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

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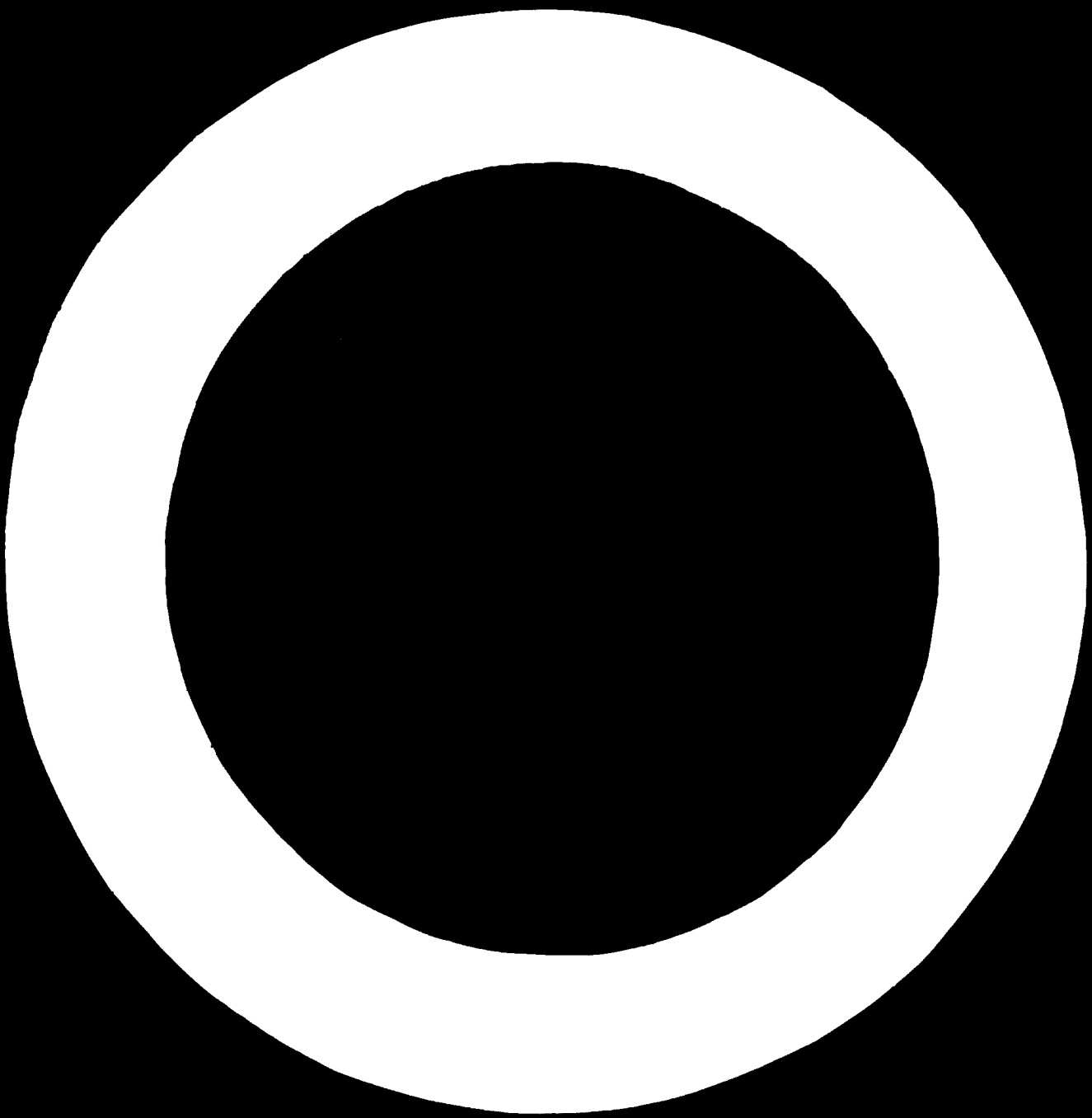

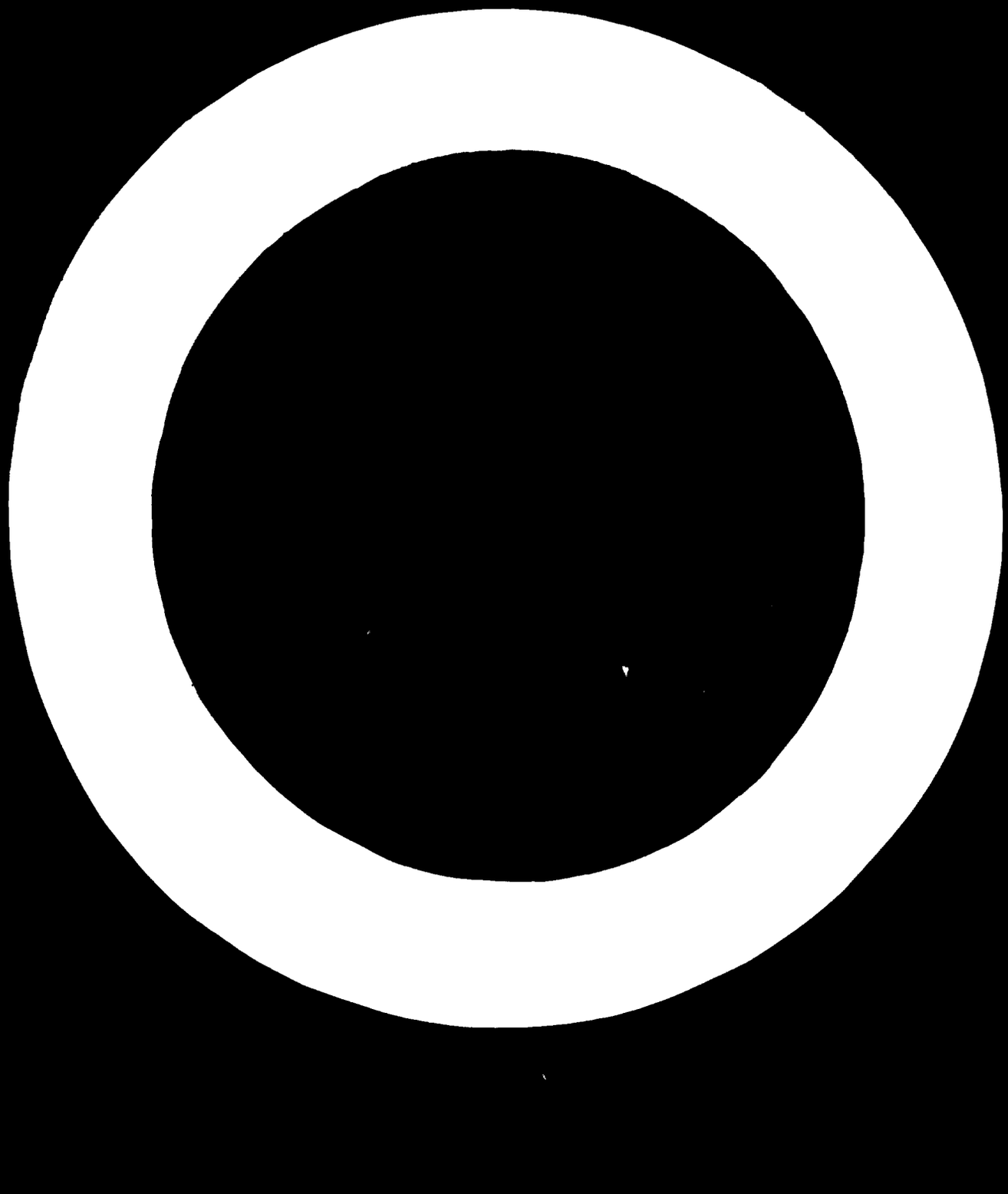

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THE METAL-TRANSFORMING INDUSTRY IN VENEZUELA: AN IMPORT SUBSTITUTION DEVELOPMENT PROGRAMME

Secretariat of the United Nations Economic Commission for Latin America

Introduction

Venezuela's national development plan for 1963-66 established goals for the various economic activities, with a view to an annual average growth rate of 7.9 per cent in the gross domestic product. This programme assigns the metal-transforming industries an outstanding role in the expansion of the manufacturing sector, within which their projected rate of development is the highest.

The initial object of study was to consider the metal-transforming sector's practical possibilities of meeting the goals established under the National Plan (Plan de la Nación). Serious deficiencies in the structure of the industry were noted, as well as a lack of specific plans for metal-transforming activities. It was for these reasons that the sector did not fully respond to the incentives provided by the Government and was unlikely to succeed in reaching the goals set up under the plan.

Now emphasis is on the correction of structural defects rather than on fulfilment of the plan's objectives. To this end, a development programme is outlined for the metal-transforming sector, designed to fill the technological gaps and thus gradually create a sectoral infrastructure which will enable the metal-transforming industry to improve its competitive position both on the domestic and on the world market and to undertake more complex lines of manufacture in the future.

The National Plan directs that in the promotion of new industrial activities the policy should be primarily one of import substitution and that "in this connexion the sectors producing intermediate and capital goods hold out the best prospects".

In 1962, imports of metal-transforming products amounted to 309,000 tons valued at 1,731.4 million bolívares, and included a considerable quantity of goods that could feasibly be manufactured in Venezuela. With 1962 as the base year, a preliminary selection of products was made, taking into consideration not only those cases in which import substitution would be possible almost at once, but also those recommendable on account of the technical processes and know-how that would be brought into the country with them. The following were the definitions on which the selection was based:

(*a*) Simple products that could be manufactured in small and medium industrial establishments by means of relatively labour-intensive procedures;

(*b*) Products for which manufacture processes are used that are not yet familiar in Venezuela or that require perfecting, in so far as much techniques could be introduced through medium and small enterprises;

(*c*) Products required for the integration of other activities as inputs in more complex metal-transforming processes.

From the selection thus made it appeared that about 25 per cent of imports in terms of weight, or 23 per cent in terms of value (77,540 tons and 398.1 million bolívares, respectively) could be replaced by domestic production. At a reasonably conservative estimate, this could be reached within four or five years. The programme would be largely implemented through the establishment of new medium- or small-scale enterprises whose organization and operation would be more in keeping with the country's incipient entrepreneurial capacity. This procedure would make it easier to put the programme into effect and at the same time would contribute to the more widespread diffusion of metal-transforming technology and the training of a larger number of workers.

A first evaluation of the programme suggests that its implementation would entail investment in fixed assets amounting to approximately 204.9 million bolívares and a labour force of 7,150 workers, 3,300 of whom would be skilled operatives basic to the programme.

It would be essential to adopt measures and action that would provide the appropriate institutional framework and would include, primarily, organization for the implementation of the programme; mobilization of external technical assistance resources; definition of goals and of industrial policy; establishment of financing and credit systems; and technological research.

Lastly, the metal-transforming industry's prospects under a regional integration plan are analysed with due regard to the objectives envisaged in this development programme and in others prepared in Venezuela for the manufacture of heavy machinery and equipment. The programme has been adopted by the Venezuelan Development Corporation (Corporación Venezolana de Fomento) for the expansion of the country's metal-transforming industries.[1]

The 1963-1966 development plan in relation to the metal-transforming industry

The aim of the National Plan is to raise the average annual growth rate of the gross domestic product to 7.9 per cent in 1963-66, as against the rates of 3.7 and 2.8 per cent registered in 1957-60 and 1960-62, respectively. Although this rate is lower than that attained in 1950-57

[1] See Corporación Venezolana de Fomento, *Promoción Activa*, April 1965.

(9.3 per cent), which was attributable to an exceptionally favourable situation on the world petroleum market, it will necessitate a rapid expansion of the manufacturing sector of the economy. According to the development goals established under the plan, the industrial product should increase during the period under consideration at an annual rate of 13.5 per cent, as compared with 11.6 per cent in the 1950s. Consequently, the volume of additional employment afforded by the manufacturing sector would represent the absorption of 82,100 workers, the annual average being a little over 20,500. The significance of this objective, as is noted in the plan, will be realized "if it is borne in mind that in the whole of the last decade (1950-1960), manufacturing industry created only 84,200 employment opportunities, i.e., absorbed about 7,650 workers a year. Thus the aim is almost to treble the effort made in the past".

The attainment of these production and employment goals will call for a systematic promotion effort on the part of the authorities and for private enterprise energetic use of initiative and determination to outdo previous achievements. "Venezuela's manufacturing industry is entering a phase which, both economically and technically speaking, is broader and more difficult than that ended with the fifties. The stage now reached involves the installation of heavier industries with more complex techniques, some of which will have to compete on foreign markets and must therefore operate efficiently and at competitive costs. Furthermore, the industries already established will have to embark upon a rationalization process designed to raise their productivity and to improve the quality and lower the prices of the goods they manufacture - another complex and ambitious task.

"Concurrently with the diversification of production, effort will have to be concentrated on industrial integration with a view to the introduction of the structural changes required for the more efficient operation of the whole industrial complex. In other words, this implies improving interindustrial relationships", the plan says.

For the promotion of new industrial activities, according to the plan, an import substitution policy would be the most appropriate to pursue and "in this connexion, the sectors producing intermediate and capital goods hold out the best prospects".

An import substitution programme does not preclude the promotion of exports; on the contrary, this should be regarded as deriving from such a programme, and should be the natural outcome of an over-all consolidation and diversification of the manufacturing sector for which the dynamic impetus is generated, in the first place, by a selective import substitution policy.

In the outline of general policy for the promotion of the manufacturing sector as a whole (whose share in the gross domestic product should rise from 16.4 per cent in 1962 to 20 per cent by 1966), the following are the salient directives:

(*a*) Import substitution should be the mainspring for the installation of new activities;

(*b*) The selection of new activities should be directed towards the improvement of interindustrial relationships, with a view to the gradual establishment of a better balanced industrial structure characterized by maximum complementarity of enterprises;

(*c*) In manufacturing activities, products and processes should be introduced which will imply technological progress in industry as a whole, in the sense that their mastery by domestic industry will open up prospects of manufacturing other more complex products for which there will be a gradually expanding domestic market;

(*d*) Absorption of manpower should be maximized through proper selection of the lines of manufacture to be introduced, as well as of the production processes and equipment to be adopted.

The leading role in the expansion of the manufacturing sector falls to the metal-transforming industries. Table I sums up the production objectives formulated for manufacturing industry in general and for the metal-transforming industries in particular, these latter being broken down by subsectors corresponding to four major groups (35 to 38) in the International Standard Industrial Classification (ISIC):

(*a*) Manufacture of metal products;

(*b*) Manufacture of machinery (except electrical);

(*c*) Manufacture of electrical machinery, apparatus, appliances and supplies;

(*d*) Manufacture of transport equipment.

From an examination of the goals for these four groups, certain inferences can be drawn.

The annual growth rate of apparent consumption is almost the same (a little over 10 per cent) in the first three groups and more than twice as high in the fourth (transport equipment). But in the period under consideration, the shares corresponding to domestic production and to imports will have to undergo radical changes which will differ from one group to another. It seems likely that between 1962 and 1966 the proportion of apparent consumption represented by imports will decline more sharply in the industries producing electrical equipment (from 82 to 44 per cent) and machinery (from 95 to 69 per cent) than in those manufacturing metal products (40 to 22 per cent) and transport equipment (53 to 30 per cent). In absolute figures, however, the production increments envisaged are considerably higher in the case of transport equipment and metal products.

To judge from these larger increases in the output of the metal products and transport equipment groups, the volume of additional employment in 1962-1966 will range from 15,000 workers in the transport equipment sector to 2,500 in metal products. The expected increase in the number of persons employed in the metal-transforming industries as a whole is slightly over 23,000.

As regards the product (value added) per employed person, the plan estimates that it will be 28,000 bolivares in 1966, compared to 22,800 bolivares in 1962 for manufacturing industry as a whole (excluding artisan industry). The metal-transforming industry should show a value added amounting to 20,800 bolivares in 1966, as against the 19,600 bolivares registered in 1962.

Investment requirements for the expansion of metal-transforming activities are estimated at 640 million bolivares (at 1960 prices), which implies a *per capita* investment of a little over 33,000 bolivares, or rather

Table 1

VENEZUELA: GOALS FOR THE MANUFACTURING AND METAL-TRANSFORMING INDUSTRIES ESTABLISHED IN THE NATIONAL DEVELOPMENT PLAN FOR 1963–66

Item	*Years*				*Variation between 1962 and 1966*		*Annual percentage increase 1962-1966*
	1960	1962	1963	1966	*thousands of persons*	*percentage*	
		(millions of bolivares at 1960 prices)					
1. Apparent consumption of manufactured goods	9,898	11,060	12,738	17,001	—	53.7	11.4
Products of the metal-transforming industries	1,225	1,393	1,720	2,530	—	81.6	16.1
G.35 Metal products	573	604	667	899	—	48.8	10.5
G.36 Machinery	35	164	181	244	—	48.8	10.4
G.37 Electrical equipment	88	119	131	177	—	48.7	10.4
G.38 Transport equipment	529	506	741	1,210	—	139.1	24.4
2. Value of manufacturing output	8,521	10,063	11,476	16,210	—	61.0	12.7
Products of the metal-transforming industries	535	634	903	1,721	—	171.5	28.4
G.35 Metal products	309	365	429	699	—	91.5	17.6
G.36 Machinery	6	8	9	75	—	837.5	75.0
G.37 Electrical equipment	18	21	25	100	—	376.2	47.5
G.38 Transport equipment	202	240	440	847	—	252.9	37.1
3. Value of gross product in the manufacturing sector	3,914	4,648	5,320	7,720	—	66.1	13.5
Metal-transforming industries	283	337	432	840	—	149.3	25.6
G.35 Metal products	189	223	263	428	—	91.9	17.7
G.36 Machinery	3	5	6	55	—	1,000.0	82.1
G.37 Electrical equipment	11	12	14	80	—	566.7	60.6
G.38 Transport equipment	80	97	149	297	—	206.2	32.3
4. Value of exports	1,850	2,184	2,367	2,939	—	34.6	7.7
Metal-transforming industries	—	—	—	—	—	—	—
5. Value of imports	3,227	3,181	3,629	3,730	—	17.3	4.1
Metal-transforming industries	690	759	817	809	—	6.6	1.6
G.35 Metal products	264	239	238	200	—	(−) 16.3	(−) 4.4
G.36 Machinery	29	156	172	169	—	8.3	2.0
G.37 Electrical equipment	70	98	106	77	—	(−) 21.4	(−) 4.9
G.38 Transport equipment	327	266	301	363	—	36.5	8.1
	As a percentage of value of apparent consumption						
5A. Imports of manufactured goods	32.6	28.8	28.5	21.9	—	—	—
Metal-transforming industries	56.3	54.5	47.5	32.0	—	—	—
G.35 Metal products	46.0	39.6	35.7	22.2	—	—	—
G.36 Machinery	82.9	95.1	95.0	69.3	—	—	—
G.37 Electrical equipment	79.5	82.4	80.9	43.5	—	—	—
G.38 Transport equipment	61.8	52.6	40.6	30.0	—	—	—
6. Employment (thousands of persons)	309.3	323.1	340.5	405.2	82.1	25.4	5.8
Metal-transforming industries	18.0	17.2	21.0	40.3	23.1	134.3	23.7
G.35 Metal products	5.0	0.8	5.3	7.3	2.5	52.1	11.1
G.36 Machinery	0.3	0.3	0.3	2.6	2.3	766.7	71.6
G.37 Electrical equipment	1.0	1.1	1.2	4.4	3.3	300.0	41.4
G.38 Transport equipment	11.7	11.0	14.2	26.0	15.0	136.4	24.0
7. Product per employed person (thousands of bolivares)	12.7	14.4	15.6	19.1	—	32.6	7.3
Metal-transforming industries	15.7	19.6	20.6	20.8	—	6.1	1.5

Source: National Development Plan (*Plan de la Nacion*) for 1963-66.

more than half the figure for manufacturing industry in the aggregate. This high proportion is of course due to the heavier incidence of the markedly capital-intensive basic and petroleum industries on the over-all figure.

As can be seen from the foregoing data, the hypotheses adopted do not assume any significant increase in labour productivity or, probably, in rates of return on capital and therefore seem realistic, given the brevity of the period covered by the analysis.

CHARACTERISTICS OF THE EXISTING METAL-TRANSFORMING INDUSTRY

The existing metal-transforming industry constitutes the springboard for the sectoral expansion programme propounded below. On its characteristics, in respect to products, organization, plant size, technological progress, manpower supply at the various levels of skill, capital and value added per worker, etc., will depend the nature of the programme and the intensity of the promotional effort. Accordingly, the next step will be to give a brief description of the main characteristics of Venezuela's existing metal-transforming industry, based on the findings of CORDIPLAN's industrial survey (1961) and on the data obtained by means of another survey, much more limited in its scope, carried out by ECLA during the first half of 1964.

The figures presented in table 2 give some idea of the magnitude of the sector as well as of its relative signi-

ficance within the manufacturing industry. In general terms, the table shows that in 1961 the metal-transforming industries contributed 9.7 per cent of the value added in the whole of the manufacturing sector and provided employment for 22,215 workers, i.e., 14.2 per cent of the personnel employed in industry as a whole, whence it can be inferred that metal-transforming activities have achieved some degree of importance in Venezuela. To this over-all evaluation, however, must be added a few indications of the real significance of these figures and the true structure of the sector.

The first striking point is that fixed capital in this industry accounts for only 4.2 per cent of the total amount registered for manufacturing activity which, by comparison with the level of employment, implies a very low capital density per employed person while at the same time showing that servicing and maintenance enterprises predominate over what may strictly be classed as productive activities in this sector. Secondly, it must be stressed that a division of industrial units by plant size reveals a high proportion of medium and small establishments, especially the latter, which represent about 90 per cent of the units in question and account for approximately 57 per cent of the personnel.

No further evidence is needed to show that the sector as a whole, despite its relative importance within Venezuelan industry from the standpoints of value added and employment levels is, in the first place, seriously underproductive on account of its low *per capita* investment rate and, secondly, handicapped by a structural composition almost of the artisan-industry type, which makes it ill-fitted to tackle or develop the production techniques involved in metal-transforming activities.

If the various branches of the metal-transforming

Table 2

VENEZUELA: THE METAL-TRANSFORMING INDUSTRY IN RELATION TO MANUFACTURING INDUSTRY, 1961

(In millions of bolivares)

	Large-scale industry	*Medium-scale industry*	*Small-scale industry*	*Total*	*Manufacturing industry*	*Percentage share of the metal-transforming industry*
Number of establishments[a]	7	195	1,574	1,776	7,531	23.6
Number of persons employed[b]	2,799	6,724	12,692	22,215	156,938	14.2
Gross value of production	292.7	294.8	278.5	866.0	9,261.5	9.4
Value added	85.2	141.8	160.9	287.9	3,999.4	9.7
Fixed capital[c]	66.3	91.5	106.1	263.9	6,316.0	4.2

Source: Central Co-ordination and Planning Office (*Oficina Central de Coordinación y Planificación* - CORDIPLAN) Industrial Survey 1961.

[a] Reference is made to "industrial units", i.e., to a plant, group of plants or industrial complex belonging to a single owner and situated in one and the same place.

[b] Including, in addition to operatives and employees, other types of workers such as partners, members of the entrepreneur's family and home workers.

[c] Excluding the value of the site.

Table 3

VENEZUELA: DIVISION OF GROSS VALUE OF PRODUCTION AND OF VALUE ADDED, BY MAJOR GROUPS, 1961

	Large-scale industry	*Medium-scale industry*	*Small-scale industry*	*Total*
		Millions of bolivares		
A. *Gross value of production*	292.7	294.8	278.5	866.0
35. Metal products	97.6	56.9	52.6	207.1
36. Machinery	—	11.7	8.2	19.9
37. Electrical equipment	8.4	93.5	46.4	148.3
38. Transport equipment	186.7	132.7	171.3	490.7
B. *Value added*	85.2	141.8	160.9	387.9
35. Metal products	47.4	28.4	24.0	99.8
36. Machinery	—	6.2	4.4	10.6
37. Electrical equipment	2.8	36.4	24.6	63.8
38. Transport equipment	35.0	70.8	107.9	213.7
		Bolivares per annum		
C. *Value added per operative*	40,242	28,029	17,865	23,978
		Thousands of bolivares		
D. *Fixed capital per operative*	31.3	18.1	11.8	16.3

Source: CORDIPLAN, Industrial Survey, 1961.

sector are analysed individually, their operational characteristics become even more patent. From the figures presented in table 3, showing the composition of production in the metal-transforming industry, it can clearly be seen how large a proportion is represented by transport material, more than 55 per cent in terms both of the gross value of production and of value added. This branch is made up of vehicle assembly plants which can be classified among the large and medium industrial establishments, and small and medium repair and maintenance workshops. The former constitute a primary activity using a low proportion (not more than 10 per cent) of domestically manufactured parts, most of which are not products of the metal-transforming industries. Consequently, in terms of value added, the contribution made by these plants in the aggregate is very small and does not amount to as much as 20 per cent of the value of the vehicles assembled. The main activity of the other establishments in this branch is the servicing and maintenance of motor vehicles. A similar situation, although on a more limited scale, is to be found in the manufacture of electrical equipment, where again the enterprises assembling radio sets and other household appliances, and those providing maintenance services and installing electrical fittings, show a heavy incidence. In this group, however, there are sizeable industrial establishments engaged in the manufacture of steel-reinforced electric cables and accumulators.

The group producing non-electrical machinery is almost negligible, with an output slightly exceeding 2 per cent of the whole sector's, and here too the great majority of the establishments concerned are not manufacturing enterprises in the proper sense of the term. The oldest and most important metal-transforming industries in Venezuela are those in the metal products group, outstanding among which are the plants manufacturing metal structures, wire products and other goods for the construction sector. Their installation was motivated by the fact that these lines of manufacture do not require very highly skilled labour.

Because of this structure of production in the existing industry, the productivity and capital-density indexes and the other production ratios deducible from the figures given are of little significance and hardly applicable as a means of quantifying installed production potential and its future prospects. Similarly, the machine-tool inventory at the industry's disposal displays the usual characteristics of an activity primarily concerned with metal-transforming services: a high proportion of metal-forming machines and only a very few cutting machine tools, mainly of the simplest all-purpose type. Accordingly, there is a shortage of manpower at the various levels of skill, and this may constitute a serious obstacle to the development of the metal-transforming sector.

All this clearly testifies to the structural weakness and underdevelopment of Venezuela's metal-transforming industry, and its growth prospects are therefore closely linked to the establishment of new enterprises whose characteristics and structure fit them for definitely productive activities. In this connexion, the contribution of the existing industry, with its marked predominance of service and maintenance workshops and of primary metal-transforming activities, will be very limited.

Evaluation of the programme and determination of the corresponding inputs

In order to evaluate the nation's proposed manufacturing programme, even if only on an over-all basis, and to determine labour inputs and investment, a number of coefficients were established whereby the production goals could be expressed in terms of the inputs required. The coefficients correspond to average manufacturing conditions for the product structure and are based on the findings of various surveys undertaken in Venezuela, as well as on data collected by ECLA in several studies carried out in other Latin American countries.

Once manufacturing projects have been determined at the product level, of course, these coefficients will have to be revised in the light of the scales of production adopted, the plant sizes selected and the manufacturing techniques chosen. But in the case of the great majority of the imported products whose replacement by domestic production is recommended, considerations of technology or scale of operations will not exert much influence in this connexion.

As regards the value of production per operative the average figure for the manufactures proposed was estimated at some 69,000 bolivares, which compares satisfactorily with the findings of the surveys. According to the industrial survey carried out by CORDIPLAN in 1961, the average for the metal-transforming industry was 53,522 bolivares; while the result obtained in the survey made by the Metallurgists' Association (*Asociación de Metalúrgicos*) was about 56,000 bolivares. In view of the fact that at the date in question the metal-transforming industry was operating at low performance levels, it may be concluded that the coefficient adopted is reasonably realistic.

Similarly, these surveys establish densities of fixed capital per operative in the neighbourhood of 16,300 bolivares and 22,500 bolivares, respectively, which are regarded as too low for new activities. In the case of the Guyana Project,[2] average investment works out at 63,000 bolivares per operative, a ratio which, on account of the type of equipment that will be manufactured, corresponds to a high category metal-transforming activity. It was thought that for the type of products under consideration investment coefficients ranging from 25,000 to 50,000 bolivares per operative would be representative, the over-all average thus being 36,000 bolivares.

It can be shown that manpower requirements will amount to 5,722 operatives, and that 204.9 million bolivares will have to be invested in fixed capital (see table 4).

Consistently with this number of operatives, it may be estimated that the total personnel required will comprise about 7,150 employees of whom approximately 70

[2] *Corporación Venezolana de Guyana* (Joint Centre Guyana Project), *Preliminary Programme for the Heavy Machinery Building Complex, Guyana Region*, 162.

will be mechanical engineers and metallurgists and some 210 will be technicians and draughtsmen. It may be reasonably supposed that the skilled operatives will number about 3,300, and that they can be tentatively classified in the following categories:

Metal-cutting machine operatives	1,540
Adjusters	820
Toolmen	200
Foremen	240
Others	500

Since the programme was meant to be carried out within four or five years, it can be seen how great a manpower training effort will be required; no fewer than 800 workers will have to be trained every year. The annual investment figure will not be less than $10 or $12 million, to cover production equipment, construction and other ancillary services.

Raw material inputs were determined by direct reference to the volumes of production established. A point that emerges clearly from this evaluation is the importance of castings for the implementation of the programme, since the volume needed will slightly exceed 20,000 tons, which means that it will account for 30 per cent of the total weight of the products to be manufactured. In order to meet these requirements, the existing foundries will have to be expanded and new ones installed, equipped with plant and techniques that will enable them to satisfy the demands of the new metal-transforming activities.

they will supply has been settled. Transport costs are a factor that will weigh heavily in decisions as to whether some of the proposed lines of production should be integrated or whether certain units should be more widely scattered throughout the country, a matter which will call for careful study.

If this manufacturing programme is evaluated in relation to the existing industry, the progress it will imply is obvious. The following points are worthy of emphasis:

(*a*) Personnel requirements for the manufacturing programme represent 30 per cent of current employment in the metal-transforming industry;

(*b*) The new investment will increase the existing industry's fixed capital by about 80 per cent;

(*c*) The value of production will rise by approximately 50 per cent in relation to its present level.

Furthermore, the new manufacturing activities will indirectly exert a favourable influence, difficult to quantify, on the existing industry, since it will benefit both by the manpower to be trained and by the products to be manufactured, and will thus undoubtedly be an incentive to improve current operational conditions as well as to expand and diversify its lines of manufacture.

Lastly, production ratios bring to light the differences between the two industrial groups as regards the structure of production; the new enterprises call for more capital per employee and also show a higher level of productivity. The low ratio between the value of production and fixed capital indicates pre-eminently productive operational

Table 4

VENEZUELA: MANPOWER AND INVESTMENT NEEDS FOR THE IMPORT SUBSTITUTION PROGRAMME

	Output		Number of operatives	Fixed capital (thousands of bolivares)	Probable number of enterprises
	Tons	Thousands of bolivares			
Containers and tinware	9,550	19,560	257	12,850	5-7
Hot-forged and hot-pressed products	8,221	34,982	603	24,120	4-8
Wire products	3,800	6,500	75	2,625	1-3
Primarily stamped products	3,250	16,160	207	7,245	8-13
Small products and parts primarily machined	5,460	25,059	501	15,030	6-12
Boiler shop products and metal structures	5,900	15,948	182	4,550	3-6
Sheet metal work, with or without metal-spinning	11,550	57,522	770	26,950	10-20
Light machinery and machine parts	13,367	108,054	1,544	54,040	20-30
Medium weight and heavy machinery and machine parts	9,532	75,478	1,161	40,632	20-30
Other products	6,910	38,838	422	16,880	5-10
Total	77,540	398,101	5,722	204,925	82-139

In table 4, an indication will be found of the number of enterprises that might be installed to cover the manufacturing requirements shown for each group of products. It is intended merely as a rough guide, and the figures in question cannot be accurately established until the products have been specifically determined and manufacturing costs have been fixed at the product level. As will be noted, many of these enterprises may be integrated in a single unit, but the advantages or disadvantages of this procedure can only be assessed once the possible geographical location of the plants and of the markets

conditions, in contrast with the figure registered for the existing industry, greatly distorted as it is by the heavy incidence of service and maintenance activities.

THE METAL-TRANSFORMING INDUSTRY AND REGIONAL INTEGRATION PROSPECTS

In the main, the immediate object of the study was to formulate a relatively short-term development plan for the metal-transforming sector, with the sole intention of offering a few pointers to possible new lines of domestic production that would help to raise the technological

level of the existing industry and to form a metal-transforming infrastructure such as is indispensable for the consolidation of the sector's future development. Thus, the selection of products was essentially based on two considerations deemed fundamental for this preliminary approach: the prevailing techniques used in their manufacture and the volume of the domestic market evaluated through imports. The study of the existing industry, structurally weak, and under-productive, sufficed to suggest that it would be advisable to adopt a development plan directed towards the attainment of certain levels of technological progress and training of skilled workers rather than towards quantitative achievements that would call for a substantial manufacturing effort or would have a powerful impact on the expansion of the gross domestic product. Consequently, in the programme presented here, economic considerations have played a secondary role in the sense that recommendations for the manufacture of new products are not backed by comparative cost studies.

Broadly speaking, this procedure is justified by the convictions that the development of the metal-transforming sector must be a gradual process and that it is impossible to move on to more complex manufactures until certain basic production methods have been introduced and that the vast range of products of the metal-transforming industry, especially durable consumer goods and building materials, includes a large number of articles which entail relatively simple manufacturing processes, which the developing countries should start to produce as they reach more advanced stages of industrialization, and which are the very means of introducing new techniques and manufacturing processes. In Venezuela's case, it could be seen that the metal-transforming sector is lagging far behind, since its manufacturing lines are not in keeping with the country's level of industrialization, the size of its market and the *per capita* income available.

The fact that the volume of the domestic market was the principal determinant of the production targets established for the initial phase of the development of the metal-transforming industry does not mean that no thought was given to the possibilities that would be opened for this activity under a regional integration programme. On the contrary, it was considered that the ultimate objective must be to equip the domestic industry with such production media as will enable it not only to provide the home market with adequate supplies of the products to be manufactured in Venezuela, but also to concert with other countries' complementarity of integration agreements in connexion with manufacture of the more complex products of the metal-transforming industry, which will no doubt be those accounting for a major share of future intraregional trade. Moreover, manufacture for export will be vitally necessary for Venezuela if substantial and uninterrupted rates of industrial growth, which the domestic market alone will be capable of sustaining, are to be kept up over the long term. It must be borne in mind that, in the metal-transforming sector, production for export cannot be undertaken on a makeshift basis or over the short term since, apart from cost considerations, it entails a lengthy process of manpower training and adaptation of techniques before products can be manufactured in conformity with the specifications and quality standards required for this type of trade, especially if they are to be exported for the purpose of complementing metal-transforming activities in other countries.

In this context, short-term export prospects may be described as non-existent, except perhaps in the case of a few products which may be saleable on occasion to neighbouring countries where they are not yet manufactured or where domestic production is insufficient to meet requirements. Such a situation could not be other than temporary. From the standpoint of the development of the metal-transforming sector, this would not represent an immediate obstacle, inasmuch as the domestic market affords opportunities favourable enough for high growth rates to be attained, at least during the next five years.

The solution of the longer term problem has been engaging attention in Venezuela for years, and one of the studies that has been put forward in this connexion is the project for the formation in the Guyana area of a complex for the manufacture of heavy machinery and equipment. The manufacturing lines envisaged in the preliminary project[3] comprise the construction, in horizontally integrated plants, of large machinery and equipment for mining and building, for the petroleum industry, for the transport of materials, for the wood and machine-tool industries, etc. By 1975, according to estimates, the output quantum might be about $476.4 million (at 1957 prices), of which $150 million worth would be exported to other Latin American markets and might cover about 21 per cent of domestic demand, which by that year would amount to $1,535.1 million. At the same time, it is estimated that the medium and light machinery constructed in the rest of the country might represent about $347.6 million, i.e., nearly 23 per cent of the domestic market. The investment required for the building of this complex would be approximately $370 million and for its operation about 26,500 workers would be needed.

The decision to locate this complex in the Guyana area is justified in the preliminary project referred to by the existence of an integrated steel mill in this part of Venezuela which, in addition, possesses an up-to-date machining shop and a big iron foundry; by the fact that there is a project for an aluminium plant in the same locality; and by the availability of good transport communications with internal and external markets. The economic justification of the project, in its turn, and the expectation of low manufacturing costs, would derive from the reduction of investment which the location itself would facilitate; from the organization and structure of the complex in terms of horizontal integration, with many services in common, and maximum utilization of capacity; and from the considerable economies of scale that would be achieved.

Irrespective of the volumes of demand and investment and the levels of productivity it is hoped to attain figures which in any event will require careful revision, particularly as regards the market for such large machinery

[3] See *Preliminary Programme for the Heavy Machinery Building Complex, Guyana Region*, op. cit.

and the matter of investment. The execution of this project, which calls for such highly developed technical know-how, seems a trifle premature in view of the entrepreneurial and technological conditions prevailing in Venezuela. Probably, when the project was devised, it was thought that the rest of the metal-transforming industry, which from every point of view undoubtedly has a key role to play in the establishment of this complex, would develop on the lines contemplated in the National Plan. But, as previously pointed out, this has not happened for want of appropriate programming in this sector, and in all likelihood, therefore, the Guyana project will have to be postponed or the time schedules and manufacturing programmes will have to be thoroughly overhauled.

In the latter case, the Guyana programme ought not to be carried out in isolation, regardless of the development of the other metal-transforming activities. The mere observation of the evolution of this sector indicates that it is impossible to embark upon complex undertakings in the metal-transforming industry without a certain amount of ballast in the shape of basic know-how and metal-transforming tradition. The building of heavy machinery and equipment of the type which it is intended to manufacture in Guyana constitutes one of the most advanced states in the development of the metal-transforming sector. Because of the constructional complexities and responsibilities it involves, it is not a suitable activity for the training of manpower, especially in the case of Guyana where such training would have to be given almost in its entirety and from the very start. Another aspect of this project which should be subjected to a more careful scrutiny is that relating to the economies of scale which would be achieved, inasmuch as the equipment concerned is of the large and heavy type which is usually made on a unit basis, each piece virtually representing a new project, on account of the modifications that are generally requested by the consumers to suit their working requirements and procedures and also because of the technical innovations which are constantly being introduced in such machinery.

The foregoing considerations give some idea of the tremendous gap between the existing industry and the demands implicit in the Guyana programme, a gap that will have to be narrowed if the project in question is to materialize. In this connexion, the import substitution programme suggested in the present study plays an important role, and constitutes a basis for technical improvements and for the initial phases of manpower training. Nevertheless, other stages will have to be traversed before the final objectives embodied in the Guyana industrial complex can be reached. To prevent the execution of this project from being held up, if in the course of its revision no situations emerge that might cast doubt on the practicability of the targets originally established, the manufacture of some of the products included in the prospective manufacturing lines of the Guyana complex should be started during the stages in question, as an integral part of the national programme for the development of the metal-transforming sector. Special consideration should be given to the production of equipment and accessories for the petroleum industry.

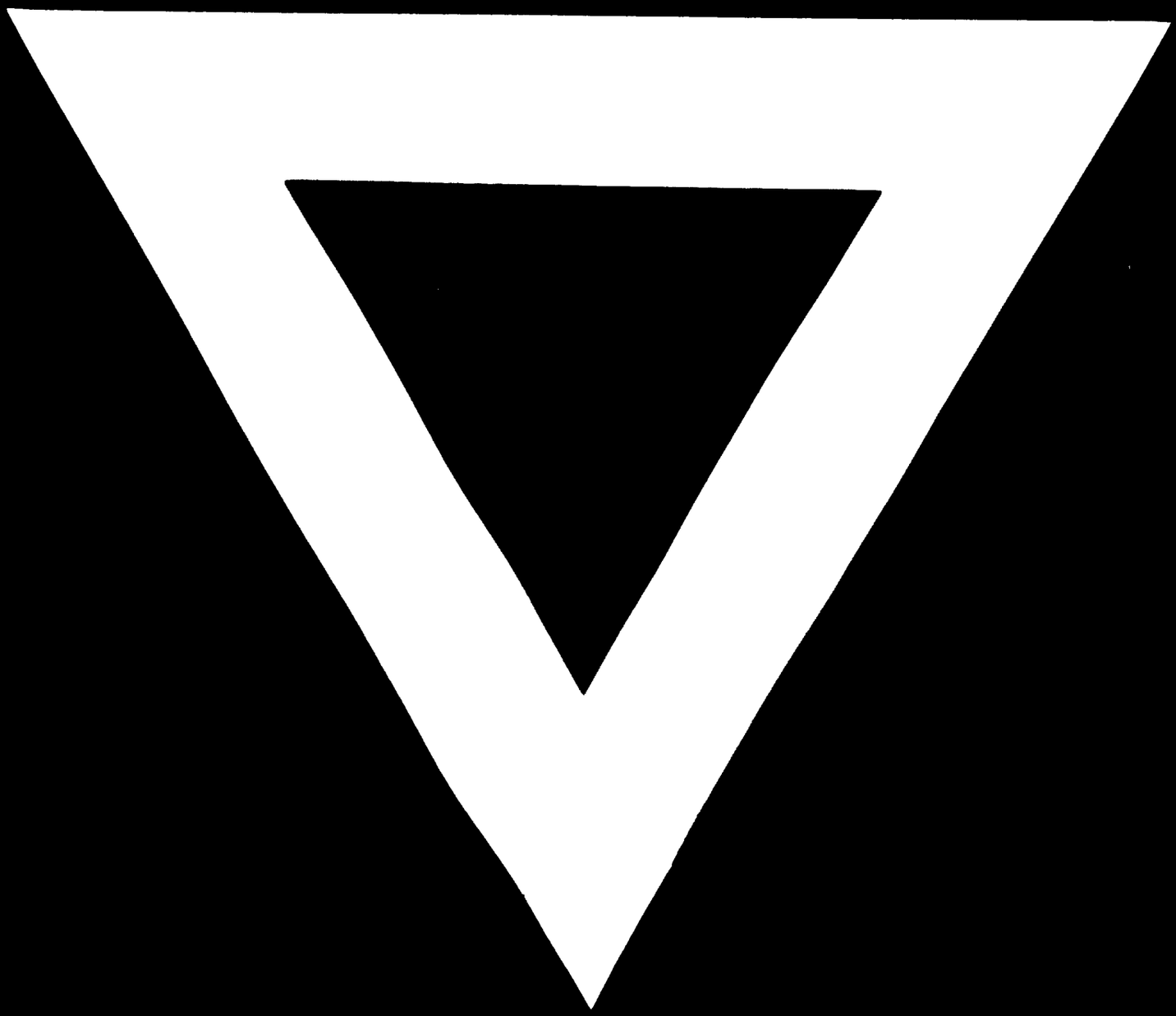
Owing to the exceptional conditions and dimensions of this industry in Venezuela, the metal-transforming sector would do well to undertake the manufacture of products to meet its needs, particularly as many of them are common to other industrial activities, such as the petrochemical industry. The wide variety of products used in this activity, ranging from the simplest, such as flanges and connexions, to the most complex, such as pumps, compressors, etc. makes it possible to graduate the programming of production in accordance with the progress made in technology and in the training of skilled workers. This is an activity for whose products, even in the case of those entailing the simplest manufacturing processes, intraregional export prospects might be very promising, so that steps could be taken to negotiate integration agreements with other Latin American countries. The most attractive feature of the manufacture of equipment for the petroleum industry undoubtedly consists in the fact that the internal market is in itself large enough to sustain an efficient domestic industry and therefore reliance upon external markets would not be necessary.

Another activity which would be worth careful study in the light of this criterion, with a view to its incorporation in Venezuela's plans for the metal-transforming industries, is the motor vehicle industry, especially as regards the manufacture of parts for vehicles. According to 1964 estimates Venezuela's motor vehicle inventory consisted of about 430,000 units, and the number comprised in assembly programmes probably exceeded 40,000 units. Although these figures, especially those relating to assembly work, are not high enough to be described as optimum in countries where the manufacture of motor vehicles is traditional, they may be regarded as satisfactory starting-points for the manufacture of specific parts and spare parts at reasonable price levels.

Apart from the fact that domestic manufacture of spare parts for the maintenance of the inventory might come to constitute a significant import substitution item and might at the same time open up new opportunities for employment and for obtaining technical know-how, it would facilitate the establishment of a programme for the manufacture of motor vehicles, with the corresponding goals for the progressive increase of their domestically manufactured components. Once this activity had been developed for the home market, it might secure a footing in adjacent countries' markets and in those of other Latin American countries where the size of the motor vehicle inventories would not be equally favourable for the establishment of similar industries, or even where domestic manufacture already exists, in view of the wide variety of models in each country's motor vehicle inventory.

To sum up, Venezuela's integration prospects in respect of the metal-transforming industry are closely linked to the formulation of a national development plan for the sector envisaging, in an initial phase, the rapid improvement of the industry's present technological status and the intensive training of skilled labour at all

levels. During this stage, the manufacture of simpler products of the metal-transforming activities should be included and initiated. These products would be those which, as pointed out above, not only enjoy significant export prospects but can also rely upon an internal market broad enough to sustain an efficient domestic industry. Over the longer term, when this stage of development had been left behind, consideration should be given to the manufacture of the heavy equipment contemplated in the case of the Guyana complex, if this seems advisable in the light of the revision and verification of the data and the practical conditions for the execution of the project.



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