at fixed prices (1960) increased by 5.6 % yearly in 1951-1958 while in the period 1959-1967 a high growth rate of 6.5 % was achieved. However, taking into account the rapid population growth, the (per capita) rates were considerably lower. The rates of growth of per capita GDP in real terms for the two periods were 2.3 % and 3.0 % (see also table 2).

13. The following table on aggregate supply and demand is calculated on the basis of 1960 prices:

	1950	1969
<u>Supply</u>	100	100
GDP	39	90
Imports	11	10
<u>Demand</u>	100	100
Consumption	75	72
Investment	14	19
Exports	11	9

Source: Nacional Financiera

14. The most striking element is the increase in the share of investment from 14 to 19 per cent. The level thus achieved can be considered high by international standards. The role of exports for expansion of demand is more limited and decreased further during the period. The domestic demand was thus the dominant growth factor. The relative decrease in imports is the rather moderate net result of pursued import substitution on the one hand and of increased payments to abroad on the other hand in the form of royalties, interest payments etc. as well as Mexican tourist expenditure abroad.

15. The structural changes of GDP can be seen in Table 1. It shows that in the period 1950-1967 the industry sector had the highest growth (7.0 %). The economic production structure changed accordingly. Thus the industry's share in the total GDP increased from 27 % to 32 % while the agriculture share sank to 13 %. Of all three periods, the period 1962-1967 is marked by the highest growth of GDP and industrial production. In an attempt to list some of the main factors of growth in the last period, one could mention the high investment share, the maintaining of a high domestic demand due to a consequent policy of import substitution and the relative price stability. Also the importance of large external financing (the external debt increased from pesos 250 million in 1950 to approximately 3,000 million in 1970), substantial improvements in infrastructure (irrigated land, rural roads, electric power) and the supply from the agricultural sector should be stressed.

16. As was already mentioned, the industry sector was the most dynamic one in the economy. Within this sector the following branches had the highest growth rates (1950-1967):

(a) Yearly average growth rates over 15 %.

basic petrochemicals
fertilisers and insecticides
synthetic fibres

(b) Yearly average growth rates between 10 % and 15 %:

rubber
basic metals
motor vehicles
electric appliances
transport equipment.

17. None of these branches, however, has any substantial share in the total production structure. The greatest shares (over 7 %) belong to the food processing, shoes and clothing and soft textiles industries. These branches have on the other hand growth rates which are below the average of the manufacturing sector as a whole.

Table 1

Key Indicators of the Mexican Economy
(Millions of pesos at 1960 prices)

Structure	1950	1957	1962	1967	Average Annual Rate of Growth (%)			
					1950-1957	1957-1962	1962-1967	1950-1967
I. Agriculture, forestry and fishing	15 442	21 546	26 043	31 506	4.9	3.8	3.9	4.3
II. Industry	23 467	35 865	47 538	74 929	6.2	5.8	9.5	7.0
Manufactures	16 064	24 315	31 030	49 778	6.1	5.0	9.9	6.9
Other industries	7 403	11 550	16 508	25 151	6.5	7.4	8.8	7.4
III. Services	48 064	71 839	91 094	131 140	5.9	4.9	7.5	6.0
IV. Total G.D.P.	86 973	129 250	164 675	237 575	5.8	5.0	7.6	6.1
Structure (%)								
I. Agriculture, forestry and fishing	17.8	16.7	15.8	13.3				
II. Industry	26.9	27.7	28.9	31.5				
Manufactures	(68.4)	(67.8)	(65.3)	(66.4)				
Other industries	(31.6)	(32.2)	(34.7)	(33.6)				
III. Services	55.3	55.6	55.3	55.2				
IV. Total G.D.P.	100.0	100.0	100.0	100.0				

Source: Cuentas Nacionales y Acervos de Capital, Consolidadas y por Tipo de Actividad. Banco de México, S.A.

Table 2

Share of manufacturing activities in total manufacturing G.N.P.
(Percentages)

	Share in total				Average annual rate of growth			
	1950	1957	1962	1967	1950-1957	1957-1962	1962-1967	1950-1967
A. Food, beverages and tobacco								
I. Processed food	36.3	37.8	34.8	30.5	6.7	3.3	7.1	5.8
Meat products	26.2	28.1	25.8	23.3	7.2	3.2	7.6	5.1
Grain mill and bakery	3.7	3.9	4.1	3.4	6.8	6.3	5.6	5.3
Other food products	13.6	11.4	10.2	8.4	3.4	2.8	5.7	3.9
II. Beverages and tobacco	8.9	12.8	11.5	11.5	11.9	2.5	10.0	3.5
Beverages	10.1	9.7	9.0	7.2	5.5	3.3	5.3	4.8
Tobacco	6.6	7.5	6.7	5.6	8.2	2.6	5.9	5.8
III. Other manufacturing	3.5	2.2	2.3	0.6	-0.9	5.6	3.4	2.7
IV. Construction materials	63.7	62.2	65.2	69.5	5.7	6.0	11.3	7.5
V. Non-metallic minerals	3.5	4.1	4.3	4.5	3.5	6.1	10.5	8.6
VI. Intermediate products I	3.5	4.1	4.3	4.5	8.5	6.1	10.5	8.6
VII. Food products	11.3	11.4	12.2	13.0	6.3	6.4	11.4	7.8
VIII. Leather	4.0	2.9	2.4	3.7	1.6	1.8	6.9	3.2
IX. Fertilisers and Insecticides	2.5	2.3	1.0	0.9	4.3	-10.3	8.3	0.9
X. Synthetic fibres	1.1	0.3	0.7	0.5	22.0	24.0	3.2	16.6
XI. Basic metals	0.5	0.6	1.5	2.0	9.4	25.0	16.8	16.0
XII. Intermediate products II	3.2	5.3	6.6	5.9	9.9	9.3	12.8	10.5
XIII. Basic chemicals	22.6	20.1	21.5	22.7	4.4	6.4	11.2	6.2
XIV. Basic petrochemicals	0.9	1.1	1.6	1.3	9.4	12.5	5.2	9.1
XV. Soft textiles	(-)	(-)	0.5	1.2	(-)	60.0	29.0	(-)
XVI. Other textiles	9.6	7.5	6.6	7.0	2.6	2.4	11.1	4.9
XVII. Pulp and paper	2.6	2.0	2.1	1.4	2.4	5.7	1.5	3.0
XVIII. Rubber	4.5	3.3	3.5	3.9	1.7	5.8	12.4	6.0
XIX. Other chemicals	1.4	1.4	2.1	2.9	16.6	13.7	16.7	11.6
XX. Metal manufactures	0.8	0.9	1.4	1.2	7.8	13.3	7.9	9.4
XXI. Other manufactures	2.8	3.9	3.7	3.8	10.3	4.9	11.2	8.9

Table 2
(cont.)

	Share in total				Average annual rate of growth			
	1950	1957	1962	1967	1950-1957	1957-1962	1962-1967	1950-1967
VI. Non-durable consumer goods								
Shoes and clothing	19.8	17.5	17.9	16.8	4.3	5.4	8.5	5.2
Fur clothing	11.3	8.7	7.8	7.1	2.1	2.9	7.9	4.0
Furting	2.3	2.2	2.5	2.2	5.0	7.7	7.3	6.4
Soups and detergents	1.0	0.9	1.0	0.9	3.5	8.6	7.8	6.2
Pharmaceuticals	2.0	2.3	2.8	2.2	8.4	9.1	5.0	7.6
Perfumes and cosmetics	1.0	1.2	1.7	1.5	9.0	13.2	8.1	9.9
Other manufactures	2.2	2.3	2.1	2.3	8.0	2.4	16.3	8.7
VII. Durable consumer goods								
Electrical appliances	3.8	5.2	6.0	8.9	10.9	8.4	18.7	12.4
Motor vehicles	2.2	3.1	3.4	4.5	11.1	7.2	16.1	11.4
Other manufactures	1.6	2.1	2.6	4.4	10.7	9.8	22.0	13.8
VIII. Machinery and transport equipment								
Machinery	2.7	3.8	3.3	3.6	11.3	1.8	11.2	8.5
Transport equipment	1.6	2.1	1.3	1.7	9.1	-3.7	15.1	6.8
Transport equipment	1.1	1.7	2.0	1.9	10.1	7.0	3.6	10.6
TOTAL :	100.0	100.0	100.0	100.0	6.1	5.0	9.9	6.9

2. Foreign trade

2.1 Structure and geographical distribution

18. Foreign trade has always played an important role in Mexico's economic development. In the past, the country's main exports consisted of minerals, agricultural crops and fuels while the import bill was mainly made up by consumer goods.

19. Structural changes in Mexico's exports and imports after 1950 reflect the changes that have occurred in the structure of the country's economy as a result of an accelerated process of industrialisation through import substitution.

20. The imports of machinery, equipment and industrial raw materials have grown to account for the major share of total imports. Although the manufactured exports have gradually increased and now account for some 23 per cent of total exports the bulk of the country's exports is still composed of minerals, agricultural crops and petroleum.

21. Structural changes that have occurred in the composition of Mexico's exports and imports during the period 1940-1965 are illustrated in tables 3 and 4 below.

Table 3
Changes in the structure of exports, 1940-1965
(per cent)

	1940	1950	1960	1965
1. Agriculture and forestry	19.6	46.9	41.6	42.7
2. Livestock and fishing	4.1	4.4	11.0	9.4
3. Ores, concentrates and unwrought metals	62.4	24.6	18.6	13.0
4. Petroleum and petroleum products	11.5	5.3	2.7	3.5
5. Manufactured goods	2.4	6.7	18.2	17.1
(a) Foodstuffs		1.4	9.6	8.7
(b) Textiles		3.8	4.6	2.3
(c) Chemicals		0.7	2.2	3.3
(d) Other manufactured products		0.8	1.9	2.9
6. Unclassified exports	-	12.1	7.7	14.1
Total :	100.0	100.0	100.0	100.0

Source: Unpublished paper by Gerardo M. Bueno

Table 4
Changes in the structure of imports 1940-1965
(per cent)

	1940	1950	1960	1965
1. Consumer goods	27.7	23.2	18.0	19.1
(a) Non-durable	14.0	12.7	6.0	5.7
(b) Durable	13.7	10.7	12.6	13.5
2. Producer goods	71.5	75.8	81.3	80.8
(a) Raw materials	44.1	37.7	34.0	35.3
(i) Non processed	8.9	7.0	4.9	5.7
(ii) Processed	35.2	30.6	29.1	29.6
(b) Capital and intermediate goods	27.9	38.2	47.2	45.5
out of which:				
machinery, equipment and parts thereof	n.a.	23.1	31.4	32.2
Total :	100.0	100.0	100.0	100.0

Source: Cuentas Nacionales y Anuario de Capital, Consolidadas y por Sectores. Banco de México, S.A.

22. The largest part of Mexico's foreign trade has been and still is oriented towards the United States market. However, like the structure of foreign trade, its geographical distribution also reflects a tendency for certain diversification. Additional outlets have gradually been found for Mexican exports and new sources of imports have emerged. In recent years, for instance, the trade with LAFTA countries and Central America has shown considerable expansion, particularly as regards Mexican exports. Trade exchange with European countries and Japan has also increased and become more diversified. Table 5 gives data on present geographical distribution of Mexico's exports and imports.

Table 5
Geographical distribution of Mexico's exports and
imports in 1968
(per cent of value)

	1968	
	Exports	Imports
North America	68.95	64.59
out of which U.S.A.	68.20	63.00
Central America	3.27	0.48
South America	6.01	2.19
Antilles	1.28	0.27
Europe	12.47	26.99
Asia	7.56	4.50
out of which Japan	6.91	3.91
Africa	0.18	0.05
Oceania	0.28	0.91

Source: Anuario Estadístico del Comercio Exterior de los Estados Unidos Mexicanos, 1968

2.2 Imports and exports of capital goods

23. Imports of capital goods represented in 1968 34.5 per cent of total imports and amounted to 8,448 million pesos. (As compared to 6,062 million pesos in 1965). Most dynamic growth of imports occurred in textile machinery, machinery replacements, electric motors and generators, electrical installation parts, etc. Major part of capital

goods imports comes from the U.S.A., but the role of Western Europe and Japan as suppliers of capital goods is gradually increasing.

24. Exports of capital goods from Mexico do not, at present, form any significant part of total exports since the existing production is almost exclusively oriented toward the domestic market. Out of total exports, the share of capital goods exports increased from 0.11 in 1965 to 0.16 per cent in 1968. In 1968, the value of the capital goods exports amounted to only 23.3 million pesos.

25. Some categories of capital goods have, however, demonstrated a certain export potential. Thus, the exports of agricultural machinery such as ploughs, tractors and cultivators have registered substantial growth in recent years (2.1, 2.3 and 1.9 million pesos respectively in 1968). Exports of industrial moulds (6.8 million pesos in 1968) and of electrical transformers (2.9 million pesos in 1968) have also gradually increased. A significant export item is also export of structures and spare parts for machinery and equipment. Most of these exports are directed towards the markets of the LAFTA and Central American countries and to the U.S. market.

2.3 Balance of trade and payments

26. Up to 1950 Mexico normally enjoyed a favourable trade balance. Since 1950, however, a persistent deficit in the balance of trade has occurred annually ranging from US\$ 200-300 million. As mentioned above, this is mainly due to increased imports of industrial machinery, equipment, components and raw materials and intermediates. Table 6 illustrates the balance of payment position in 1967, 1968 and 1969.

Table 6
Main indicators of the external sector
(8 million)

	1967	1968	1969
<u>Current Account</u>			
Balance of trade and services	-506.3	-622.5	-569.0
Balance of trade	-644.5	-779.4	-700.0
Exports of merchandise	1,103.8	1,180.7	1,378.0
Imports of merchandise	1,748.3	1,960.1	2,078.0
Balance of services	138.2	156.9	131.0

Table 6
(cont)

	1967	1968	1969
Capital account			
Long-term capital (net income)	346.0	379.0	536.0
Foreign credits (net assets)	254.5	147.8	347.0
Direct foreign investment (gross income)	33.6	117.0	139.0

Source: Comercio Exterior, Banco Nacional de Comercio Exterior, S.A.

27. Although the deficit in the balance of trade has usually been more than compensated by active service and capital accounts, it represents a problem which can only be solved by more pronounced export orientation in the manufacturing sector. Service account income is earned basically by tourism. Outflow consists of national tourist spending abroad, border imports, direct foreign investment remittances and of the interest on official debts.

3. Brief appraisal of the present structure of the manufacturing sector

3.1 Growth potential

28. Due to the past rapid growth of the manufacturing sector, Mexico is presently self-sufficient in most of the basic durable and non-durable consumer goods. In addition there is considerable production of various intermediate goods (particularly in the metalworking and chemical industries) in some of which the country is largely self-sufficient.

29. There are some branches which should be specially mentioned in regard to their role for future industrial development. Two of the fastest growing industries in Mexico are the chemical and the petrochemical industries. It can be assumed that these industries will continue to play a major role for the future industrial development of the country.

30. The pulp and paper industry is well developed. The production is expected to grow due to an increasing demand in the industrial, educational and other sectors.

31. The automobile industry is another fast expanding branch. The production of passenger cars in 1969 amounted to 113,000 cars. It should, however, be noted that these cars were produced in 9 factories and

comprised 19 makes and 36 models. The branch has therefore not been able to utilize advantages of large scale production and sales. It could be expected that some rationalization measures would have to be taken at some point in order to bring down the number of different makes and models and to lower the costs of production. The automobile industry has created various opportunities for auxiliary industries. In 1967 there were more than 300 firms which produced most of the components required by the automobile industry.

32. The iron and steel industry produces in addition to basic materials various rolled products such as different sections, flats and tubes. Exports have been achieved mainly in the case of steel tubes while export possibilities for other products are considered rather limited. The domestic demand is expected to continue to grow at a rate of 7-8 % yearly and this opens for a further expansion of the branch.

33. The machinery industry plays a surprisingly small role in the manufacturing sector. Its share in total manufacturing G N P amounts to only 1.7 % (1967). The bulk of machinery and heavy equipment for the industrial sector is thus being imported.

34. In the machine-tool manufacturing there are presently 13 industrial units with totally 685 employed. Various types of machine tools are being produced. There is a considerable possibility for expansion of this branch but manufacturers fail to use this opportunity due to high price and low quality of material inputs, lack of skilled labour, foreign competition and financial limitations. Estimates show that the domestic demand for various machine tools will grow from about 390 million pesos in 1970 to about 1,000 million pesos in 1980.

35. Similar conditions prevail in the heavy mechanical equipment industry. Also in this branch there are clear growth potentials which are presently not utilized. Besides the problems already mentioned it could be pointed out that the consumers of these products for various reasons may prefer to import the equipment rather than to examine the possibilities of obtaining it domestically. Thus it could be observed that many industrial plants in Mexico rather import or produce in their

own plant various intermediate goods. The reason may be a general lack of confidence in domestic goods but also the experience of actual failures of domestic suppliers to keep the quality and the delivery time

36. Up to now it has been quite easy for manufacturers to obtain import licences for equipment and machinery. Furthermore, the tariff on these items is relatively low. Presently there is therefore little stimulation for manufacturers to develop domestic capital goods industries although there are potentials for a substantial expansion.

37. Summarizing the findings on recent trends in the manufacturing sector in Mexico, the following could be said: The import substitution policy has led to a substantial industrial growth. This orientation towards self-sufficiency in the consumer goods sector has, however, created highly protected industries with prices generally well over the world market prices and with little possibilities for exports. Imports of machines, equipment, raw materials and specific intermediate goods have continued to grow, causing an increasing strain on the balance of payments. The limitations of the domestic market for those branches which have the greatest shares in the production structure may cause diminishing possibilities for continued industrial growth. On the other hand there exist various unutilized possibilities of expanding the capital goods sector, and increasing the specialization of industries.

3.2. Specific problems prevailing in industry

38. The mission identified certain problems of the existing industry and these are briefly described below. This description does not represent an attempt to fully cover all problem areas. The mission felt, however, that the listed problems are the most important among those relevant to the objectives of the future technical assistance programme. A separate report on plant visits undertaken by the mission in Mexico appears in Annex 3.

(a) Finance

39. One of the most serious limitations for establishment of new or expansion of existing production facilities is the general lack of

financial resources on the capital market. Interest rates are comparatively high; an annual rate of 12-16 % for short-term business credits is quite common. Due to this constraint, modernization of equipment is often not being carried out to sufficient extent. Foreign investment, public investment and self-financing also play a particularly important role for industrial development. The mission felt that those companies which have in the past been in the position to accumulate large capital funds or which could have access to foreign capital had a clear advantage in continuing their expansion compared to new and small industrial enterprises. An illustration of the large effect of capital injection may have on industry was given by Cia. Fundidora de Hierro y Acero de Monterrey, S.A. Since financial resources became available in 1960 enabling the company to undertake a substantial modernization, the production and sales data show a dramatic increase.

40. In the capital goods industry generally the gestation period is longer and the risks greater than in the consumer goods sector. The problem of finance is therefore particularly important in the capital goods industry.

(b) Technology

41. Mexican firms generally spend very little on research and development. There is a large dependency on foreign technology. According to a study prepared by Batelle Memorial Institute in conjunction with Nacional Financiera on the heavy mechanical equipment industry, about 70 % of the production of this branch is directly dependent on foreign technology.

(c) High production costs and prices

42. The prices of manufactured goods in Mexico are mostly higher than in industrialized countries. This can be seen mainly as a result of the high protection in the form of tariffs and import licenses. Even if the price rule for obtaining incentives is observed (prices of existing industries may not exceed 90 % over the world market prices and 25 % in the case of new industries) most goods are non-competitive on the world market. In one of the plants visited, (Hylsa de México, S.A.;

steel industry) it was stated that to be able to sell on the US market and compensate the preference for US goods, the Mexican products' price be at least 10 % lower (after duties are paid) than the price of the equivalent US product. Due to the limited domestic market, most Mexican plants are smaller than their equivalent in industrialised countries. In many branches this means that large-scale production gains cannot be utilized and that costs will be relatively high. In addition prices of raw materials are generally higher in Mexico than for instance in the USA. In the case of capital goods industries, the intermediate inputs available on the domestic market are relatively costly and tend to make the final product non-competitive on foreign markets. In addition these costly products of the capital goods industry would again tend to increase production costs of the domestic users of the machines and equipment.

(d) Industrial norms and standards

43. Mexico is officially using the metric system but close links with the US market have made the use of US measures quite common in the country. Due to the fact that machines and equipment as well as technologies are being imported partly from the USA and partly from European countries and Japan, several different industrial norms and standards are being used in the Mexican industry. This creates many problems for the Mexican industry in regard to standardization and specialization. In the continued industrial development process in Mexico and specially in the development of a domestic capital goods industry - which to a certain extent will have to be export-oriented - the problem of the lack of a uniform Mexican system of industrial norms and standards will necessarily be aggravated.

4. Government's present industrial development strategy and policy

44. It is a declared policy of the Mexican Government to maintain balanced and integrated expansion of industry through co-ordinating the efforts of private enterprise and of the public sector. While industrial development is considered to be basically the responsibility of the private sector, it is the Government's policy to intervene when the private sector fails to respond, or when national interests so require.

45. The growth of Mexican industry has so far been influenced by import substitution and by the expansion of domestic demand. Infant industry protection, established during the early stages of the industrialization process has provided the most effective single incentive to industrialize. Effective protection on most manufactured products has been high. This is being frequently reflected in high price structure and has given rise to problems of international competitiveness. In addition, the limits for import substitution have by now been largely reached in a great number of most categories of manufactured goods.

46. Certain measures are being taken by the Government in order to improve the efficiency of the industrial sector. First of all, it is intended to gradually lower the level of protection. In case of new industries, proof is required for the granting of incentives that respective production costs will not exceed by 25 per cent the price of an identical imported product.

47. In recent years, the importance of promoting the exports of manufactured goods has been increasingly recognized in view of the rising deficit in the balance of trade. The attention has been focussed on establishing the mechanics of export promotion, starting with industrialization policies.

48. The main objectives of the present industrialization policies, in the order of importance attached to them by the Government, may be briefly summarized as follows:

- (a) To improve the efficiency of the industrial sector in terms of costs and quality;
- (b) To eliminate regional imbalance in industrial development so far characterized by excessive concentration in a few regions;
- (c) To promote exports of manufactured goods;
- (d) To promote rational import substitution programmes.

49. A number of policy instruments is being used for implementing the Government's policies in the field of industrial development and foreign trade. These comprise various fiscal incentives, the system of protection of domestic industries, production and export financing schemes and certain services of a general nature mainly in the field of export promotion.

4.1 Fiscal incentives

50. Import of certain raw materials, machinery and equipment used by industry is allowed duty-free under the Law on New and Necessary Industries, provided that newly established industries are at least 51 per cent Mexican owned and that the "national content" is not lower than a specified percentage. Industries within these classifications are eligible for 5, 7 or 10 year reductions or exemptions from import duties and surcharges, gross receipts taxes and the income tax.

51. Rule 14 of the general rules for the application of the Mexican tariff provides for reduction of up to 75 per cent of the regular import duties for firms which import certain specified types of machinery or equipment to establish new industrial plants and expand and modernize existing plants.

52. The income tax law provides for accelerated depreciation for firms which make new investments in machinery and equipment. Firms producing manufactured goods for exports may obtain subsidies in the form of reduction in income taxes, on the gross receipts taxes and on duties applicable to imports of raw materials and components, if the finished goods are exported.

4.2 Foreign trade regulations

53. Mexican import tariff is composed of both specific duty based on weight or quantity, plus an ad valorem duty. Preferential customs treatment is granted to imports from the LAFTA member countries. Duty rates are very high on luxury items and on products which compete with national industries. On the average, however, Mexican tariffs represent a relatively moderate 20-30 per cent. On the other hand, import licensing, applicable to some 65 per cent of imports, represents Mexico's most effective instrument of control. Licensing procedure is not discriminatory; it applies equally to all countries except those in LAFTA.

54. Most exports were freed from export duties in 1961. Only a few items are subject to export duties and to a prior license requirement. These controls are intended to prevent exports of some essential goods, raw materials and irreplaceable natural resources and to encourage domestic

processing and manufacture. There are no export controls on manufactured goods.

55. Tax exemptions and duty drawbacks (for companies with 51 per cent or more Mexican ownership) were introduced in 1961. In 1966, a privileged export processing zone along the United States - Mexican border was established with the aim of assisting in setting up of US oriented export industries. Machinery and raw materials can be imported duty free into the zone. Quantitative import restrictions, national content regulations and foreign ownership rules do not apply to this zone.

4.3 Production and export financing schemes

56. A Fund for the Promotion of Manufactured Exports was established in 1962 to finance the production, storage and export of manufactured goods, through notes discounted by commercial banks with the Banco de Mexico. The credit rates are preferential in relation to general local rates and competitive in relation to those available to foreign exporters. The Fund provides also guarantees against political and devaluation risks. Private insurance companies insure against commercial risks.

57. During recent years the operations of the Fund have expanded substantially. In 1965, manufactured exports supported by the Fund covered 6 per cent of total manufactured exports, while in 1968 the financing by the Fund covered already 22 per cent of the total.

4.4 Export promotion services

58. The National Bank for Foreign Trade provides various promotional services within the specialised field of foreign trade. It appoints commercial attachés abroad and co-ordinates the network of commercial attachés, supplies basic information on foreign markets, publishes foreign trade statistics and surveys, etc.

59. In 1965, the Bank established a National Foreign Trade Information Centre, whose functions are to advise exporters on all matters relating to export regulations both domestic and foreign, to supply them with export markets information, to assist in the selection of distribution outlets abroad and in the participation in international trade fairs and exhibitions, etc.

5. The institutional set-up in industrial policies and programming

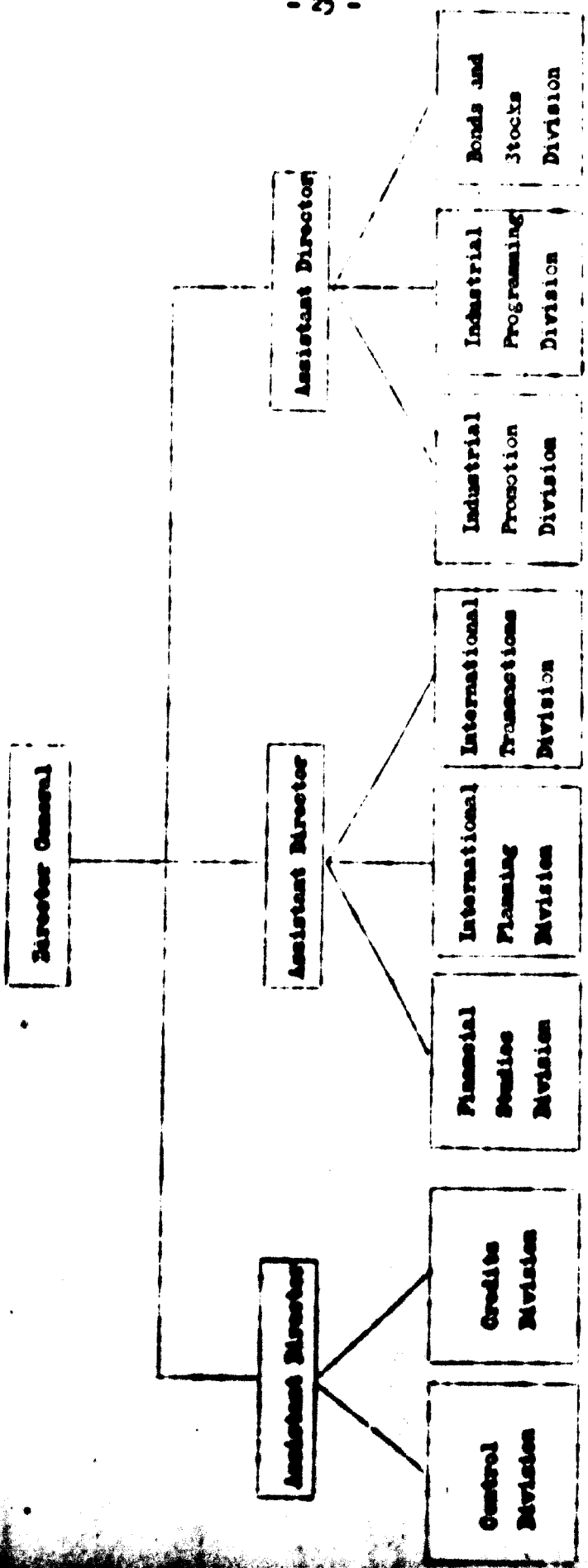
60. The Mexican economy is basically a market economy. The Government, however, has the responsibility to promote and channel economic development. The Government has no comprehensive economic development programme but it establishes five year public investment programmes and can also influence the level and type of certain categories of private investment by way of licenses, import regulations and incentives. Furthermore, the following activities belong to the public sector: petroleum, railways, telegraphs and electric power. In basic industries there is high public participation.

The main government bodies in the field of industrial policies and programming are the following

(a) Nacional Financiera, S.A.

61. Nacional Financiera, S.A. is the state industrial development bank. It recommends priorities for industrial development, promotes and finances investments and is in charge of government participation in industries. Through Nacional Financiera the Government participates in industries producing for instance iron and steel, non-ferrous metals, railway cars, automobiles, coal and coke, steel pipes, chemicals, textiles, cement and pulp and paper.

62. The organisation chart below shows the most important substantive divisions of Nacional Financiera. The work of the Industrial Programming Division should be especially mentioned. It is responsible for carrying out general economic studies on industrial branches and projects and on policies. These studies outline potentials and problems of the various industrial branches and aim at serving as a general basis for decisions on investment promotion, public participation in industry and for the formulating of industrial policies. In addition the Ministry of Finance occasionally requests the Division to advise on the feasibility of specific public investment projects. Of the studies which the Programming Division has prepared on various industrial branches, the following can be mentioned as an example: studies on future machinery demand (1965), prospects of manufacture of machine tools (1968), the market for heavy mechanical equipment (1970) and the structure of protection and on the automotive industry.



(b) The Ministry of Finance (Secretaría de Hacienda y Crédito Público)

63. This Ministry carries out general ministerial functions in regard to monetary, fiscal and tariff policies. Its Directorate General for studies on financial and international affairs prepares general and specific economic studies on foreign trade, fiscal matters, etc. and elaborates recommendations for incentives and tariffs.

(c) Secretariat of the Presidency (Secretaría de la Presidencia)

64. This office is in charge of programming public investments. The last programme covered the period 1966-1970. A new programme is now being prepared for 1971-1975 and will be finalised and approved by the new administration which is to take office in December this year. The programmes are considered relatively flexible. They are divided into annual plans which are determined from year to year. The public investments in the industrial sector presently account for about 38 % of total public investment. The petroleum industry and the power sector set the largest part of this (18.6 % and 12.9 %) while the rest (7.1 %) goes to the fertilizer, iron and steel and other industries.

65. The Secretariat's Directorate for Investments (Dirección de Inversiones) is in charge of the actual programming and co-ordination of development plans and for the evaluation and annual authorisation of projects. The planning procedure can be described as follows:

- (i) The Banco de México prepares macro-economic studies and elaborates Harrod Domar models and an input-output table with 57 sectors to serve as a broad framework for the plan;
- (ii) The Directorate reviews these studies to assess the potential role of the public sector within the overall economy;
- (iii) The Directorate prepares preliminary estimates of public investment;
- (iv) Each public institution and enterprise elaborates and submits to the Directorate proposals for investment projects and their financing;

- (v) The Directorate analyzes the requirements and availability of financial resources (fiscal funds and domestic and foreign credits);
- (vi) The various proposals and studies are reviewed and discussed between all institutions involved;
- (vii) The final program is prepared and approved by a Commission (SubComisión de Inversiones y Finanzamiento), consisting of two representatives of the Directorate and three members of the Ministry of Finance.

(d) Directorate General of Industry (Dirección General de Industrias)

66. The function of this Directorate General which is a part of the Ministry of Industry and Commerce is to implement government policy with regard to industrial development and to issue licenses for new establishments. In conjunction with other Government bodies it controls imports of industrial goods.

67. In 1965, the Directorate conducted a study for the identification of potential export goods for the U.S., Canada and Latin America. Also starting in 1965 the Directorate has periodically published a list containing items of significant import value which are expected to justify domestic production. An extract of the 1970 list of "Industries that Mexico wants and needs" by Secretaría de Industria y Comercio covering items that relate to the capital goods sector is presented in Annex 4.

(e) Directorate General of Commerce (Dirección General de Comercio)

68. This is a part of the Ministry of Industry and Commerce. In conjunction with the Directorate General for Industry, this Directorate is responsible for the control of and for issuing import and export licenses. In the case of capital goods the tariffs are generally low and the import licenses are in most cases granted relatively easily. The Directorate is also engaged in the factoring of exports by using a rather flexible system of export incentives.

69. In addition to these functions, the Directorate gives assistance to industry in the financing and organizing of participation in international fairs and by publishing the Directory of Mexican Exporters.

(f) Directorate General of Statistics (Dirección General de Estadística)

70. This Directorate which is part of the Ministry of Industry and Commerce is responsible for collecting, processing and publishing of all statistical data. The last industrial census was carried out in 1966. Presently a new census is being prepared. It will be completed in March/April 1971 and will be available in print in June/July 1971. Industrial activities are classified according to ISIC in four digits with certain modifications. Annual and monthly industrial statistics are published, covering about 65-75 % of all industrial establishments.

71. Trade statistics are prepared annually. The last volume available in print refers to 1968. However, import/export data of the first quarter of 1970 are already now available in the Directorate. New export statistics are classified according to ISIC showing the industrial origin of exported products.

(g) National Bank of Foreign Trade (Banco Nacional de Comercio Exterior)

72. This is a governmental institution but operates on a commercial basis. Its function is to promote exports, including exports of manufactured goods.

The services offered include:

- (i) Credits to producers of export goods and to exporters, including credits for stockkeeping;
- (ii) Trade information (through Centre of Mexico):
 - Information on foreign markets;
 - Information on trade regulations;
 - Information relating to pricing, maritime transportation, etc.
 - Monthly, weekly publications and publication of the Exporters Handbook;
 - Inquiry service;
- (iii) Identification of export opportunities through commercial attachés abroad (20 attachés);
- (iv) Through the Economic Research Department: examination of special foreign markets and market studies for specific product groups;
- (v) Organization and financial assistance for participation in international fairs;
- (vi) Regulation of imports for the public sector (1/3 of total imports).

(h) Fund for Promotion of Exports (Fondo para el Fomento de las Exportaciones de Productos Manufacturados - Banco de México)

73. The Fund is a part of the Bank of Mexico, which is the Country's Central bank. The objective of the Fund is to enable the Mexican producers to compete on equal terms (in regard to export) with foreign competitors. This is done through the country's banking system. The Fund has the following functions:

- (i) To assist in financing exports by supplementing suppliers credits;
- (ii) To issue export credit guarantees (against political risks against commercial risks, a private insurance company provides coverage for exporters);
- (iii) To assist in financing production oriented to import substitution.

Presently the Fund examines the possibilities of granting credits for the establishment and expansion of export industries.

II. FINDINGS AND CONCLUSIONS

1. The need for developing the capital goods sector

74. The capital goods sector is generally recognized as one of key importance for industrial development, as it includes the production of machinery and equipment for all productive sectors of the economy. This sector therefore assumes a leading role in industrial growth, and represents a major breeding ground for generating new skills, and technological progress.

75. As shown in the preceding chapters of the report, there exists an imbalance in the structure of Mexican manufacturing sector. Compared to consumer goods manufacturing sector, the capital goods sector is underdeveloped in terms of output as well as volume of exports. In fact, this sector is underdeveloped also as compared with the structural share of the capital goods sector of such Latin American countries as Brazil and Argentina. The rates of growth of the capital goods sector have also been lower than those of the manufacturing sector taken as a whole.

76. The reasons that have so far hold back the development of the capital goods sector in Mexico, could be briefly summarized as follows:

- (a) Establishment of industries in Mexico has traditionally followed the lines of import substitution for a protected domestic market. In case of capital goods, however, the existing rate of protection is not high and the import licenses are generally given fairly freely.
- (b) The domestic market for capital goods, although gradually expanding, has so far on the whole not been large enough to support economic domestic production. The potentialities of export markets, on the other hand, have only rarely been taken into consideration when assessing the feasibility of domestic production.
- (c) For manufacturers, the field of capital goods generally has been associated with the image of a complex technology and of relatively high commercial risks as compared to consumer goods industries.
- (d) Existing systems of industrial and export incentives have not proven sufficiently attractive for the private sector to enter more rigorously this specific industrial field. In fact, the Government's attention has only recently been turned to the complex problems of developing the capital goods sector.

(e) Low level of standardization within the sector as well as general unreliability in respect of delivery schedules by subcontractors has led the majority of existing plants producing capital goods to excessive levels of production integration. Consequently, potential advantages of specialization could not be achieved.

77. The development and expansion of the capital goods sector in Mexico could contribute significantly to alleviating the burden for the country's balance of payments represented by rapidly rising imports of machinery and equipment. Even more important, exports of capital goods could add to the foreign exchange earnings. It would seem that reasonable export opportunities for selected capital goods from Mexico exist mainly in the LAFTA and Central American countries and on the United States market.

78. The development and expansion of the capital goods sector would further positively contribute to improving the structural balance of the manufacturing industry as a whole. It would moreover contribute to developing a body of technically progressive labour skills that could influence the process of improving the efficiency of the whole industrial sector.

79. In selected areas, the development of the capital goods sector would contribute to the development of Mexican technology. The existing high levels of dependency on foreign technology which reflects itself in increasing royalty and other payments abroad could therefore be lowered.

80. However, no developing country could and should attempt to develop the whole spectrum of capital goods industry. Concentration of resources on a few selected branches or product lines in terms of investment, labour skills, research and development efforts etc. is needed. The Government's industrial policy should be so designed that such concentration is a distinguishing feature of the whole process of development and expansion of the sector.

81. The Mission is at this stage obviously not in the position to make any precise recommendation on the selection of specific growth industries within the capital goods sector. It was, however, felt that certain areas of the capital goods industry could be identified as suitable candidates for detailed investigation.

82. As an example of industries which appear promising growth industries the following can be mentioned

- (i) Certain agricultural machinery (e.g. ploughs, cultivators)
- (ii) Textile machinery
- (iii) Machinery for food processing
- (iv) Lifting and loading trucks and equipment
- (v) Equipment for the chemical industry.

83. In addition to these industries, there are various cross-sector products which should be regarded as promising in this context. Such product lines are for instance heavy and specialized forging, gears and various common spare parts for machinery and equipment. To a certain extent such products are already being manufactured in the country, but their production is in most cases a more or less uneconomic sideline of individual industrial enterprises for their own consumption. These industries tend to produce these products themselves to be self-sufficient rather than to rely on outside specialized manufacturers. The reason for this is that so far outside manufacturers could often not supply these products at a reliable quality and within agreed delivery time.

84. As an illustrative example, the following case can be mentioned. In one expanding industrial plant - producing machinery - which the Mission visited, all gears needed in the final product were produced on a small-scale basis within the plant. According to a representative of that plant, the company had so far failed to obtain on the domestic market gears with sufficient precision and within the agreed delivery time. Since it is difficult to obtain import license for products which in some form are produced in the country, the company had to start its own production of gears. For the same reason this company did its own heavy forging. Needless to say that the capacity utilization of the heavy equipment was low and costs of these operations were high.

85. A specialization of industries through establishing of separate production facilities for such selected cross-industry products would thus be beneficial for the industry as a whole and should be systematically explored.

2. The formulation of a development programme

2.1 The need for a programme

86. An examination of past development and present situation of the manufacturing industry reveals that the market forces in the Mexican economy presently are insufficient to start a substantial development of the capital goods sector. The main reason for this is probably not a general lack of entrepreneurship. However, it is felt that there is a lack of confidence on the part of potential or existing entrepreneurs to set up capital goods industries since the potentials of the domestic market and especially of foreign markets are relatively uncertain and difficult to assess. In addition the lack of financial resources especially in the industries with rather long gestation periods will be a serious obstacle to private, individual investment in the capital goods sector.

87. It is therefore strongly felt that in order to develop this sector on a long term basis, the Government has to compensate the market forces by drawing up a systematic and thorough development programme and in conjunction with the private sector carry out the programme. It is believed that through this programme the vicious circle can be broken which at present forces the individual industries to import - or to some extent produce themselves - the equipment and machinery needed, while at the same time the establishment of specialized plants and machinery plants is hindered.

88. The need for this development programme becomes even more obvious when it is realized that the capital goods industry is likely to have a substantial long-term impact and thus will play a strategic role for the development of the industrial sector as a whole. It is therefore necessary to make a systematic selection of potential growth industries according to specific criteria and prepare the required techno-economic studies including market studies and the final programmes.

89. The lack of indigenous technological know-how and the absence of the corresponding facilities for research and development make it necessary to systematically examine the needs for research and development activities and to elaborate concrete solutions to meet these needs simultaneously with building up of the selected capital goods industries.

The technological problem thus too requires a programming approach.

90. A pre-condition for the development of the capital goods sector is the appropriate design of industrial policies. As a vital part of the programming exercise the policy instruments therefore must be carefully examined and revised with a view to fostering the establishment and growth of the selected industries within the framework of the overall industrial development objectives.

91. The problems of industrial norms and standardisation have a major importance for the development of the capital goods sector. These problems have to be solved in a consistent and systematic programming effort. This also goes for the quality control which is a crucial problem in this context.

92. Finally it can be mentioned that the co-ordination efforts within LAFTA is examined and that the findings are 'built in' into the activities for promoting the sector's growth.

2.2 Main aspects of the programme

93. The objectives of the programme have been outlined by Nacional Financiera as follows:

- (a) To identify selected items of capital goods which will have an attractive internal market as well as immunity from the threat of technological obsolescence for consideration of their production in the country.
- (b) To add a new dimension by way of an export market to the selected items wherever feasible so as to make internal manufacture more economically viable as well as provide greater benefit to the Mexican economy.
- (c) To examine the present structure of the existing Mexican industry related to the capital goods sector from the technological and economic points of view vis-à-vis projections of future demand and make appropriate recommendations on a manufacturing programme which will give due consideration to diversification and expansion of existing resources as well as developing new additions or alternatives. Also attention should be paid to auxiliary industries for the manufacture of parts and components.

- (d) To suggest appropriate industrial financial and fiscal policies for the successful implementation of the manufacturing programme as recommended, placing special emphasis on the nature of the technological research programme

94. The area for examination has been limited to the production of machinery and equipment (excluding transport equipment)

95. The process of preparing the development programme can be briefly described as consisting of the following stages

- (a) Systematic examination of the economic and technological problems and potentials of the capital goods sector as a whole
- (b) Formulation of a long-term strategy within the framework of the government's general economic objectives and priorities.
- (c) Identification of specific growth industries within the sector.
- (d) Preparation and evaluation of selected industrial projects.
- (e) Preparation of medium-term and short-term programmes of concrete industrial projects.
- (f) Implementation of the finalized programme by investment promotion and/or direct public investment and setting up of adequate research facilities for the support of the new industries.

96. During the discussions which the Mission had with the representatives of various Government institutions as well as of banks and industries, it became quite obvious that Nacional Financiera was regarded as being the most appropriate institution to conduct all necessary studies and analyses and to prepare the programme for the development of the capital goods sector.

97. Nacional Financiera has in the past carried out a number of studies concerning the development of the capital goods sector. These studies can be considered as an important starting point for the continued, more detailed and comprehensive effort to examine the potentials of the capital goods sector, as well as the implications and limitations of

the possible exploitation of those potentials. This effort requires a thorough and systematic analysis of all relevant economic, technological, organisational, legal and policy aspects. The most important aspects to be examined can be briefly described as follows

(a) Markets

98. There exists a growing demand for capital goods on the domestic market (machinery and equipment needed for modernization and expansion of the manufacturing sector, as well as the construction, agriculture, transportation and power supply sectors). However, in many cases domestic demand alone would not be able to sustain economic domestic production. Export prospects should be added as a new dimension that would enable selected branches to achieve the economies of scale required. Strong emphasis should therefore be placed on the examination of potential export markets for selected capital goods, in the Latin American countries - particularly the LACFTI countries - Europe and USA.

99. The examination of markets should be based on long-term development trends of major sectors of the economy in the case of the domestic market and long-term export market forecasting in case of selected foreign markets.

(b) Policies

100. This concept includes a long-range of general policy instruments and specific policy measures, as well as various types of direct Government action. All these policies will have to be systematically examined as to their present role for the development of the capital goods industry, i.e. for the establishing, effectiveness, technological progress, and imports and exports of the selected potential industries. Based on this examination, proposals for a possible amendment of the present policies should be elaborated with a view to creating a consistent, effective, self-regulating and enduring "package" of policies which would assist the implementation of the development programme.

101. Main emphasis of this analysis will obviously be laid on the question of how tariffs and import licensing should be designed for the dual task of fostering the establishment of selected capital goods industries and of increasing the productivity of the existing and the

new manufacturing industries. In addition it should be examined which forms of incentives could supplement tariffs and promote exports. The basis for this analysis has already been made by the study "The Structure of Protection in México" by Gerardo H. Bueno of Nacional Financiera. In addition, Nacional Financiera has prepared a study on the Industrial Development Policy in Mexico which also should be considered as a basis for the confirmed effort to design appropriate policies in the framework of the government's general objectives.

102. Besides these policy instruments, there is a need to examine additional possibilities for Government action of more direct and selective nature. This would include the possibility of stimulating on a continuing basis research and development activities in industry. It can be mentioned in this context that the Government is contemplating examining the possible introduction of tax incentives for this purpose.

103. Other direct assistance by the Government could be in the form of preparation of market studies for existing and potential capital goods industries. The possibility of establishing facilities for such an activity on a continuing basis coupled with direct promotion should be explored.

104. Further possible forms of Government assistance to capital goods industries are the preparation of studies on the opportunity and feasibility of industrial investments, the conducting of various training programmes of technological, economic and organizational nature and assistance in contracting procedures.

105. Finally direct financial support should be mentioned. This obviously requires special attention in the programming of the sector. Included here is the whole range of possible public financing such as direct public investment or participation, loans and credits, supplementary suppliers credits or subsidies for purchases of domestically produced machines, etc.

(c) Technology

106. For the development of the capital goods sector the technological aspect plays a very significant role. The preparation of the development programme of this sector must therefore consider this aspect extensively from various viewpoints.

107. In the first place it is necessary to examine the specific needs for technology both in the initial phase of the setting up of the selected industries and in the continuous process of development of products and production methods. Subsequently the problem must be tackled as to how these needs best could be met. Thus, the question arises how much foreign technology is required and how it should be transferred and to what degree and at what stage domestic research and development activities should be initiated. Mexico must concentrate its limited resources in this field and it is therefore necessary to focus the efforts to a few selected industries of the capital goods sector. The analysis should accordingly be directed towards identifying those fields of industry in which there is a long run positive benefit cost relation between, on the one hand, research and development outlays including initial transfer of foreign technology and on the other hand achievements in the form of commercial and social benefits.

108 The question of technology is thus to be regarded as a part of the problem of selecting growth industries. Potential growth industries should be examined as to their technological requirements in relation to their comparative advantages. The efficiency of each dollar spent on improvement of technology will be crucial for the competitiveness of these industries. The strategy for choosing among various industries subject to technological progress will therefore have to be based on two considerations. Firstly, the particular research and development to be carried out in the industry should be competitive, i.e. research and development outlays should yield technological progress which keeps pace with (or goes ahead of) foreign competitors' progress. Secondly, and alternatively, the industry should have a cost advantage in the world market which could partially offset any incompetiveness of research and development outlays. These factors should obviously be considered from the standpoint of their long-term impacts.

109. The research and development resources required for the exploitation and development of potential comparative advantages should be designed to meet the specific needs. It therefore should be examined what institutional and financial arrangements are to be undertaken to ensure the creation of new research facilities in the country, as well as to

build up a continuous communication with foreign sources of new technologies. Also the possible contact and co-operation with other Mexican institutes as well as with the proposed Andean technological agency and the Centre for Scientific and Technical Assistance and Information should be explored.

2.3 Criteria for the selection of potential growth industries

110. In previous chapters the most important fields were mentioned which have to be thoroughly analyzed as a first step in preparation of the development programme.

111. These analyses will enable the programmers to make a first selection of promising growth industries within the sector. The selection of these industries marks obviously the most crucial stage in the process of programming. At this stage all preliminarily identified industrial opportunities will be scrutinised and only the most "promising" growth industries will be selected. Some of the most important criteria for the selection would be the following.

(a) Domestic market

112. Sufficiently large potential demand on the domestic market and a long-range increase of this demand would form the basic criteria.

(b) Export markets

113. To secure a sufficiently large volume of production the possibilities for exports are of greatest importance. Moreover, the export orientation of the industry and the challenge that the foreign competition means in terms of quality, prices and deliveries is expected to have a major positive impact on the growth possibilities of the industries. The trend in the balance of payments furthermore makes it quite obvious that from the macro-economic view point it is necessary to combine any effort for industrial development with a substantial expansion of exports. Thus, the existence and probable expansion of specific export markets should be considered as a fundamental criteria for the selection of industries.

(c) Technological level

114. The industries to be selected should have a "reasonable" level of technology, so that the strain on the country's resources for initial

research and development is reasonable. The required research and development should not be of basic but of applied research character.

(d) Technological progress

115. The type of industry selected should have a 'reasonable' degree of general technological progress. As far as can be foreseen, the technology should neither be of immobile character nor be subject to 'dramatic' changes.

(e) Linkages

116. The capital goods industries to be established are expected to play a strategic role in the development of the industrial sector and the economy as a whole. Accordingly, it appears essential that these industries are optimally integrated into the structure of the economy and that they also have future techno-economic backward and forward linkages. Therefore those types of industries should be examined with particular attention which are of cut-across-industry type or which are oriented to the agriculture sector.

(f) Comparative advantages

117. A fundamental aspect for selecting potential growth industries obviously is the utilization of present or potential comparative advantages. Such advantages would be for instance:

- labour intensive processes (Mexican labour costs are relatively low);
- production which is connected with relatively cheap domestic raw materials and intermediate goods;
- products which do not require very large scales of production;
- products for which the nearness to the southern part of the USA market would have a substantial impact.

118. The general problems in regard to the comparative advantages are quite known: the comparative advantages are difficult to identify, their actual long-term impacts are hard to assess and their utilization is limited. This complex problem thus needs to be looked into with special attention. In this connexion it should be mentioned that the comparative advantages should be treated dynamically, i.e. possible future changes should be taken into account. It is essential to include these comparative

advantages which the country is likely to achieve in the future. Development represents a change in the economic structure. Development programmes aim at changing structural relations in order to overcome the present state of underdevelopment. Thus programming the industrial development of a country usually means striving to change the proportion of available production factors and accordingly their prices. Consequently, factor price relations between various countries differ at different points of time. In the development process and/or with technological progress, those comparative advantages which prevailed at the starting point of the programming effort will be subject to both autonomous and to induced changes. A development strategy is of a long-term nature. A country's strategy for developing its industry should accordingly be formulated with due regard to potential changes in comparative advantage and the possibility of taking advantage of such changes. Technological progress is one of the main causal factors of these changes, and it should be studied and guided with particular attention. Furthermore, the identification of potential skills and the appropriate training needed should be stressed. Finally the importance of potential future markets - domestic and foreign - should be assessed.

119. It is understood that the practical application of all the above mentioned criteria for the selection of growth industries will be a difficult task. The combination and the weighing of the - possibly contradicting - criteria, especially the inclusion of the various comparative advantages, will offer a problem. Obviously, the criteria cannot be applied mechanically but a case-by-case judgement will have to be made.

**III. UNIDO'S PROPOSAL FOR LONG-TERM ASSISTANCE TO THE GOVERNMENT OF MEXICO
IN THE DEVELOPMENT OF THE CAPITAL GOODS INDUSTRY**

1. Objectives

120. The objective of the proposed project is to assist Nacional Financiera in the various stages of the preparation and implementation of the development programs for the capital goods industry. The project will be designed to meet the specific requirements of expertise in each stage of the programs. The UNIDO project is therefore proposed to be composed of three different phases to be financed under different forms of technical assistance. The aim is, however, to design a coherent program and to link the phases very closely to each other in order to facilitate the transition. In this way it is expected that UNIDO can assist Nacional Financiera not only in carrying out specific studies but also in following up each action, tying together in a consistent way various parts of the programs and in bringing the programs forward to its completion. A diagram showing the duration of each phase is attached. It is understood at the same time that the project may be revised if - in the course of its implementation - this would be required.

2. Phase I: 1976/1977

121. The aim of this phase is to identify potential growth industries in the capital goods sector and to formulate strategies, priorities and policies for the development of the sector.

122. For this purpose, a team of five UNIDO experts will be assigned to Nacional Financiera, Industrial Programming Division, for a period of nine months.

123. The Government wishes to have the preparations of the programs started immediately so that the first, general outline of a development strategy for the sector can be formulated and the follow-up actions be specified in the very near future. The team of experts should therefore begin its assignment already in November this year and submit its preliminary report not later than mid 1977. In view of this urgency, financing is suggested under Special Industrial Services Programs (SIS).

124. The team will consist of the following five experts (see relevant draft job descriptions in Annexes 5A - 5E) :

- one senior industrial programmer (team leader)
- one industrial policies expert
- one expert in export product and market development
- one market analyst (domestic market)
- one industrial engineer.

125. Together with the staff of the Industrial Programming Division of Nacional Financiera as well as other Divisions and relevant institutions, the team of experts is expected to

- (a) examine all relevant statistical data and studies hitherto prepared or collected by Nacional Financiera as well as other agencies (a list of available studies is attached as Annex 2);
- (b) supplement and substantiate the studies available and carry out further techno-economic studies of the capital goods sector as required;
- (c) examine in detail the potentials of both domestic and foreign markets for the development of economically viable branches or product lines within the capital goods sector;
- (d) on the basis of these findings select those industrial branches which are the most promising ones in regard to markets (domestic and foreign), technology, linkages, etc.
- (e) elaborate preliminary proposals for the solution of the problem of technological transfer and research and development as well as of industrial norms and quality control for the selected branches of the capital goods industry;
- (f) examine the whole set of present industrial policy instruments and elaborate proposals for amended or new appropriate policy measures which would foster the development of identified growth industries of the capital goods sector.

2. Phase II : 1971/1973

126. The UNIDO assistance in this phase will tie in directly with and partly overlap the activities of phase I. The emphasis will, however, be shifted from the broad strategy aspect covering the capital goods sector as a whole to the elaborations of detailed studies for selected industrial projects.

127. The objective of Phase II will be to formulate and evaluate specific industrial projects based on the identification and selection of potential growth industries carried out in Phase I. The evaluated projects will be integrated into a programme showing time sequence of desired investments and linkages between the projects.

128. In addition, organizational requirements for the establishment of a Research and Development Institute will be prepared in detail. This institute is planned to be set up in Phase III of the UNIDO programme of assistance.

129. Three experts (TA) will be assigned to Nacional Financiera, Industrial Programming Division. Two expert posts will have a duration of 2 years and the third of 6 months. The experts are expected to begin the assignment two months before Phase I terminates, i.e. in June 1971. Through this arrangement the basis for the work of the experts can be directly provided by the team of Phase I.

130. The team will consist of the following experts (see relevant draft job description in Annexes 6A - 6C):

- one industrial programmer and project planner (2 years)
- one industrial project planner (2 years)
- one industrial engineering consultant (6 months).

131. The experts are expected to

- (a) on the basis of the strategies outlined and the industrial projects identified by the previous experts team, formulate and evaluate industrial projects for the capital goods sector;
- (b) identify further potential growth industries and evaluate them;
- (c) prepare a detailed development programme for the capital goods sector;
- (d) prepare detailed proposals for the establishment of a Research and Development Institute;
- (e) co-operate closely with the team of experts which will carry out Phase III of UNIDO's programme of assistance.

4. Phase III : 1972/1975

132. During the period of this phase it is expected that a number of previously identified and evaluated industrial projects will be implemented. The UNIDO assistance of Phase III will aim at supporting these new industries in four important fields

- (a) industrial research and development,
- (b) industrial management and training;
- (c) industrial marketing,
- (d) industrial standards and norms and quality control.

133. Emphasis will be laid on the field of industrial research and development. Based on the findings and recommendations of the expert team operating in Phase II it is envisaged that a Research and Development Institute will be set up geared to the specific needs of those selected capital goods industries which are to be supported. The Institute should therefore be very closely linked to these industries. Furthermore, the institute is expected to co-operate with the Engineering Institute of the University of Mexico, the Mexican Institute of Technological Research (IMIT), The Mexican Institute for Iron and Steel (being set up) and other relevant institutes in the country and abroad.

134. The main tasks of the institute will be to foster the development of new or the improvement of existing products of the capital goods industry. The institute will also work for the development and adaptation of respective technological processes. In addition, it should provide assistance in testing of equipment and materials.

135. In the field of industrial management and training, it is envisaged that the institute will be able to advise on modern management methods and organise training courses for technical and managerial staff of the selected industries in the capital goods sector.

136. With a view to the importance of establishing a set of industrial norms and standards for the capital goods industry it is envisaged that the institute will carry out systematic work on standardisation and industrial norms as well as on the organisation of quality control.

137. Finally, the institute should provide a methodological and advisory support to the industry in the specific field of industrial marketing of

the selected capital goods, including the problems of after-sales service, the selection of distribution channels, etc. in relation to both internal and foreign markets.

138. It is proposed that the institute be financed under the Special Fund Programme for a period of three years. The details of the Special Fund Project are yet to be worked out. At this stage it is envisaged that the project will have the following components.

(a) International experts:

- one expert in industrial organisation and training (project manager);
- three research and development engineers;
- one industrial engineer for setting up industrial norms, standardisation as well as quality control;
- one expert in industrial marketing for the export markets;
- one expert in industrial marketing for the domestic market.

(b) Equipment.

A component for testing and research equipment is envisaged.

(c) Documentation:

An up-to-date set of relevant publications, periodicals, etc. will be required to cover the most important technological fields of the specific industries to be supported.

(d) Fellowships:

A number of fellowships for training abroad of the counterparts is considered essential for the continuation of the institute after termination of the SF project.

(e) Subcontracting:

A certain amount of funds for subcontracting is envisaged for engaging foreign consultant firms for specific research tasks.

IV. FURTHER POSSIBLE UNIDO ASSISTANCE TO THE GOVERNMENT OF MEXICO

1. Regional development

139. In the framework of the Government's policy on regional decentralization of industry in Mexico, the Investment Directorate of the Secretariat of the Presidency is currently examining the regional development potentials of two regions identified as promising. These are the regions of Tlapice and Coahuacalco/Minatitlán.

140. Both regions have abundant labour force, large areas of irrigated agricultural land, power supply and port facilities suitable for export of future production to foreign markets. Railway connexion with the central regions of the country also exists. The regions are thus favourably connected with both domestic and foreign markets. In both regions, petroleum industries are already established, although petrochemical industries are much more developed in the Coahuacalco/Minatitlán area.

141. The Directorate currently collects necessary data and information on the two regions. It is envisaged that based on this, a thorough examination could be made of growth potentials of integrated industrial complexes which could be developed in the regions. Particular emphasis would have to be placed on the export orientation of the future industries.

142. Pending the Government's final decision to go ahead with this programme, UNIDO assistance would be required in the form of a team of experts assigned to the Directorate. Tentatively the team of experts shall cover the following fields:

- (a) Regional planning;
- (b) Export industries development;
- (c) Industrial engineering;
- (d) Industrial project planning.

143. An official request for UNIDO assistance may be submitted after the process of initial evaluation of the two regions by the Directorate has been completed.

2. Industrial project implementation

144. UNIDO earlier had discussions with the Government on this matter. It was confirmed to the mission by Ing. Lomicq, Deputy Director of the National Productivity Centre, that the Government is interested in receiving assistance from UNIDO in the field of industrial project implementation and related control systems either in the form of an advisory mission or a training workshop. The Government is likely to approach UNIDO in this matter in 1971.

LIST OF PERSONS VISITED

Secretaría de Industria y Comercio

Lic. Luis Bravo Aguilera, Director General de Industrias
Lic. Ernesto Ramirez Salas, Director General de Comercio
Lic. Rubén Gleason, Director General de Estadística

Secretaría de la Presidencia

Lic. Carlos Tello, Director de Inversiones

Secretaría de Hacienda y Crédito Público

Lic. Agustín López Nunguía, Sub-Director de Estudios Hacendarios

Banco de México, S.A.

Ing. Gonzalo Febles, Departamento de Investigaciones Industriales
Lic. Miguel Zamora, Gerente del Fondo de Fomento a la Exportación

Nacional Financiera, S.A.

Lic. Julián Díaz Arias, Director Adjunto
Lic. Gerardo M. Basso, Gerente de Programación Industrial
Ing. Hector Castro Ulloa, Subjefe de Programación Industrial

Banco Nacional de Comercio Exterior, S.A.

Lic. Antonio Calderón, Sub-Director

Instituto Mexicano de Investigaciones Tecnológicas

Ing. Ignacio Duchamps, Director Técnico

Instituto de Ingeniería de la Universidad Nacional Autónoma de México

Ing. Juan Herrer, Director
Ing. Daniel Rosendo Sáez

UNEP

Dr. Flores Serrillo, Resident Representative in Mexico
Dr. Juan Vill-Gabrán, Deputy Resident Representative in Mexico

HELA

Lic. David Ibarra, Director, Office in Mexico

FAO

Mr. Angelo A. de Tullio, Resident Representative in Mexico

IBRD

Prof. Bela Balassa, Consultant of the IBRD

UNIDO Liaison Office, New York

Mr. A. Alenstat, Director, UNIDO Liaison Office in New York

Mr. Kouriel, UNIDO Liaison Office in New York

New School for Social Research, New York

Prof. Thomas Vioreris

Mr. Richard Lisack

Estelle Memorial Institute, S.A.

Eng. Karl H. Pitzer

LIST OF PLANTS VISITED AND PERSONS CONTACTED

1. Campos Hermanos, Tlalcapana, Edo de México -
Ing. Fernando Campos
2. Byron Jackson Co., S.A., Sta Clara, Edo. de México -
Ing. Gabriel Villaseñor, Director of Production
3. Fábrica de Máquinas y Accesorios, S.A., México (1), D.F. -
Ing. Josef Sustek
4. Nylon de México, S.A., Xerita, Pab. -
Lic. Manuel de la Fuente
5. Hojalata y Lámina, S.A., Monterrey, N.L. -
Ing. Juan Colada, Technical Director
6. Cia Fundidora de Hierro y Acero de Monterrey, S.A. -
Ing. Alfredo González Ballesteros, Assistant Director
7. Fabricación de Máquinas, S.A., Monterrey, N.L. -
Mr. Andrés Martínez, Sales Manager of the Forgings Department
and Mr. Parker, General Sales Manager.

LIST OF STUDIES ON CAPITAL GOODS SECTOR IN MEXICO
AND OTHER DOCUMENTATION MATERIAL

Studies

1. **Perspectivas para la Fabricación de Máquinas Herramientas en México**
(Prospects for Manufacture of Machine-tools in Mexico) by Ing. Karl
Heinz Pflaetz in collaboration with NAFIN, 1968, (in Spanish).
2. **El Mercado de Equipos Mecánicos Pesados en México**
(The Market for Heavy Mechanical Equipment in Mexico),
by Estelle Institute, 1968, (in Spanish).
3. **Investigación de las Posibilidades de Fabricación de Maquinaria y
Equipo Pesado y de la Situación de la Industria Mecánica Pesada en
México, Volumen I, Marzo 1968**
(Study of the possibilities of manufacture of machinery and heavy
equipment and the situation of the heavy mechanical industry in
Mexico, Volume I, March 1968)
by Dr. Ing. Walter, Ingenieurberatung Hoesen, (in Spanish).
4. **Investigación de las Posibilidades de Fabricación de Maquinaria y
Equipo Pesado y de la Situación de la Industria Mecánica Pesada en
México, Volumen II, Marzo 1968**
(Study of the possibilities of manufacture of machinery and heavy
equipment and the situation of the heavy mechanical industry in
Mexico, Volume II, March 1968)
by Dr. Ing. Walter, Ingenieurberatung Hoesen, (in Spanish).
5. **Mecanismos de Transferencia de Tecnología al Nivel de Empresa a los
Países en Desarrollo: el Caso de México. Informe preliminar.**
(Mechanism of the transfer of technology at the plant level to the
developing countries: the case of Mexico. Preliminary Report),
31 December 1969, by Miguel S. Wlanczek, Jorge Eduardo Navarrete,
Felipe Tobín and Ignacio Coss, (in Spanish).
6. **The Structure of Protection in Mexico, 1970**
by Gerardo H. Buso (in English).

Other documentation material

1. **Política de Desarrollo Industrial en México - Resumen y Conclusiones**
(Industrial Development Policy in Mexico - Summary and Conclusions)
(in Spanish).
2. **Comisión de Desarrollo (Development Commission) - June 1970**
Instituto Nacional de la Investigación Científica, (in Spanish).
3. **Mercedes y Productos (Markets and Products) - September 1965,**
Banco Nacional de Comercio Exterior, S.A., (in Spanish).
4. **Mercedes y Productos (Markets and Products), July 1965,**
Banco Nacional de Comercio Exterior, S.A., (in Spanish).
5. **Industries that Mexico Needs and Wants 1970,**
Secretaría de Industria y Comercio, (in English).
6. **Mercedes, Desarrollo y Política Económica: Perspectivas de la**
Economía de México
(Markets, Development and Economic Policy: Forecast of Mexican
Economy) by David Ibarra, (in Spanish).
7. **Highlights of 1969 Annual Report Banco Nacional de Comercio Exterior**
S.A. - Mexico's National Foreign Trade Bank, (in English).
8. **Informe Anual 1969 Banco Nacional de Comercio Exterior S.A.**
(Annual Report 1969), (in Spanish).
9. **200 Possibilities to Increase Mexican Exports to the United States,**
Banco Nacional de Comercio Exterior, S.A. Mexico, 1969,
(in English and Spanish).
10. **Fondo Para el Fomento de las Exportaciones de Productos Manufacturados**
(Fund for Promotion of Exports of Manufactured Products),
Banco de México, S.A. (in Spanish).

11. Guía para Formular Solicitudes de Crédito con Cargo al Fondo.
Fondo de Garantía y Fomento a la Industria Mediana y Pequeña
(Guide for Formulating Application for Credit. Guarantee Fund
for Development of Small- and Medium-scale Industry), Mexico D.F.,
January 1969, (in Spanish).
12. Fondo para el Fomento de las Exportaciones de Productos Manufacturados.
Banco de México, S.A., Resumen del Informe de Operaciones
(Fund for Promotion of Exports of Manufactured Products. Summary of
Report of Operations), 30 June 1969, (in Spanish).
13. Nylsa de México, S.A., (in Spanish).
14. FAIM - Manufacture of Machinery for the Glass Industry
(in English and Spanish).
15. Grupo Acero Nylsa, (in Spanish).
16. Cuentas Nacionales y Acervos de Capital, Consolidadas y por Tipo de
Actividad Económica 1956-1967, (National Accounts and Capital Stocks,
Consolidated and according to Types of Economic Activities),
Banco de México, 1969, (in Spanish).

FACTORY VISITS

1. In order to gain knowledge of as wide a cross-section of Mexican industry as possible within the short time available, the mission visited the following companies:

- A. Campos Hermanos
- B. Byron Jackson
- C. Fábrica de Máquinas y Accesorios, S.A.
- D. Hylsa de México, S.A. - Puebla
- E. Hylsa de México, S.A. - Monterrey
- F. Cia. Fundidora de Hierro y Acero de Monterrey
- G. Fabricación de Máquinas, S.A. - Monterrey.

2. The information obtained and the observations made by the mission in each of these companies are briefly described in the following:

1. Campos Hermanos, Tlalampunta, Edo. de México

3. This company manufactures overhead travelling cranes, structural steelwork, pressure vessels, boilers and a large range of hand tools for industry and the automotive trade. They also manufacture components for Volkswagen engines and parts for agricultural machinery manufacturers.

4. The company which is completely Mexican was founded in 1936. The factory occupies 189,000 square meters and employs 4,000 workers, the majority of them male.

5. Campos Hermanos have their own foundry and a steel mill containing an electric blast furnace designed and constructed by their own staff, together with a steel rolling mill, large sections of which are of their own design and manufacture.

6. Forging is carried out with steam and electric drop-hammers and the company has installed the largest hydraulic press in Latin America, of three thousand tons capacity.

7. Most of the company's products are based either on imported technology, as in the case of the overhead cranes which are made under license, or on customers' engineering as in the case of boilers and pressure vessels. Structural steelwork, however, is designed by their own engineering staff.

8. All raw materials and components are manufactured in Mexico with the exception of certain sizes and types of electric motors and certain gearboxes and gearbox components, and mechanical seals.

9. This company exports nothing believing that the Mexican market is large enough for its output. Although it has the engineering skills to design sophisticated equipment for its own use, it does not market this equipment.

10. The mission formed the impression that this company has the capability and the expertise to compete in many fields but does not maintain the engineering staff necessary to keep abreast of world technology.

11. During the tour modern techniques such as ultra-sonic testing and H.F. induction hardening were observed to be in operation. In some areas more labour was available than generally necessary for the work involved.

12. The buildings and plant are well laid out, well maintained but under-utilized, and efficiency could be improved in many departments by the adoption of more modern methods.

3. Burg-Warner Co., S.A. S.A. Clara, Mo. Co. Mexico

13. This company manufactures pumps, speed reduction gears and agricultural machinery components. It is a subsidiary of Burg-Warner of the U.S.A., but has 51% Mexican ownership.

14. The majority of the work of this company consists of machining and assembly of forgings and castings made to their own patterns by other companies. Their facilities consist of machine shop, press shop, heat treatment, assembly, and test and balancing equipment. They also carry out balancing for other companies to utilize the spare capacity of their equipment.

15. The majority of raw materials and components for production are of Mexican origin with the exception of certain gearboxes and drive components.

16. The company is capable of competing in world markets in the larger ranges of pumps and does in fact export pumps to Europe.

17. The mission felt that this company will expand steadily but probably not on its present site, which suffers the disadvantage of regular and persistent flooding. For this reason the buildings were not as well laid out as might have been expected for a company of this type.

C. Fábrica de Máquinas y Accesorios, S.A. México 11, D.F.

18. This company manufactures under license three models of lathes designed and engineered entirely by the firm of "TOF" in Prague. The production is two hundred machines a year. The plant is working on the individual construction basis rather than quantity production. The capacity of the factory was stated to be three hundred machines a year but this figure was not reached due to marketing problems.

19. It was noted that apart from machining of castings and parts in the machine shop the rest of the work was hand work and there was no form of production line or special equipment. Spray painting took place in the open shop without any form of screening or fume extraction.

20. All materials used in the construction of the machines are of Mexican origin, including electrical control gear and motors. It was stated by the management that the quality of many of the castings was poor and much time was wasted on machining castings which subsequently proved faulty.

21. The buildings and general facilities are excellent. There is no doubt that considerable improvements in efficiency and output could be achieved by more systematic layout, improved methods and increased mechanization. This company exports small quantities of machines to Latin American countries.

D. Hysa de México, S.A. Xortla, Pao.

22. The plant at Xortla is one of a number of plants belonging to Hysa de México, S.A., and produces steel in ingot, bar or rod form using the sponge iron process invented and developed by Hysa de México and patented by them. This is a modern plant which has only recently commenced production. The sponge iron plant was designed and constructed entirely with Mexican technology and the steel making and rolling plant was imported mainly from the Federal Republic of Germany. The whole plant, from sponge iron to rolling mill, can be numbered among the most advanced steel plants in existence.

23. The setting up of this plant in Xortla presented special problems as a large number of potential employees were not only industrially inexperienced but also illiterate. This made necessary the setting up of educational facilities which the company donated to Xortla and the results have proved that the training of inexperienced personnel to operate a very complicated plant is possible and practicable in Mexico.

24. Plant utilization was good and there was no evidence of inefficient use of labour. The company has plans for considerable expansion on the Xortla site.

E. Hojalata y Lámina, S.A., Monterrey, N.L.

25. The head office at Monterrey which controls policy, technology and the over-all management of all the Hysa plants. This group of companies is completely Mexican owned.

26. The attitude of this company was stated to be the purchase of foreign technology, when necessary. However, the company employs thirty-two people on research and has invented, developed and is successfully operating the sponge-iron process at the plants at Xortla and Monterrey. Great attention is paid to keeping abreast of the latest developments in plant engineering and production engineering. Hysa has a progressive outlook and plans to considerably expand its facilities in the near future.

27. The company is basically oriented to the domestic market. However, one thousand tons of steel pipes per month are presently exported to Houston, USA.

28. Although general company policy favours the purchase of Mexican products wherever possible but since very little of the plant equipment is available from Mexican sources in the steel industry, this policy has limited application.

F. Cia. Fundidora de Hierro y Acero de Monterrey, S.A.

29. This company produces steel in ingot, plate sheet and a variety of rolled sections. The company is entirely Mexican-owned and has been producing steel at Monterrey since 1903. The company's expansion has been retarded by difficulties in obtaining finance for the expansion of production facilities. Finance became available in 1960 and since then production has increased considerably.

30. Cia. Fundidora does not export. The company plans to keep pace with the 7 per cent per annum growth of the domestic demand. The company is producing at the rate of 850,000 tons per year and expects to increase this to 1,000,000 tons this year. All the raw materials are supplied from company resources within Mexico. Heavy plant and machinery of the type required are not available in Mexico. Of the imported machinery American manufacture is preferred owing to its higher overload capacity.

31. A brief tour of the factory showed that this company is well laid out and equipped to produce high quality steel products. Plant utilization is high and the standard of maintenance of plant and buildings good. Labour was apparently effectively utilized.

G. Fabricación de Máquinas, S.A., Monterrey, N.L.

32. This company manufactures glass making machinery. It exports not only this machinery but also machine technology to many parts of the world. There is an information exchange arrangement with Pilkington Bros. in the United Kingdom. Their policy is one of continuous research and development which keeps them ahead in their own specialized field.

33. Their experiences of bad delivery and poor quality from sub-contractors and suppliers has led them into manufacturing as many of their components as possible. The company's comprehensive facilities include blast furnaces, forging presses, machine shop, tool room, mould shop, gear hobbing, wire belt making and jig boring in temperature-controlled conditions.

34. Much of the company's equipment is designed and produced by their own staff. The plant and labour utilisation appeared excellent, although the buildings themselves were not as well suited to their purpose as some that were seen on other works visits.

35. It was indicated that the company is considering diversification and is starting systematic analysis of products which could be manufactured with the staff and facilities available in the existing factory. Items such as machine tools and textile machinery are under active consideration and the company feels that with its existing high quality reputation and its export outlets it would have good prospects in entering the above fields.

EXTRACT FROM THE 1970 LIST OF "INDUSTRIES THAT
MEXICO WANTS AND NEEDS" (CAPITAL GOODS)

New Industries

Agricultural machinery
Food machinery
Extractor presses
Textile machinery
Paper machinery
Printing machinery
Rubber machinery
Packing, bottling and canning
machinery
Machine tools
Trucks and concrete spreaders
Concrete mixers
Hydraulic separators
Refrigeration compressors
Atomising pistols
Cigarette machinery
Wood drying machines
Wire binding machines
Scrap metal presses
Metal cleaning and polishing equip.
Cotton baling presses
Rolling mills
Plastic moulding machinery
Blow moulding machines
Sand mixers
X-ray equipment
Testing machines
Automatic thermostats
Ball and roller bearings
Electronic apparatus
Electric motors, generators and
switchgear

Existing Industries

(capable of growth)

Milling cutters
Reamers
Sand mixers
Dies, moulds
Agricultural machinery
Food machinery
Wrapping machines
Winches and jacks
Lathes
Hydraulic presses
Grinders
Pneumatic drills
Graders
Excavators
Crushers and screeners
Air compressors
Heat exchangers
Pressure filters
Electric ovens
Electric generators
Galvanizing and tin-plating
machinery
Welding machines
Zip fastener machinery
Mixers and blenders
Sand mould machines
Pressure regulators and valves

Source: Industries that Mexico
wants and needs, 1970, Secretaría
de Industria y Comercio.

Draft

REQUEST FROM THE GOVERNMENT OF MEXICO FOR
SPECIAL INDUSTRIAL SERVICES

Job Description

- Post title:** Senior industrial programmer (team leader)
- Duration:** Nine months
- Date required:** As soon as possible
- Duty station:** Mexico City, with travel in the country
- Purpose of the project:** The expert will be leader of a team consisting of four other experts assigned to Nacional Financiera. The team will assist in the identification of potential growth industries within the capital goods sector as well as in the formulation of appropriate strategies, priorities and policies for the development of this sector.
- Duties:** In close co-operation with the staff of Nacional Financiera S.A., the expert will be expected to:
1. Review available studies and data relevant to the development of the capital goods industry;
 2. Prepare a time schedule and programme of work for the team and co-ordinate and guide the work;
 3. Elaborate specific criteria for the selection of priority growth industries or product lines within the capital goods sector;
 4. On the basis of the findings of the team and by applying these criteria, identify and select potential growth industries and formulate a long-term strategy for the development of the capital goods sector as a whole;
 5. Prepare details of the work to be carried out in subsequent phase of the UNIDO long-range assistance programme to Nacional Financiera. Carry over the reports to the experts of the next phase and set substantive guidelines for their work.

Language: English. Spanish is an asset.

Qualifications Advanced degree in economics, with considerable experience in programming and planning of industries, preferably in the machinery sector. Ability to co-ordinate and lead the work of the team.

Background information:

The Mexican Government considers that the capital goods sector could play a significant role in the country's continued development efforts and in the strive for increased exports of manufactured goods. The Government's industrial development bank, Nacional Financiera S.A., will therefore systematically examine potentials and obstacles for the development of the sector and prepare a long-term development programme. The team of international experts will assist Nacional Financiera in this task by reviewing domestic and export market prospects, relevant policy instruments, technological aspects, etc. The aim of the team's work will be to identify potential growth industries in the capital goods sector and to assist in formulating strategies, priorities and policies for the development of the sector. The team of experts will consist of:

- one senior industrial programmer (team leader)
- one industrial policies expert
- one expert in export product and market development
- one market analyst (domestic market)
- one industrial engineer.

The work of the team is expected to be followed up by a phase II of the UNIDO assistance programme to Nacional Financiera. In phase II a team of international experts is expected to assist in formulating, evaluating and implementing specific projects of the capital goods sector based on the selection of potential growth industries carried out in the previous phase. In a phase III (1973-75) it is expected that an industrial research and development institute be set up with the aim to support the previously selected capital goods industries.

Draft

REQUEST FROM THE GOVERNMENT OF MEXICO FOR
SPECIAL INDUSTRIAL SERVICES

Job Description

Post title: Industrial policies expert

Duration: Nine months

Date required: As soon as possible

Duty station: Mexico City, with travel in the country

Purpose of the job: The expert will be a member of a team consisting of four more experts assigned to Nacional Financiera. The team will assist in the identification of potential growth industries within the capital goods sector as well as in the formulation of appropriate strategies, priorities and policies for the development of this sector.

Duties: In close co-operation with other members of the team and the staff of Nacional Financiera, S.A., the expert will be expected to:

1. Review the present legal, economic, financial and foreign trade policies and instruments which affect the development of the manufacturing industry and in particular of the capital goods sector.
2. Prepare general guidelines and elaborate specific proposals for appropriate policy measures for the development of identified growth industries of the capital goods sector in the framework of the over-all industrial growth. Particular emphasis should be placed on measures for export promotion and also for increasing the efficiency of existing industries;
3. Prepare proposals for policy measures and incentives which would facilitate the transfer of technology and the building-up of a research and development base required for the growth of selected capital goods industries.

Language: English; Spanish is an asset.

Qualifications: Economist with considerable experience in analysing the effectiveness of industrial policy instruments and in formulating policies for industrial and export promotion.

Background information:

The Mexican Government considers that the capital goods sector could play a significant role in the country's continued development efforts and in the strive for increased exports of manufactured goods. The Government's industrial development bank, Nacional Financiera S.A., will therefore systematically examine potentials and obstacles for the development of the sector and prepare a long-term development programme. The team of international experts will assist Nacional Financiera in this task by reviewing domestic and export market prospects, relevant policy instruments, technological aspects, etc. The aim of the team's work will be to identify potential growth industries in the capital goods sector and to assist in formulating strategies, priorities and policies for the development of the sector. The team of experts will consist of:

- one senior industrial programmer (team leader)
- one industrial policies expert
- one expert in export product and market development
- one market analyst (domestic market)
- one industrial engineer.

The work of the team is expected to be followed up by a phase II of the UNIDO assistance programme to Nacional Financiera. In phase II a team of international experts is expected to assist in formulating, evaluating and implementing specific projects of the capital goods sector based on the selection of potential growth industries carried out in the previous phase. In a phase III (1978-79) it is expected that an industrial research and development institute be set up with the aim to support the previously selected capital goods industries.

Draft

REQUEST FROM THE GOVERNMENT OF MEXICO FOR
SPECIAL INDUSTRIAL SERVICE

Job Description

Post title: Expert in export product and market development

Duration: Nine months

Date required: As soon as possible

Duty station: Mexico City, with travel in the country and extensive travel abroad

Purpose of the project: The expert will be a member of a team consisting of four more experts assigned to Nacional Financiera. The team will assist in the identification of potential growth industries within the capital goods sector as well as in the formulation of appropriate strategies, priorities and policies for the development of this sector.

Duties: In close co-operation with other members of the team and the staff of Nacional Financiera S.A., the expert will be expected to:

1. In collaboration with the other members of the team, identify those capital goods that will have sufficient market prospects to lend themselves to economic domestic manufacture;
2. To this end, review available studies and data on present and potential export markets and analyze long-term trends of world market demand for various categories of capital goods;
3. On the basis of these findings and through travel in Latin America, URM and Europe, explore in detail export prospects for Mexican capital goods on selected foreign markets;
4. Outline appropriate production structure for promising export fields (product lines or assortment whenever applicable, product adaptation and development programmes,

standards to be observed, etc.) that would reflect specific requirements laid upon the exports of capital goods by the markets in question.

5. Suggest other appropriate measures for the promotion and adaptation of export-oriented industries with the aim of increasing capital goods exports.

The export's duties will be partly carried out in Mexico and partly in the United States of America, selected Latin American and European countries. It is envisaged that the first stage (2 months) and the third stage (2 months) will be carried out in Mexico, while the second stage (5 months) will consist of exploratory missions abroad.

Language: English; Spanish is an asset.

Qualifications: Market analyst with considerable experience in export demand forecasting for capital goods. Knowledge of long-term market trends particularly in the USA, Latin America and European countries as well as of general technological trends in the capital goods sector.

Background information:

The Mexican Government considers that the capital goods sector could play a significant role in the country's continued development efforts and in the strive for increased exports of manufactured goods. The Government's industrial development bank, Nacional Financiera S.A., will therefore systematically examine potentials and obstacles for the development of the sector and prepare a long-term development programme. The team of international experts will assist Nacional Financiera in this task by reviewing domestic and export market prospects, relevant policy instruments, technological aspects, etc. The aim of the team's work will be to identify potential growth industries in the capital goods sector and to assist in formulating strategies, priorities and policies for the development of the sector.

The team of experts will consist of:

- one senior industrial programmer (team leader)
- one industrial policies expert
- one expert in export product and market development
- one market analyst (domestic market)
- one industrial engineer.

The work of the team is expected to be followed up by a phase II of the UNIDO assistance programme to Nacional Financiera. In phase II a team of international experts is expected to assist in formulating, evaluating and implementing specific projects of the capital goods sector based on the selection of potential growth industries carried out in the previous phase. In a phase III (1972-75) it is expected that an industrial research and development institute be set up with the aim to support the previously selected capital goods industries.

Draft

REQUEST FROM THE GOVERNMENT OF MEXICO FOR
SPECIAL INDUSTRIAL SERVICES

Job Description

Post title: Market analyst (domestic market)

Duration: Nine months

Date required: As soon as possible

Duty station: Mexico City, with travel in the country

Purpose of the project: The expert will be a member of a team consisting of four more experts assigned to Nacional Financiera. The team will assist in the identification of potential growth industries within the capital goods sector as well as in the formulation of appropriate strategies, priorities and policies for the development of this sector.

Duties: In close co-operation with other members of the team and the staff of Nacional Financiera S.A., the expert will be expected to:

1. Review available studies on domestic demand for products of the capital goods sector and analyze long-term development trends of major sectors of the economy;
2. On the basis of these findings elaborate detailed studies on the long-term demand for various categories of capital goods;
3. In collaboration with the other members of the team identify those categories of capital goods that will have sufficient market prospects to lead themselves to economic domestic manufacture.

Language: English; Spanish is an asset.

Qualifications: Market analyst with considerable experience in demand forecasting for capital goods.

Background

information: The Mexican Government considers that the capital goods sector could play a significant role in the country's continued development efforts and in the strive for increased exports of manufactured goods. The Government's industrial development bank, Nacional Financiera S.A., will therefore systematically examine potentials and obstacles for the development of the sector and prepare a long-term development programme. The team of international experts will assist Nacional Financiera in this task by reviewing domestic and export market prospects, relevant policy instruments, technological aspects, etc. The aim of the team's work will be to identify potential growth industries in the capital goods sector and to assist in formulating strategies, priorities and policies for the development of the sector. The team of experts will consist of:

- one senior industrial programmer
(team leader)
- one industrial policies expert
- one expert in export product and market
development
- one market analyst (domestic market)
- one industrial engineer.

The work of the team is expected to be followed up by a phase II of the UNIDO assistance programme to Nacional Financiera. In phase II a team of international experts is expected to assist in formulating, evaluating and implementing specific projects of the capital goods sector based on the selection of potential growth industries carried out in the previous phase. In a phase III (1978-79) it is expected that an industrial research and development institute be set up with the aim to support the previously selected capital goods industries.

Draft

REQUEST FROM THE GOVERNMENT OF MEXICO FOR
SPECIAL INDUSTRIAL SERVICE

Job Description

Post title: Industrial engineer
Duration: Nine months
Date required: As soon as possible
Duty station: Mexico City, with travel in the country

Purpose of the project: The expert will be a member of a team consisting of four more experts assigned to Nacional Financiera. The team will assist in the identification of potential growth industries within the capital goods sector as well as in the formulation of appropriate strategies, priorities and policies for the development of this sector.

Duties: In close co-operation with other members of the team and the staff of Nacional Financiera S.A., the expert will be expected to:

1. Review available studies and data relevant to the development of the capital goods industry and prepare additional techno-economic studies with a view to identifying potential growth industries in the capital goods sector taking into account its present and future techno-economic linkages;
2. Assess the requirements for initial and continuous transfer of technologies as well as the needs of domestic research and development in identified growth industries;
3. Review the present system of industrial standards and norms and suggest long-term appropriate measures on standardization in the capital goods industry. The suggestion should take into account the fact that exports of selected capital goods to foreign markets are envisaged.

4. Assess the needs and requirements for quality control in the capital goods industry.

Language: English; Spanish is an asset.

Qualifications: Industrial engineer, with considerable experience in techno-economic analysis of the capital goods industry. Knowledge of the specific requirements for standardisation and quality control.

Background information: The Mexican Government considers that the capital goods sector could play a significant role in the country's continued development efforts and in the strive for increased exports of manufactured goods. The Government's industrial development bank, Nacional Financiera S.A., will therefore systematically examine potentials and obstacles for the development of the sector and prepare a long-term development programme. The team of international experts will assist Nacional Financiera in this task by reviewing domestic and export market prospects, relevant policy instruments, technological aspects, etc. The aim of the team's work will be to identify potential growth industries in the capital goods sector and to assist in formulating strategies, priorities and policies for the development of the sector. The team of experts will consist of:

- one senior industrial programmer (team leader)
- one industrial policies expert
- one expert in export product and market development
- one market analyst (domestic market)
- one industrial engineer.

The work of the team is expected to be followed up by a phase II of the UNIDO assistance programme to Nacional Financiera. In phase II a team of international experts is expected to assist in formulating, evaluating and implementing specific projects of the capital goods sector based on the selection of potential growth industries carried out in the previous phase. In a phase III (1972-75) it is expected that an industrial research and development institute be set up with the aim to support the previously selected capital goods industries.

Draft

REQUEST FROM THE GOVERNMENT OF MEXICO FOR
SPECIAL INDUSTRIAL SERVICES

Job Description

Post title: Industrial programmer and project planner (team leader)

Duration: Two years

Date required: June 1971

Duty station: Mexico City, with travel in the country

Purpose of the project: The expert will be leader of a two-man team assigned to Nacional Financiera. The team will assist in the formulation and evaluation of industrial projects within the capital goods sector and the preparation of a development programme for the sector.

Duties: In close co-operation with the staff of Nacional Financiera, the expert will be expected to:

1. On the basis of previously identified industrial opportunities within the capital goods sector, formulate projects and evaluate these in terms of their commercial profitability as well as of the national economic profitability;
2. Based on the above evaluations assist in assigning priorities to projects and integrating them into a development programme of the capital goods sector, taking into special consideration the strategies previously outlined as well as the techno-economic linkages and the availability of resources;
3. Identify additional potential growth industries within the capital goods sector and evaluate these for a later inclusion in the sector's development programme;
4. Lead and co-ordinate the team's work in these fields and co-operate closely with the team of international experts (in marketing and research) assigned to a Research and Development Institute which is expected

to be set up later in conjunction with the development programs of the capital goods sector:

5. Train counterpart personnel.

Language: English; Spanish is a asset.

Qualifications: Advanced degree in economics or industrial economics. Extensive practical experience in industrial planning and programming especially with respect to the formulation and evaluation of industrial projects as well as to the preparation of sectoral programmes. Experience in the capital goods sector would be an asset.

Background information:

The Government of Mexico considers that the capital goods sector could play a significant role in the country's continued development efforts and in the strive for increased exports of manufactured goods. The Government's industrial development bank, Nacional Financiera S.A., will therefore systematically examine potentials and obstacles for the development of the sector and prepare a long-term development programme. UNIDO's Technical Assistance Programme to Nacional Financiera in this field will consist of three phases. In phase I (1970-71) a team of international experts will identify potential growth industries in the capital goods sector and assist in formulating strategies, priorities and policies for the development of the sector.

In phase II (1971-72) a team of international experts is to assist in formulating, evaluating and implementing specific industrial projects in the capital goods sector, based on the selection of potential growth industries carried out in the previous phase. Within this phase, the need for national research and development facilities for the capital goods sector should also be explored in detail.

In phase III (1972-75) it is expected that an industrial research and development institute be set up with the aim to support the capital goods industries selected.

Draft

REQUEST FROM THE GOVERNMENT OF MEXICO FOR
SPECIAL INDUSTRIAL SERVICES

Job Description

- Post title:** Industrial project planner
- Duration:** Two years
- Date required:** June 1971
- Duty station:** Mexico City, with travel in the country
- Purpose of the project:** The expert will be a member of a two-man team assigned to Nacional Financiera. The team will assist in the formulation and evaluation of industrial projects within the capital goods sector and in the preparation of a development programme for the sector.
- Duties:** In close co-operation with the staff of Nacional Financiera, the expert will be expected to:
1. Prepare investment projects on the basis of previously identified industrial opportunities within the capital goods sector;
 2. Co-ordinate interrelated projects and co-ordinate the new projects with already existing similar and related industrial enterprises;
 3. Evaluate the formulated projects in terms of their commercial profitability and by taking into account national goals and strategies, evaluate the national economic profitability of the projects;
 4. Identify, formulate and evaluate additional industrial opportunities within the capital goods sector for later inclusion in the sector's development programme;
 5. Co-operate closely with the team of international experts (in marketing and research) assigned to a research and development institute which is expected to be set up later in conjunction with the development programme of the capital goods sector.
 6. Train counterpart personnel.

Language: English; Spanish is an asset.

Qualifications: Advanced degree in economics or industrial economics. Extensive practical experience in the formulation and evaluation of industrial projects preferably in the capital goods sector. Experience in industrial investment financing would be an asset.

Background information:

The Government of Mexico considers that the capital goods sector could play a significant role in the country's continued development efforts and in the strive for increased exports of manufactured goods. The Government's industrial development bank, Nacional Financiera S.A., will therefore systematically examine potentials and obstacles for the development of the sector.

In phase II (1971-72) a team of international experts is to assist in formulating, evaluating and implementing specific industrial projects in the capital goods sector, based on the selection of potential growth industries carried out in the previous phase. Within this phase, the need for national research and development facilities for the capital goods sector should also be explored in detail.

In phase III (1972-75) it is expected that an industrial research and development institute be set up with the aim to support the capital goods industries selected.

Draft

REQUEST FROM THE GOVERNMENT OF MEXICO FOR
SPECIAL INDUSTRIAL SERVICES

Job Description


- Post title:** Industrial engineering consultant
- Duration:** Six months
- Date required:** June 1971
- Duty station:** Mexico City, with travel within the country
- Duties:** The expert will be assigned to Nacional Financiera S.A., the country's development bank. In co-operation with its staff and in consultation with other relevant Government institutions and applied research institutes, the expert will be expected to:
1. Based on the previously prepared assessment of the needs for domestic research and development for identified growth industries in the capital goods sector, elaborate detailed proposals for the establishment of a research and development institute. The purpose of the Institute will be to support the development programs for the sector in four major fields; industrial research and development, industrial management and training consultancy, industrial marketing consultancy, industrial standards, norms and quality control;
 2. The above proposals should cover the following aspects: Institute's functions and activities, organization, operation, manning table, testing and other required equipment, etc.
 3. Co-operate closely with the industrial engineer of the five-member SIS team assigned to Nacional Financiera with the aim of identifying growth industries in the capital goods sector as well as with the team of two international experts on industrial project formulation, evaluation and implementation for the capital goods sector.

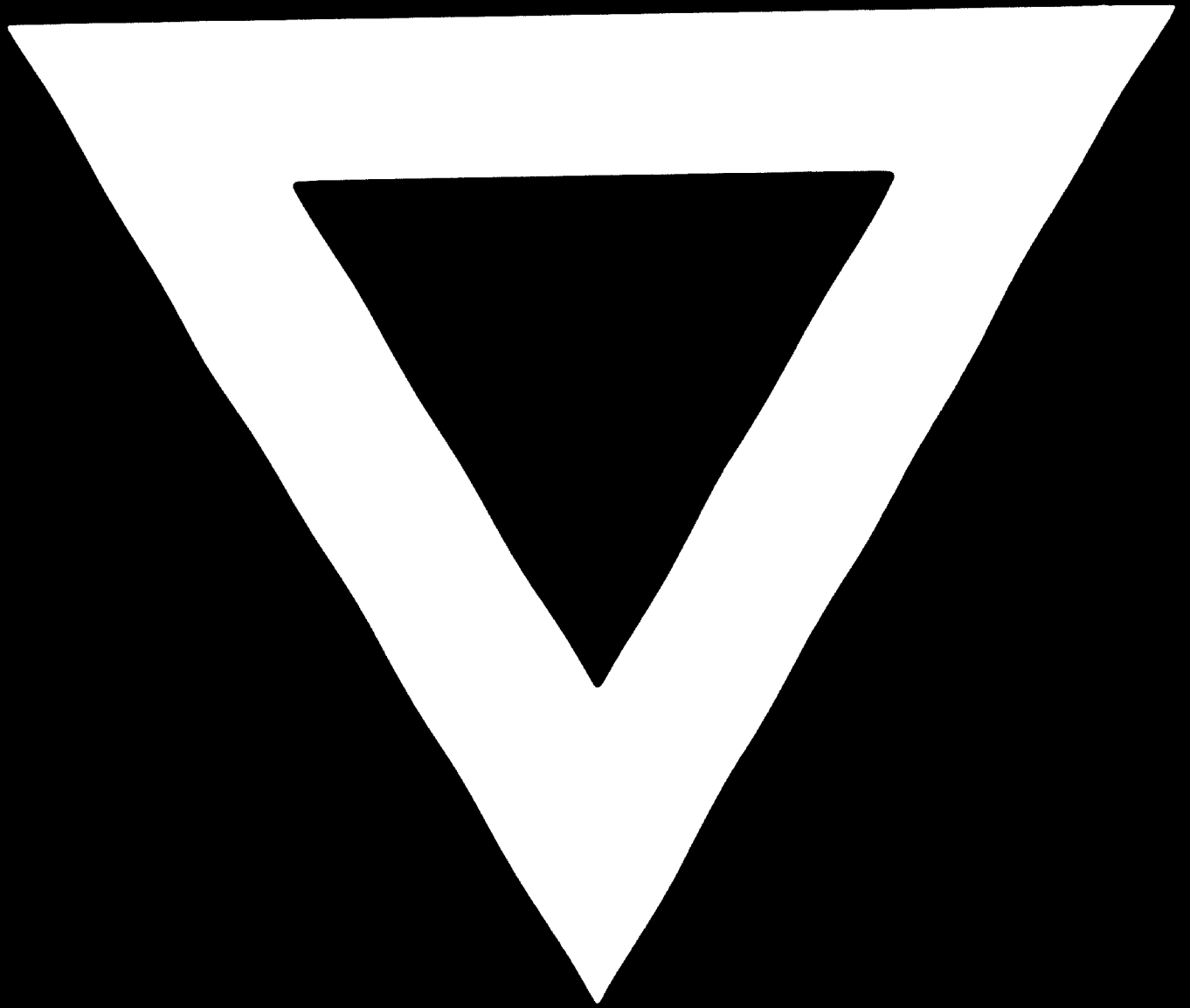
Language: English; Spanish is an asset.

Qualifications: Industrial engineer with extensive experience in the organization of industrial research. Experience in the selection and procurement of modern testing and other equipment for engineering and consultancy institutions in the metalworking sector is also required.

Background information:

The Government of Mexico considers that the capital goods sector could play a significant role in the country's continued development efforts and in the strive for increased exports of manufactured goods. The Government's industrial development bank, Nacional Financiera S.A., will therefore systematically examine potentials and obstacles for the development of the sector and prepare a long-term development programme. UNIDO's Technical Assistance Programme to Nacional Financiera in this field will consist of three phases. In phase I (1970-71) a team of international experts will identify potential growth industries in the capital goods sector and assist in formulating strategies, priorities and policies for the development of the sector. In phase II (1971-72) a team of international experts is to assist in formulating, evaluating and implementing specific industrial projects in the capital goods sector, based on the selection of potential growth industries carried out in the previous phase. Within this phase, the need for national research and development facilities for the capital goods sector should also be explored in detail. In phase III (1972-75) it is expected that an industrial research and development institute will be set up with the aim to support the capital goods industries selected.





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