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SITUATION OF THE MACHINE TOOL INDUSTRY AND MARKET IN MEXICO 1/

by

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1/ The views and opinions expressed in this paper are those of the author and do not necessarily reflect the views of the secretariat of UNIDO.

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INTRODUCTION

Economic growth in Mexico has been sustained. The nation's average annual growth rate during the sixties was 7 per cent, while the figure for the manufacturing sector was 8.6 per cent. In turn, mechanical engineering showed the greatest advances with 16 per cent per year during the sixties, as opposed to 8.9 per cent during the preceding decade. The second most dynamic branch was that of the transport equipment (basically automotive) industry with an annual rate of 14 per cent, followed by chemical products and the basic metal industries. For obvious reasons (namely, their already almost total development), such traditional industries as the textile, clothing and footwear industries showed slower growth rates (between 5 and 6 per cent).

Thus, since 1960 Mexico has achieved a more accelerated production of capital goods: ten years ago imports of these goods accounted for 70 per cent of total consumption, while the same figure now stands at 59 per cent. It is in this area, therefore, that an enormous industrial potential awaits its development.

The machine tool industry

One of the more seriously under-developed areas is the domestic production of machine tools, a situation that we intend to remedy as far as possible.

Background and economic importance

Our machine tool industry is relatively young, and this fact accounts, in part, for its present small share of the consumer market (in 1969 Mexican industry satisfied 8.8 per cent of the total demand). Its beginnings date back to 1959 with a stamping press factory and it now includes seventeen enterprises, a number of them established in 1968.

The average capital investment per firm is 7.1 million pesos ($568,000) and the value of production 6.6 million pesos (including "other items" derived from repairs made to machines of outside companies). The smallest of these enterprises has investments amounting to 620,000.00 pesos ($49,600), the largest 15 million pesos ($1.2 million). The greatest investments are in lathe and press factories.

Location and number of enterprises

The factories are situated in general near the centres of greatest industrial development. Seven of them based in the Federal District, two each in the States of Mexico, Coahuila and Jalisco, three in Neuvo León and one in Querétaro (see List, page 13).

Main machine tools produced and degree of national integration

At the present time, both metalworking and woodworking machines are produced:

Stock-removing machines	Metal-forming machines	Woodworking machines
Engine lathes 1/	Presses	Planers
Automatic lathes	Drop forges 3/	Saws
Drilling machines 2/	Shearing machines or guillotines	Edgers
Grinders	Bending and rolling machines	Lathes
Saws		Shapers
		Tenoners
		Drilling machines

Of the total production, by value, metalworking machine tools account for 86.9 per cent and woodworking for 13.1 per cent. Within the former category, stock-removing machines make up 62.2 per cent and forming machines 37.8 per cent. Lathes and presses constitute the most important items.

The degree of national integration in comparison with the total cost is 86 per cent in the case of engine lathes and 25 per cent in the case of automatic lathes. In regard to the raw materials, components and parts necessary to produce a lathe, the figure is 71.1 per cent, i.e. only 28.9 per cent of the total inputs are imported.

Capacity, value of production and share of domestic consumption

In 1965, the value of production was 13.9 million pesos and by 1969 it had risen to 53.4 million; the actual figures are perhaps slightly higher because some enterprises do not provide information on the subject. In 1965 domestic manufacture accounted for 2.7 per cent of total consumption, whereas in 1969 the figure was 8.8 per cent.

1/ Bed up to 2 m and swing over bed up to 45 cm.

2/ With capacities of half an inch and up to one inch (diameter).

3/ With capacities of 5, 10, 18 and up to 80 tonnes.

Capacity utilized fluctuated between 27 per cent and 100 per cent, the average is calculated to be 62.8 per cent. Plants producing lathes and drills show lower indices; those manufacturing machine tools for woodworking and some of those producing presses for metalworking are in the best situation in this regard. By type of machine tool, the relationship between domestic manufacture and total consumption was as follows in 1969: lathes 15.6 per cent, drilling machines 12.5 per cent, grinders 7.9 per cent, presses and cutting machines 19.4 per cent, drop forges 5.2 per cent. The woodworking machine figure was 17.5 per cent.

Technology

Lathes are based on Czechoslovak, Spanish and French technology. Presses use United States licences. At the present time a number of countries have expressed an interest in combining their efforts with Mexican industrialists for the production of these machines in Mexico (see Annex).

Protection and incentive measures

Tariffs on products from foreign countries are of medium level and in the case of countries belonging to LAFTA they are practically nil. Prior permission is required for the import of machines which are already produced in Mexico, except in the case of LAFTA countries; the great majority of machines imported are not affected.

The industry benefits from the Law on New and Necessary Industries, with the tax allowances specified in this legislation. Plants are allowed when they begin activities to have low levels of national integration and they operate under the production programme regulations which offer the benefits of rules 14 and 8 (facility to import machinery, equipment and raw materials free of tax).

Principal machine tools required

In the year 1970 the composition of the machine tool pool of less than fifteen years of age was as follows: lathes 19.7 per cent, presses 8.2 per cent, grinders [illegible].5 per cent, drilling machines 10.4 per cent, milling machines 4.7 per cent, miscellaneous metalworking machines 33.2 per cent, miscellaneous woodworking machines 15.2 per cent.

No data for national production by value are available for 1971, but imports for that year (which represent most of consumption) stood as follows:

Type of machine	Million [illegible]	Million dollars
Lathes	117.2	9.4
Presses	7[illegible].9	6.2
Grinders	61.1	4.9
Drilling machines	60.7	4.8
Milling machines	47.9	3.8
Other metalworking machines	18[illegible].2	14.9
Machines for wood and plastic	3[illegible].9	2.9
Total	586.9	46.9

The greatest increase in import volume during the 1962-1970 period was recorded in the area of drilling, grinding and milling machines.

In general, the demand for this equipment, particularly metalworking machines, is determined by expansion and advances in the manufacturing sector, specifically the engineering and metalworking industries. Both these industries are on the rise in our country.

The principal factors which influence the consumption of woodworking machine tools are population and available personal income, because this equipment is largely used in the manufacture of home and office furniture. Both population and income growth are on the increase in our country.

Industrial development and the need to replace the present supply, or stock, of machine tools of more than forty years service life are additional factors which will have a decisive effect on future consumption.

Sales system and policy

A high percentage of national production is distributed, on an order by order basis, from producer to consumer, with a very few firms operating out of stocks on hand.

In view of the small volume of domestic production at present, distributors do most of their business in imported equipment.

Distributors obtain these machines abroad either on order or for display purposes (the latter being discouraged as far as possible to avoid idle assets). In the case of imports based on catalogues (direct imports), these distributors merely act as the middlemen, receiving a commission from the foreign manufacturers, with the purchaser paying cash and attending to the necessary formalities to bring the machinery into the country. However, distributors make their largest sales on a credit basis: the customer has no import formalities to attend to and pays off the equipment in instalments over a period of two or more years, after an initial payment of 20 per cent.

There are distributors who operate exclusively with a single foreign country and are financially assisted by that country through finance companies and banks abroad. Others operate through local finance agencies.

Employment, wages and salaries

In eleven of the seventeen enterprises in the branch the number of persons employed in December 1969 was 763, including technicians, manual workers, and office staff. Wages, salaries and social benefits amounted to 16.7 million pesos (US$1.3 million), the annual average per worker being 21,877.00 pesos (US$1,750).

Labour productivity

Average productivity per employee is 95,447 pesos, somewhat above that of small-scale and medium-scale industry but rather lower than that of large-scale industry. The enterprises with higher indices are those producing presses (shearing and bending machines) and automatic lathes. Those of lower productivity include some manufacturing woodworking machinery.

Raw materials are obtained from the nearest metallurgical enterprises; however, as demand takes the form of small individual orders, materials have to be bought from small or medium-sized producers at higher prices than from the large companies.

Our country has the second-largest steel industry in Latin America. This industry, as shown by the recent growth in its exports, is constantly improving in quality and productivity.

Investments: amount and structure

The total assets of eleven enterprises in this branch amounted in December 1969 to 94.7 million pesos (US$7.6 million). Their net assets were 63.7 million pesos (US$5.1 million) and the registered capital 56.8 million pesos (US$4.5 million); that is, accumulated reserves stood at 6.9 million pesos (US$552,000).

Sources of finance

Domestic credit is little used; most enterprises rely heavily on their foreign parent companies for investment in machinery and equipment. Bank loans or advances against orders are obtained for minor operations and for working capital.

Capital investment per worker

The average capital investment required to employ one person is 124,114.00 pesos (US$9,929). For the small firms the figure was 24,800 pesos (US$1,984) and for the large 191,033 (US$15,283).

Structure of imports and exports

The machine tool branch has no exports. The bulk of domestic demand for machine tools is satisfied through imports.

In 1962 the value of imported equipment was 142.4 million pesos (US$11.4 million) against 586.9 million pesos (US$46.9 million) in 1970. The greatest increase was recorded in 1964 -- 117.4 per cent - with a drop occurring in 1966. Purchases have fluctuated because of the inherent characteristics of these goods.

Import structure

The largest share of machine tools are of the metalworking variety. These machines accounted for 74.3 per cent of the total value in 1963 and 90.5 per cent in 1969.

Of the eighteen types most frequently imported - all of the metalworking class - the most prominent are lathes, grinders, sharpening machines and milling machines.

Purchases abroad of parts and components amounted to 53.4 million pesos (US$4.3 million), this figure being practically equal to the value of domestically manufactured machine tools.

Supplying countries

In 1969, twelve nations provided 96.9 per cent of all the machine tools purchased by Mexico abroad. The principal supplier countries were the United States of America, the Federal Republic of Germany, France, Italy and the United Kingdom.

Of especial importance in the Latin American bloc are Brazil and Argentina. In 1969 Mexican purchases from these countries amounted to 17 million pesos (US$1.4 million) and 8.6 million pesos (US$688,000), respectively.

Machine tool requirements for 1980

The projection of future demand was based on imports, but it was unfortunately not possible to have more than a series of data covering the last ten years, since the figures for the previous period were not very reliable. This series shows a very irregular pattern marked by sharp fluctuations. This in turn derives from the fact that the demand for this kind of equipment is affected by a variety of factors, such as industrial development policies, transfers of equipment from foreign concerns to their branches, replacement of obsolete equipment, expansion of old and establishment of new plant facilities, acceleration or deceleration of the pace of economic activity, the service life of machinery, import substitution, etc.

It must also be borne in mind that any projection is subject to later revision. On this basis, therefore, a very conservative estimate would indicate that our machine tool imports, by 1980, will reach figures of the order of 1,200 million pesos (US$96.6 million) annually. Of this amount, 68 per cent (US$65.6 million) will go for lathes, presses, grinders, drillers and milling machines. Imports of lathes alone will amount to 212.5 million pesos (US$17 million), and the figure for presses will be similar. Another important type will be the drilling machines; unless conditions change after 1980, imports of these will amount to 156 million pesos (US$12.5 million).

All told, the value of imports during the 1972-1980 period will amount to 8,395 million pesos (US$671.6 million), as opposed to 3,566 million pesos (US$285.3 million) during the 1962-1970 period. This means that, even if they continue to increase at the moderate rates taken as the basis of this projection, annual imports will reach figures of 1,000 million pesos (US$80 million) by 1977.

On the other hand, the number of machine tools that will be required annually by 1980 will be approximately 16,000 units (the average weight per machine being somewhere between 1 and 5 tons). The total stock of machine tools less than 25 years old will number some 206,000 units, and these will require an efficient maintenance system. As already noted, Mexico now domestically produces fourteen types of machine tools (seven for metalworking and seven for woodworking) of the 160 types which are imported. It would not be economic to manufacture all these types, since, individually, many of them have a very small market. The same situation presumably also exists in the other countries of the region, for which reason in this matter, as in others, what is needed is a co-ordinated policy of co-operation among the interested nations of our region on the basis of more detailed studies on the subject.

Final considerations

Mexico is endeavouring, through a more strict observance of quality standards as well as through the removal of protectionist tariff barriers, to make its industrial enterprises more efficient, placing the emphasis on those firms which operate in the supply and service sector. In this spirit, intensive training programmes have been instituted, ranging from plans calling for vocational training centres and the opening of technical schools to the creation of funds and trusts to make it possible to send technical personnel abroad for study and direct work with foreign industries and firms. At the same time, development machinery has been set up which ranges from tax incentives to the creation of an industrial and financial infrastructure.

The country's present course calls for every enterprise to plan its operations in line with the changing conditions of the domestic and foreign market and to apply techniques and designs adaptable to Mexican needs. There is an obvious need for every enterprise to up-date its production procedures continuously.

The development of an industry such as the machine tool industry must take into account the aforementioned principles. It is our belief, therefore, that a Regional Plan for the Co-ordinated Development of the Machine Tool Industry in Latin America must be based on a realistic survey of the region's needs in this respect. A sound technical and economic foundation is required for the co-ordination and growth of investment in this industry.

Taking into account the need to continue the economic integration of our countries, it is believed that the creation of mixed (government and private) multinational Latin American enterprises with adequate technical support from specialized agencies and from the advanced nations, might perhaps be able to solve the problems of plant size and technology. It is also considered advisable to set up a Latin American Institute for the Technological Development of the Machine Tool Industry, supported by interested governments and industrialists, to take charge of the formulation of a regional Technological Plan or to form a staff of designers, production engineers, and specialists in the different technical disciplines required for machine tool manufacture, so that these personnel might periodically serve in all the industries of the region, whether through a quota system or on the basis of contributions to the financing of the Institute. In addition, a centre of this kind might assume the function of training new technical personnel and of organizing competitions aimed at original work and research for the improvement of the industry.

There should, therefore, be created some machinery to ensure that the costs of technology are shared by all, in order that the introduction of this technology can be made less expensive.

Finally, we believe that the development, in the true sense of the word, of this branch will make it more easy for us, at a later date, to undertake new projects in any industrial area. This is the road we must follow - in common and within the framework of authentic international co-operation.

ANNEX

We are pleased to mention that Mexico will soon open a plant whose technical and economic performance will be very efficient.

We refer to the firm "AHMSA, Fábrica Nacional de Máquinas-Herramienta, S.A." (AHMSA, National Machine Tool Factory, Ltd.), which will initially produce engine lathes and milling machines, of different specifications, mainly of class B, and at a later date other machine tool types such as turret and automatic lathes, surface and cylindrical grinders, boring machines, and special-purpose machines of classes B and A. The technology employed will be Yugoslav and German, and will include: product production plans, the operational sequence for each part, specifications for the machinery required for production, plans for the design of the clamping devices, plans for casting models, specifications concerning the materials, auxiliary equipment and tools required for production, personnel training and technical consultation for the start-up and operational phases.

The initial investment is in the amount of US$6 million, with a 60 per cent degree of national integration during the first phase. Beginning in 1979, all shafts, gears and smaller components in general will be produced, including: main shaft, tapered reduction gear, lead screw and tailstock assembly (lathes).

The firm is scheduled to supply 75 per cent of the average demand for class B machines, while at the same time promoting exports to Latin America and the United States. Production volumes have been programmed to achieve a figure of 10 per cent foreign sales for class B machines by 1976.

This project is viewed as the beginning of a new stage in the history of the machinery and capital goods industry in Mexico.

L I S T

ENTERPRISES, THEIR LOCATION AND TYPES OF MACHINE TOOLS WHICH THEY PRODUCE, 196[illegible]

Name of enterprise	Location and year of establishment	Types of machine tools produced
Fábrica de Máquinas y Accesorios, S.A. Av. 7 No. 168 Col. Granjas San Antonio.	Distrito Federal (1965)	Metalworking lathes with beds up to 2 m.
Industrial Lagunera, S.A. Carret. Torreón-Matamoros Km.2	Torreón Coahuila (1965)	Metalworking lathes: beds of 1 m.
Verastegui, S.A. Prol. Calz. Emilio Carranza y Lasalle	Saltillo Coahuila (ND)	Planers, Sewing machines, edgers, lathes, wood moulding machines and tenoners (all for woodworking).
Maquinaria Butrón y Cía. S. de R. L. Calz. Sto. Tomás No. 100 Col. Atzcapotzalco	Distrito Federal (1963)	Planers, sawing machines, edgers, wood moulding machines, lathes (all for woodworking).
Maquinaria Occidental Mexicana, S.A. Monte Morelos # 225 Col. Loma Bonita. Apartado Postal 1310 Of. en el D. F. Sr. Rincón Alvarez Metal No. 625 Z.P. 14 519-86-66	Guadalajara Jalisco (ND)	Drop forges, drilling machines (for metalworking)
Cía. Vimalert de México, S.A. Av. Sara No. 4413 Col. Guadalupe Tepeyac.	Distrito Federal (ND)	Drilling machines with medium capacity and a diameter of up to 1 inch (for metalworking).
Endor, S. A. Serapio Rendón No. 112	Distrito Federal (195[illegible])	Automatic lathes (for metalworking).
Eléctrica Universal, S.A. Km. 15-100 Carret. México-Laredo	Santa Clara México (ND)	Grinders (for metalworking)
Paramount, S.A. Av. 7 No. 205 Col. Granjas de San Antonio	Distrito Federal (1966)	Grinders (for metalworking)

LIST No. 1 (continued)

Name of enterprise	Location and year of establishment	Types of machine tools produced
[illegible] Ochoa, S.A. Km. [illegible] Carret. México-Laredo	Santa Clara, México (1968)	Sawing machines, wood moulding machines, edgers, small lathes, drilling machines, etc. (all for woodworking, some for metalworking).
Wysong de México, S.A. Nicanor Alvid No. 35, Mixcoac.	Distrito Federal (ND)	Shears or guillotines for metalworking.
Dreis and Krump-Izns, S.A. Madero Pte. # 2707	Monterrey, Nuevo León (1961)	Shears and bending machines for metalworking.
Remiol, S.A. Calle 64 No. 420, Sector Libertad	Guadalajara Jalisco (ND)	Shears and bending machines for metalworking.
Cincinnati Mexicana, S.A. (empresa Nueva) Of. en México: Insurgentes Sur # 1746-504 Teléfono: 5 34-85-[illegible]	Querétaro, Querétaro. (1968)	Shears and bending machines for metalworking
Hércules, S.A. Antig. camino a Culhuacán 2[illegible]9	Distrito Federal (1959)	Drop forges for metalworking (capacities of 5, 10, 18 and 30 tonnes).
Sociedad General de Maquinaria, S.A. (SOGEMA) Av. Tecnológico Sur No. 2[illegible]3-B, Tels. 5 43-76-78 y 79	Monterrey, N. L.	Yarte metalworking lathes (beds up to 1 metre).
Máquinas Monterrey, S.A. 611 Poniente Col. San Nicolás de los Garza	Monterrey, N. L. (1964)	Presses, shears and bending machines (for metalworking

ND- No date.

Source: Direct research.

MEXICO: VALUE OF MACHINE TOOL IMPORTS, 1962-1980

(In millions of dollars at current prices)

Year	Total	Lathes	Milling machines	Drilling machines	Grinding machines	Presses	Other metalworking machines	Wood-working machines 1/
1962	11.4	2.8	0.7	0.5	0.8	1.6	4.3	0.7
1963	16.7	4.1	1.3	0.6	1.3	2.7	6.3	0.4
1964	36.1	6.9	4.7	3.5	4.1	4.3	11.8	0.8
1965	33.4	9.4	4.1	3.7	4.2	4.4	10.8	2.1
1966	30.4	6.4	3.4	1.4	3.8	3.0	10.4	2.0
1967	31.4	6.4	3.6	3.0	3.3	2.8	9.3	2.9
1968	37.2	7.8	4.1	2.5	5.1	3.7	11.7	2.4
1969	41.4	10.1	4.5	2.1	5.9	4.3	11.9	2.8
1970	42.3	8.8	3.7	3.0	5.5	4.2	13.5	3.7
1971	47.1	9.4	3.8	4.9	4.9	6.2	14.9	3.0
1972*	52.7	10.3	4.3	5.8	5.6	7.4	16.1	3.2
1973	58.1	11.1	4.7	6.6	6.4	8.5	17.3	3.5
1974	63.6	12.0	5.1	7.4	7.2	9.6	18.5	3.8
1975	69.2	12.9	5.6	8.3	7.9	10.8	19.7	4.0
1976	74.5	13.7	6.0	9.1	8.6	11.9	20.9	4.3
1977	80.1	14.5	6.5	10.0	9.4	13.1	22.1	4.5
1978	85.7	15.4	6.9	10.9	10.2	14.3	23.3	4.7
1979	91.1	16.2	7.4	11.7	10.9	15.4	24.5	5.0
1980	96.6	17.0	7.9	12.5	11.7	16.5	25.7	5.3

* From this date on, only estimates are given

1/ From 1965 on, the data also include machines used to work cork, ebonite, and similar materials.

Source: Compiled from data obtained from the Foreign Trade Statistical Yearbooks (Anuarios Estadísticos de Comercio Exterior), General Office of Statistics.

MEX.CO: ESTIMATE OF THE NUMBER OF MACHINE TOOLS IMPORTED, 1962-[illegible]

(In units)

Year	Total	Lathes	Milling machines	Drilling machines	Grinding machines	Presses	Other metalworking machines	Woodworking machines
1962	4,102	796	149	334	242	377	1,718	[illegible]
1963	5,272	1,338	234	413	389	546	2,035	31[illegible]
1964	7,802	1,576	475	1,163	594	743	2,755	4[illegible]
1965	9,655	2,030	481	1,391	1,015	871	2,145	1,[illegible]
1966	6,999	1,222	378	713	739	551	2,233	1,[illegible]
1967	7,297	1,362	390	929	643	540	1,875	[illegible]
1968	6,439	1,685	400	957	819	601	2,282	[illegible]
1969	8,754	1,903	526	835	872	799	2,242	1,[illegible]
1970	8,888	1,500	365	993	954	543	2,496	[illegible]
1971	8,278	1,459	366	1,179	668	745	2,[illegible]	[illegible]
1972	9,025	1,564	397	1,389	730	835	2,560	[illegible]
1973	9,797	1,720	428	1,599	795	925	2,720	[illegible]
1974	10,[illegible]	1,868	463	1,809	865	1,015	2,880	[illegible]
1975	11,403	2,028	500	2,020	945	1,105	3,040	[illegible]
1976	12,255	2,200	540	2,230	1,030	1,195	3,200	[illegible]
1977	13,130	2,388	582	2,440	1,125	1,285	3,360	[illegible]
1978	14,040	2,592	629	2,650	1,225	1,375	3,520	2,[illegible]
1979	14,980	2,810	680	2,860	1,335	1,465	3,680	2,[illegible]0
1980	15,960	3,051	734	3,070	1,450	1,555	3,840	2,[illegible]

Note: The number of units was estimated on the basis of the following average weights (in tonnes) for the different types of machines: lathes 2.5; milling machines 3.5; drilling machines 1.5; grinding machines 2.0; presses 5.0; others 2.0; woodworking machines 1.0.

Source: Compiled from data obtained from the Foreign Trade Statistical Yearbooks (Anuarios Estadísticos de Comercio Exterior), General Office of Statistics, and from previous tables.

(In tonnes)

Year	Total	Lathes	Milling machines	Drilling machines	Grinding machines	Presses	Other metalworking machines	Wood-working machine 1/
1962	9,304	1,990	520	501	484	1,886	3,437	[illegible]
1963	12,679	3,346	819	619	778	2,730	4,070	[illegible]
1964	18,259	3,941	1,661	1,745	1,138	3,717	[illegible]	[illegible]
1965	21,315	5,200	1,682	2,067	2,030	4,355	[illegible]	[illegible]
1966	15,312	3,056	1,323	1,070	1,476	2,757	[illegible]	[illegible]
1967	15,466	3,404	1,367	1,392	1,285	2,703	[illegible]	[illegible]
1968	17,450	4,212	1,400	1,435	1,639	3,006	[illegible]	[illegible]
1969	19,613	4,758	1,840	1,252	1,743	3,952	[illegible]	[illegible]
1970	15,082	3,751	1,273	[illegible]	1,909	2,715	[illegible]	[illegible]
1971	18,024	3,647	1,283	1,768	1,335	3,727	[illegible]	[illegible]
1972*	19,719	3,960	1,390	2,084	1,460	4,175	5,120	[illegible]
1973	21,463	4,300	1,500	2,398	1,590	4,625	[illegible]	[illegible]
1974	23,258	4,670	1,620	2,713	1,730	5,075	[illegible]	[illegible]
1975	25,115	5,070	1,750	[illegible]	[illegible]	5,535	[illegible]	[illegible]
1976	27,050	5,500	1,890	3,345	2,060	5,915	[illegible]	[illegible]
1977	29,015	5,970	2,040	3,660	2,250	6,425	6,720	[illegible]
1978	31,070	6,450	2,200	3,975	2,450	6,875	[illegible]	[illegible]
1979	33,205	7,030	2,360	4,290	2,670	7,325	[illegible]	[illegible]
1980	35,420	7,650	2,570	4,605	2,900	7,775	[illegible]	[illegible]
1971 index**	194	153	247	353	276	193	140	306

* From this year on, estimates are given, based on average growth rates for selected periods.

** 1962 = 100.

1/ From 1965 on, the data also include machines used to work cork, ebonite, and similar materials

Source: Compiled from data obtained from the Foreign Trade Statistical Yearbooks (Anuarios Estadísticos de Comercio Exterior), General Office of Statistics.

(In units)

Description	1960	Share (%)	1970	Share (%)	1980	Share (%)
TOTAL	15,677	100.0	86,210	100.0	205,673	100.0
(a) Metalworking:	13,677	87.2	73,148	84.8	174,283	84.7
Lathes	2,820	18.0	17,011	19.7	38,711	18.8
Milling machines	531	3.4	4,066	4.7	9,384	4.6
Drilling machines	980	6.3	9,000	10.4	30,246	14.7
Grinding machines	830	5.3	7,317	8.5	17,485	8.5
Presses	1,206	7.7	7,106	8.2	18,606	9.0
Others	7,310	46.6	28,648	33.2	59,831	29.1
(b) Woodworking	2,000	12.8	13,062	15.2	31,390	15.3

Remarks:

Stock in 1960: machines less than five years of age.

Stock in 1970: machines less than fifteen years of age.

Stock in 1980: machines less than twenty-five years of age.

Source: Compiled on the basis of annual imports.

PRINCIPAL MACHINE TOOLS IMPORTED AND THEIR SHARE IN TOTAL IMPORTS, 1963-1969
(Millions of pesos)

TYPE OF MACHINE TOOL	1963	1964	1965	1966	1967	1968	1969	Relative share of total 1963 %	1965 %	1969 %
I. FOR METALWORKING										
(1) Lathes	81.7	86.6	117.3	50.0	80.3	97.5	125.9	21.3	23.4	22.7
(2) Grinders, tool grinders, etc.	16.0	50.6	51.9	47.6	41.8	64.2	73.6	7.5	10.4	13.3
(3) Milling or cutting machines	16.1	58.5	51.2	43.0	45.3	51.2	53.5	7.5	10.2	10.2
(4) Planers, slotting machines and boring machines	6.5	22.9	21.2	16.5	19.5	25.4	21.7	3.0	4.2	5.9
(5) Sawing machines (saws)	4.3	6.4	6.9	5.7	4.8	4.0	4.8	2.0	..4	0.8
(6) Combination machines, jig boring machines, lapping machines, threading machines and centring machines	4.8	18.9	20.1	19.8	26.5	36.1	27.2	2.3	4.2	4.9
(7) Drilling machines	7.6	44.0	46.2	17.2	37.2	32.8	26.3	3.6	9.2	4.7
(8) Eccentric presses	8.9	18.6	25.4	12.3	12.8	12.3	12.7	4.2	3.1	2.3
(9) Wire drawing machines	0.2	3.5	6.8	5.4	4.3	10.5	10.5	--	1.4	1.9
(10) Bending machines	6.0	4.4	7.2	13.8	8.2	6.5	6.9	2.8	1.4	[illegible]
(11) Machines for cutting or perforating (except shears and drills)	9.4	7.7	4.6	5.0	5.3	9.0	9.0	4.4	4.9	1.6
(12) Shears or guillotines	4.6	2.9	8.2	20.0	7.2	12.9	6.0	2.2	1.6	1.1
(13) Drop forges	10.0	12.4	11.7	15.9	13.5	18.1	27.1	4.7	[illegible]	[illegible]
(14) Machines for manufacturing springs	0.2	0.6	3.4	2.7	3.2	1.4	6.1	--	0.7	1.1
(15) Machines for manufacturing washers, tacks, screws, etc.	2.1	6.5	9.2	5.6	18.9	8.9	15.1	1.0	1.8	[illegible]
(16) Combination machines operating by forging	0.9	6.1	9.4	7.4	5.0	8.9	8.5	0.4	1.9	1.5
(17) Presses, except eccentric presses and drop forges	2.1	13.4	27.5	9.1	8.7	15.3	14.5	1.0	5.5	2.6
(18) Machines for manufacturing metal containers	2.7	2.9	1.6	13.6	6.5	5.8	5.7	1.3	0.3	[illegible]
TOTAL 1/	154.1	366.9	419.8	332.6	346.0	407.6	451.6	[illegible]	83.9	[illegible]

(continued)

TYPE OF MACHINE TOOL	1963	1964	1965	1966	1967	1968	1969	Relative share of total 1963 %	1965 %	1969 %
II. MACHINES FOR WORKING STONE AND OTHER MINERALS										
(1) Cutting machines	4.2	3.7	3.5	3.7	2.4	2.0	3.5	2.0	0.7	0.6
(2) Polishing machines	--	--	2.4	3.6	3.5	3.8	5.0	--	0.5	0.9
(3) Marble sawing machines (weight exceeding 10,000 kg)	--	--	--	1.0	0.5	1.0	4.4	--	--	0.5
TOTAL 1/	4.2	3.7	5.9	8.3	6.4	6.8	12.9	2.0	1.2	2.3
III. MACHINES FOR WORKING WOOD, PLASTICS AND OTHER SIMILAR MATERIALS										
(1) Presses	15.0	20.7	5.2	2.4	2.6	2.4	7.0	7.0	1.0	1.3
(2) Planing machines, sanding machines or polishers	2.3	2.6	7.4	7.1	13.4	7.4	9.4	1.1	1.6	1.7
(3) Drilling machines	--	--	0.7	1.0	0.8	0.8	0.6	--	0.1	0.1
(4) Lathes	0.2	0.7	1.0	1.2	1.7	1.6	1.3	--	0.2	0.2
(5) Saws (sawing machines)	1.8	3.6	5.2	5.7	7.8	5.3	5.7	1.0	1.0	1.0
TOTAL 1/	19.3	27.6	19.5	17.4	26.3	17.5	24.0	9.1	3.9	4.3
GENERAL TOTAL 1/	177.[illegible]	398.2	445.2	358.3	378.7	431.9	498.5	83.3	89.0	89.7
TOTAL IMPORTS	212.7	462.8	500.4	402.6	437.1	486.8	558.4	100.0	100.0	100.0

1/ The difference is accounted for by the remaining machines, for which there were small individual imports.
SOURCE: Prepared using data from the Foreign Trade Yearbooks, DGE, SIC.

IMPORTS OF MACHINE TOOLS, BY COUNTRY: 1965, 1968 and 1969
(Millions of pesos)

Country	1965	1968	1969	Relative share of the total (%) 1965	Relative share of the total (%) 1969
United States of America	255.0	194.7	216.2	48.8	37.3
Federal Republic of Germany	104.0	85.6	115.1	19.8	19.9
United Kingdom	44.6	25.5	37.5	8.5	6.5
Czechoslovakia	20.0	11.1	21.7	3.8	3.7
Italy	18.3	20.3	38.0	3.5	6.7
Spain	[illegible]	17.6	18.3	3.3	3.2
Switzerland	12.1	11.3	15.9	2.3	2.7
France	6.9	18.6	56.9	1.3	9.8
Belgium	6.2	4.7	11.9	1.2	2.1
Brazil	4.0	6.7	16.5	0.8	2.9
Japan	3.4	16.9	3.5	0.6	0.6
Argentina	na	na	8.6	-	1.5
All twelve countries	492.6	405.9	561.2	93.9	96.9
Remainder	32.1	21.6	18.0	6.1	3.1
Total imports 1/	522.7	427.5	578.2	100.0	100.0

1/ Includes pneumatic tools and machine tooling. The total therefore differs slightly from that given in other tables.
SOURCE: Prepared with data from the Foreign Trade Statistical Yearbooks of the United Mexican States, DGE.
na: Not available.

IMPORTS OF LATEX, 1/ BY COUNTRY: 1955 and 1969
(Millions of pounds)

Country	1955	1969	Relative share 1955 (%)	Relative share 1969 (%)
United States of America	37.2	21.0	31.7	16.7
Germany	20.9	29.2	17.8	23.2
United Kingdom	14.9	11.8	12.7	9.4
Czechoslovakia	8.9	10.3	7.5	8.2
Spain	8.7	6.0	7.4	4.8
France	4.9	24.9	4.2	19.8
Belgium	3.5	2.9	3.0	2.3
Italy	3.2	4.3	2.7	3.4
Brazil	2.8	10.3	2.4	8.2
Poland	2.4	0.3	2.0	0.2
Japan	0.5	1.2	0.4	0.9
Argentina	1.7	1.3	1.4	1.0
All twelve countries	109.6	123.5	93.3	98.1
Remainder	7.7	2.4	6.7	1.9
Total imports	117.3	125.9	100.0	100.0

1/ Only for [illegible].
SOURCE: Prepared with data from the Foreign Trade Statistical Yearbooks of the United Mexican States, DGE.

IMPORTS OF SEPARATE COMPONENTS AND PARTS FOR MACHINE TOOLS, 1965-1969
(Thousands of pesos)

Sub-division		1965	1966	1967	1968	1969
8448 A.-	Fixtures or tool holders	25,352	17,109	19,695	20,164	21,362
8448 B.-	Copying devices	3,227	1,210	580	544	530
8448 C.-	Separate components or miscellaneous accessories	33,393	27,003	26,492	24,405	31,531
	Sub-total (A)	61,972	45,322	46,767	45,113	53,423
8445/47	IMPORTS OF MACHINE TOOLS Sub-total (B)	500,400	402,600	427,100	[illegible]	555,400
	Share of B accounted for by A (%)	12.4	11.3	10.9	9.3	9.6
	TOTAL IMPORTS OF MACHINE TOOLS, SEPARATE COMPONENTS AND PARTS	562,372	447,922	473,867	511,205	608,823

SOURCE: Prepared with data from the Mexican Foreign Trade Statistical Yearbooks, DGE, SIC.

LAFTA TARIFF SYSTEM FOR TRADE IN MACHINE TOOLS, 1970

Country		Metalworking machine tools(1)			Machine tools for working wood and similar materials (1)			Separate components and accessories for metal-working machine tools(1)			Separate components and accessories for wood-working machine tools(1)		
		LS	ST	AVT(5)	LS	ST	AVT(4)	LS	ST	AVT(5)	LS	ST	AVT(5)
ARGENTINA	A	FT	(*)	79.1	FT	20.00	(4) 91.5	FT	20.00	90.0	FT	20.00	21.5
	B	FT	(*)	33.3	FT	2.00	(4) 51.5	FT	2.00	21.5	FP	2.00	[illegible]
BRAZIL	A	FT	-	37.4	FT	-	(5) 57.0	FT	-	46.0	FT	-	[illegible]
	B	FT	-	23.6	FT	-	(5) 44.0	FT	-	32.0	FT	-	[illegible]
COLOMBIA	A	PL	-	18.2	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)
	B	FT	-	13.3	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)
CHILE	A	FT	0.20	62.6	FT	0.20	92.5	(**)	(**)	(**)	(**)	(**)	(**)
	B	FT	-	19.0	FT	0.125	17.6	(**)	(**)	(**)	(**)	(**)	(**)
ECUADOR	A	FT	2.00	20.0	FT	2.00	20.0	FT	2.00	20.0	(**)	(**)	(**)
	B	FT	-	25.0	FT	-	25.0	FT	-	25.0	(**)	(**)	(**)
PARAGUAY	A	FT	-	63.0	FT	-	69.0	(**)	(**)	(**)	(**)	(**)	(**)
	B	FT	-	15.5	FT	-	23.5	(**)	(**)	(**)	(**)	(**)	(**)
VENEZUELA	A	FT	0.001	-	FT	0.001	-	FT	0.05	-	(**)	(**)	(**)
	B	FT	-	-	FT	-	-	FT	-	-	-	-	
URUGUAY	A	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)
	B	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)
MEXICO	A	FT(2)	1.00	25.3	FT	1.00	27.0	FT	0.35	21.5	FT	0.20	28.0
	B	FT(3)	-	8.9	FT	-	8.0	FT	-	13.5	FT	-	8.0

(continued)

A = Duty applicable to outsider countries.

B = Duty applicable to LAFTA countries.

LS = Legal status.

FT = Free trade.

PL = Subject to prior permit (prior licence).

ST = Specific tax per kg or pound, expressed in the currency of the relevant country.

AVT = Ad valorem tax (includes "others with equivalent effect").

(*) Exists only for the category "other metalworking machine tools", and amounts to $20.00 per kg for outsider countries and $2.00 for LAFTA countries.

(**) Negotiations have not been carried out.

(1) The taxes are expressed as an average of the total for this type of machinery.

(2) Prior permit is required for only seven types of machine tools (which are domestically produced).

(3) Of the twenty-one types of machine tool falling into this category, eleven can be imported free of duty (including those which are domestically produced).

(4) Of the twenty-two types, there have been negotiations concerning only seven, namely planing machines, lathes, sewing machines, milling machines, automatic milling machines and machines classed under "others for woodworking".

(5) There have been negotiations on only five of the existing twenty-two types.

SOURCE: Prepared with data from the consolidated list of concessions granted by the contracting parties to the Treaty of Montevideo, Mexican Inter-Secretariat Committee for the Latin American Free Trade Association, 19[illegible]0.

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