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for Countries in Latin America

Buenos Aires, Argentina
16 - 25 October 1972

Sao Paulo, Brazil
26 - 27 October 1972

REPORT ON THE STATUS AND PROSPECTS OF THE MACHINE TOOL INDUSTRY IN THE ARGENTINE REPUBLIC 1/

by

the National Institute of Industrial Technology
(INTI)
Buenos Aires

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Corrigendum

The authorship of document ID/WG.113/26 should read as follows:

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I. PROGRESS AND STATUS OF MACHINE TOOL PRODUCTION IN THE LAST DECADE

1.1. Stock, production, import and export

For the beginning of the decade, and very valuable as a precedent, we have the ECLA study on machine tools in the Argentine Republic. This study estimated the stock of machine tools existing in 1963 by means of a sampling and contrasting procedure; production by inquiry from manufacturers; and trade by direct compilation of customs data.

It is to be regretted that, except for some parts of it, this work was not brought up to date as time progressed. Consequently, a different method has been used for information regarding the close of the last decade.

Thus, stock for 1971 has been estimated by correlating general series, on the basis of 1963 data.

A census of production has been carried out by means of an ad hoc inquiry, for the purpose of informing the participants in this Regional Latin American Seminar concerning this and other important aspects of the Argentine machine tool industry. Almost all the manufacturers collaborated in this inquiry. The figures for foreign trade were taken from the documentation of the National Institute for Statistics and Censuses.

It should be pointed out that, for purposes of comparison, the first part of the form for the inquiry that was carried out is similar to the ECLA form, and includes the same classification and types of machine tools, that is to say, it excludes tools for chemical and electrical processes, welders and other similar tools, as well as hand tools.

As regards the second part of the inquiry, this contains material relating specifically to the present quality level - a key point for making a close examination of the degree of sophistication achieved by our machine tool industry.

1.1.1. Stock

The ECLA study estimated that in 1963 the stock of production machine tools in the possession of the Argentine Republic amounted to 173,000 units. If to these are added machine tools designed for maintenance services, this total rises to 202,000.

Recently, the Office of the National Director of Industrial Promotion, at the Argentine Ministry of Industry and Mines, in its study on the Machine Tool industry in the Republic of Argentina, published in 1971, thought it desirable (since they were in possession of the data of the Industrial Census of 1963, which ECLA did not have), to effect a calculation by a similar method, but making use also of the development of intercensal average productivity rates for labour between 1953 and 1963. As a result, they estimated production stock for 1963 at 191,000 units.

If maintenance units are taken into account, the total stock fluctuates around 220,000 machine tools. As a result of this correction, this study estimates that in 1970 the stock amounted to 295,000 machine tools.

1.1.2. Production

In 1963, the Argentine industry produced 4,800 machine tools, meaning as such those included in the ECLA study mentioned above. The ad hoc inquiry carried out in the course of the current year revealed a production of 12,000 units in 1971.

1.1.3. Imports

In 1962, 1,850 machine tools were imported and, in 1963, 675, to a value of US$20 million and US$11 million respectively. Import statistics showed an import of 1,750 units in 1970 and 1,370 in 1971, to the value of US$21.8 million and US$18.2 million respectively.

1.1.4. Exports

These amounted to 220 units in 1962 and 1,500 in 1963, wheras 1,700 units were exported in 1970 and 1,400 in 1972. The respective values were US$370,000 and US$2 million, and US$1.7 million and US$3.3 million.

1.1.5. Comments

The above data show normal progress.

They do not, it is true, reflect the important rise in the quality and reliability levels of Argentine machine tools during the course of the decade, nor the improvement in design and in operating features, which have continued to increase in value.

The price per unit of imported machine tools continues at the same high level as ten years ago, whereas exports are at a rather lower level, of about $1,300 each, on the average. In 1971, this value per unit went up to a little over $3,000.

It should be pointed out that although the export figures, compared with the total for the country, are not very important, they show that the contribution of the machine tool sector is acquiring an appreciable value among non-traditional products and as regards, in particular, the sector's own output.

1.2. Types and varieties produced

The sector paid a good deal of attention to this matter during the decade, with a view to adapting itself specifically to the development of the domestic market, with its growing needs and demands.

At this Regional Seminar for Latin America a paper has been presented by Mr. D. Enrique C. Sabatté, dealing with this very subject, under the title "Development of the characteristics and production of machine tools in Argentina, 1962-72."

This paper concludes by pointing out that during the decade development has been satisfactory in respect of varieties, weight, stiffness, power, range of speed and other characteristics. It adds, moreover, that the production of components with operating units, with a varying degree of automation, as also the use of hydraulic, pneumatic, low-voltage electrical and electronic systems, pressure lubrication, braking and coupling devices and accessories, which appropriately and with growing technical know-how and sophistication complete the picture of the sector.

The inquiry, for its part, clarifies the situation somewhat, with better classification and the appearance of simple but powerful machine tools designed specifically for production machinery. The sector's range of control instruments appear to be more exact.

1.3. Current projects

Some of the recommendations of the ECLA study have been carried out and others are at the prototype or project stage.

Among these are: drillers, crankshaft grinders, saw cutters, high-speed heavy presses and other varieties of wider span, based on existing models.

1.4. General structure of the enterprises

Development has been on an individual basis, as regards size, technical advance, organization, productivity, integration at the national level, and in other respects.

A comparative table of ECLA's 1963 data and the data obtained by the 1971 inquiry reflects this development, which has been satisfactory.

To some degree the factories of the sector seem to be complementing one another, but this does not keep pace with the economic and proper progress of the specialized units and sections. An opportunity is thus lost for them to achieve a better common technical level.

1.5. Infrastructure

In line with the development of the sector, pressure on the supporting sectors has grown heavier; they are being subjected to demands for more satisfactory supplies for the machine tool industry.

Consequently, the heat-treating services and sectors, the manufacturers of motors, hydraulic, pneumatic, and electrical components, of parts and accessories, have steadily improved. The same has happened with the tooling.

1.6. Summary

A comparative analysis of the events of the decade reveals an improvement, both in general and in particular.

This is the result of initiative on the part of the enterprises, particularly those in the vanguard. These last, indeed, have been maintaining a standard of quality comparable with the international average. They have raised that standard, adding more weight per unit, greater flexibility, better adaptation of models to specific uses and, in short, have achieved a higher standard of reliability than was to be had a decade ago.

Moreover, in the technical structure of the sector, there exist two sections, one intermediate and the other producing machine tools for sporadic and not exacting use, at lower prices. The intermediate section, by means of an internal and an external policy, particularly by the introduction of more technical assistance and greater adaptation to specifications, can assist the vanguard section in attaining the goals of the machine tool production sector.

2. FUTURE PROSPECTS, SUGGESTED POLICY

2.1. Shortcomings and possibilities of the present structure

The machine tool manufacturing sector in Argentina is currently proposing the following considerations as a point of departure for working out a plan of development:

- Division into three main sections, as mentioned under the preceding heading.
- A standard of quality and reliability in the vanguard section comparable to the international standard, as regards both types and models.
- An intermediate section which potentially, by means of a more or less considerable effort, could be integrated with the above.
- An attempt to find ways of expanding exports, to be undertaken by the intermediate and vanguard sections.
- A worth-while endeavour to participate in import substitution.
- A marketing structure which, especially in the intermediate section, has not been conducive to better relationship between producer and user, especially as regards the intermediate section, for the technical and economic advantage of both.
- A degree of interrelationship among the sector's enterprises which is still not as effective as could be desired.
- A structure of technical assistance, research and development, technological training and quality control that is not properly directed towards a policy aimed at specific improvements in the domestic machine tool industry.
- A similar outlook in government and credit policies, which have not been co-ordinated in concentrating on priority goals for the sector.
- A national economic situation which has not permitted the establishment of a domestic supply nor the strengthening of a national equipment policy in which the Government and the mixed enterprises should play a leading part.
- A deficiency in the composition of the machine tool manufacturers' own stocks, for which they are trying to make up by the work of skilled mechanics, of which there is an ample supply.
- This last circumstance favours expansion, that can be achieved through larger and better stocks, obtained by transferring mechanics to more precise preliminary work on machine tools, thus making use of the available skilled labour to tackle adjustments in the main volume of production.
- The advantage - taking into account the supply needs and the size of the batches produced - of incorporating numerically controlled machines in the sector's stock.
- A price level and a policy calculated to encourage non-traditional exports, and that would promote the competitive power of our machine tools in the foreign market.
- A situation in the developed countries that does not allow them to compete in the field of classical machine tools that are not very sophisticated in relation to the technological advance of developing countries like Argentina, as regards quality, simply because of the different structure of domestic costs.

2.2. Suggested policies and goals

Within the framework of the national and sectoral goals, and in accordance with the analysis that has been carried out, policies can be derived that are applicable in the course of the next decade.

Policies

- Concentration of effort on the present types.
- Raising the levels of quality and reliability, in accordance with local needs and especially as regards units for export.
- Addition of certain classic types of more finished machine tools for which there is an appreciable demand. We would mention, among others, boring machines and gear-finishing machines.
- Stepping up the construction of heavy metal-forming machines and the components for operating units designed for the automotive industry, and of other durable goods. Modern ideas and standardized models must be adopted.
- Increasing the current volume of exports, with the necessary guarentees of quality and safety required by foreign markets, including customer services.
- Creation of more technical and energetic marketing organizations, in which the producers would play a bigger part.
- Establishment of a complete official policy, that is to say, one that covers and co-ordinates all matters involved, with a view to achieving the goals set by the sector.
- Continuation of the current importation of high-precision machine tools, numerically controlled and other special machine tools.
- Growth of interrelations within the machine tool sector in order to increase the efficiency of the plant and the technology of the sector, and to strengthen the common services.

Goals

It is suggested that the Argentine machine tool industry should have the following goals during the next decade:

- Aim at effectively balancing the import of foreign machine tools against the export of our own.
- Attend to needs arising out of the above, without neglecting the stock requirements of the home industry.
- Secure sectoral agreements on complementary activities within the framework of LAFTA.

2.3. Draft plan for the next decade

The above goals take shape within the following interrelated parameters:

	US $, in millions
annual exports	30
for annual domestic consumption	40
annual imports	50
apparent annual domestic consumption	90

2.5. Supplementary policies

It is considered that promotional activities, fiscal and otherwise should, in addition, aim at:

- Application of selective criteria based on standards of quality, reliability and national integration.
- Matching, as far as practicable, the conditions accorded in other countries to the machine tool production sector.
- Livlier activation of credit support, both for manufacturers and for domestic users of machine tools.
- Application of measures to promote the continuance of enterprises financed by domestic capital, as they grow and become technically more advanced, and to ensure the permanence of enterprises now of a familiar type.
- Realization of the San Francisco Industrial Estate Association, a UNIDO project, and of the San Francisco Industrial Estate Association (ENTE), in order to secure an important nucleus of the country's machine tool industry and to establish a greater degree of inter-enterprise relationships and common activities and services.
- To promote the creation of organizations, composed of machine tool producers, to carry out certain operations economically and in the service of the sector, e.g. precision tools or large components (jig-boring, planing-milling, boring, grinding), and the manufacture of grinding and heat-treatment gear and other components characteristic of the sector's production.

It must be borne in mind that the goals which have been fixed determine the equipment and re-equipment needs of the machine tool industry, which may be valued in amounts that could rise from the present level of US$2.5 million to US$8 million in 1980.

Assistance and educational activities are essential if the set goals are actually to be achieved. The former must include technological, technical and organizational activities as well as research and development, control and quality.

As regards educational activities, these should:

- Institute special instruction, at university level, in machine tools and related subjects.
- Step up technical and mechanical instruction at the intermediate level in order to train more workshop personnel, both for support at the intermediate level and for specialized work (fitters, framers, foundrymen, designers, inspectors, etc.).

3. TECHNICAL CONSIDERATIONS

3.1. The use of licences in Argentina is governed by Law No. 19231, which established a "licensing register". Apart from the regulating of the licence market, which this law involves, there is also the disadvantage, which one usually comes up against, of a limited market that often does not permit the carring out of operations with sufficient profitibility.

In other cases the licence in itself is not enough, especially if the level of technical efficiency, standard of quality achieved in the workshop, and experience, fall below the minimum necessary for dovetailing with the machine tool requirements for which the licence is being requested. For such cases, and within the framework of the economic policy we are proposing, the concept of licences should be enlarged in order to cover shortcomings of the kind mentioned.

3.2. Original prototypes

Enterprises in a position to achieve progress, and to make their own designs, run into difficulties, at a certain stage of calculation and experiment, which could ruin their efforts for lack of the technical means to procure information about the strength of materials, dynamics, the interrelation between machine and too, and general behaviour when operating at top speed or high precision.

To that effect laboratories and workshops should be set up that are capable of providing services to meet these common needs.

Credit support for prototypes is specially arranged by the National Development Bank

2.3. Single operations

Machine production of large components with a sufficient degree of adjustment to obviate much of the work of scraping is an economic necessity for reducing the working hours employed in machine tool production in Argentina.

Modern machine tooling requires the inclusion of gear wheels, with grinding and hardening gear, and other units - especially in vital components. Hence the need to establish sections and/or workshops especially reserved for machines designed for the purposes mentioned above.

3.4. Supplies

As regards the supply of semi-finished goods, parts, components, accessories and other items and materials, supplier industries should be created at a level commensurate with that existing in the field of end products.

To this effect the casting of structural parts is a branch that merits special attention, since the mechanical skill and specialization involved calls for vocational training that should be promoted by incentives, since otherwise the foundries will tend to engage in the mass production of parts easier to manufacture, and more profitable for them.

Notwithstanding domestic efforts in electronic devices, push-button motors, hydraulic circuits and others, there is no doubt that it will still be necessary, as regards machine tools for mass production, to establish a balance between domestic and imported products in order to achieve suitable levels of quality and reliability in respect of the special products which, on the world market, are sometimes concentrated in the hands of one or two firms only.

4. MEANS OF DEVELOPMENT

4.1. Government and private means at the national level

4.1.1. Promotion and credit

Within the public sector it is to be expected that practical effect will be given to industrial promotion arrangements that will maintain the priority character of the machine tool industry.

As regards credit facilities, these must be implemented on a basis of selective criteria, guided by a level of quality, reliability and national integration, with the corresponding guarantees of progressiveness.

The granting of licences can be useful, if they are dealt with in the spirit of the law we have mentioned.

It is also worth considering the production in Argentina of units and components to the order of firms in developed countries, for sale in those countries, with mark and specifications of origin.

Although there exist special regulations that have such cases in view, they should be improved, in the national interest.

4.1.2. Co-operation

In the domestic field, community efforts should be promoted, with or without government participation, as regards private initiatives in that direction. There are several areas in which such co-operation is desirable, e.g.:

- Specific planning of specialized undertakings.
- Establishment of joint workshops and/or services.
- Exchange of products within the sector, on the basis of availability of equipment or accessories.
- Promotion of supplies specially adapted to machine tool production, with requirements as to quality.
- Exchange of experience and know-how.
- Harmonization of marketing activities (including technical promotion and assistance, installation and putting into operation, tool designing, servicing, stock of spare parts, etc.) organized by the producers themselves, particularly in order to ensure prestige in foreign markets.

4.1.3. Instructional activities

With most manufacturers a knowledge of machine tool engineering must be combined, in an ever higher degree, with other kinds of skills.

Such knowledge may derive from technical assistance, organizational and technological activities, from handing down enterprises to younger members of the family, or from catalogue listings containing the required know-how.

The establishment of specialized courses, especially at university level, since that is the level at which the need to introduce up-to-date, highly specialized information is most strongly felt.

The creation of assistance and training centres, for instance, one in the San Francisco Industrial Estate and another in the Buenos Aires district.

These activities should also deal concurrently with such subjects as tribology, hydraulic, pneumatic, electrical, electronic, pilot, motory and control circuits and parts, in order to perfect the calculation and design of machine tools.

4.1.4. Research and development

The existence of the three sections referred to in 2.1. corresponds to different levels of technical progress.

The vanguard and intermediate sections aim at perfecting the first and require a research and development centre that would provide facilities for assisting in the designing of prototypes, insofar as these lie beyond the scope of the workshops.

This is the case with the design of a frame and its prototype and the possibility of applying a study of tensions to complete the relevant calculations.

4.1.5. Quality control

This is the area which calls for the greatest effort. The most advanced section of the sector acquired, as time went on, a level of quality and reliability comparable to the equivalent international standard.

This standard must be confirmed by a quality seal that would accompany the introduction of these machine tools, especially in foreign markets.

Concurrently, inspection and control of machine tool components and mechanisms will be required, the infrastructure for which is considered to exist already. In any case, some guidance should be given according to the destination of these components and equipment, the nature and characteristics of the machine tool in question and its precise level of quality and reliability.

4.2. Organizations to be established and/or strengthened

The creation of an Argentine Machine Tool Institution responsible for technical assistance, research and development, is a need that has been emphasized in previous studies and above all by the realities of the situation. Its field of operation would be mainly in the Buenos Aires district, but without excluding other areas of the country. The establishment of joint centres in the San Francisco Industrial Park, as planned, would constitute another nucleus within the country.

The strengthening of CEMHA (Centre for Machine Tool Research) in the private sector and of CIM-INTI (Research Centre on Methods at the National Institute of Industrial Technology).

Increase activities carried out by INTI, IRAM (Argentine Institute for the Rationalization of Materials) and other institutions in regard to quality and the observance of standards.

The creation, by machine tool producers, of marketing organizations at the regional and national levels, which, above all, pay due and full attention to foreign markets according to an escalated plan that would enable these services to be maintained efficiently as the markets were being penetrated and secured.

For the same reason, research on foreign markets is required that would not only appraise them but also supply the necessary guidelines for directing marketing activities in the best possible manner.

The creation of a joint organization or joint organizations of machine tool producers in order to channel the output of machine tool components, accessories and spare parts commissioned by foreign producers for their own market.

4.3. UNIDO assistance

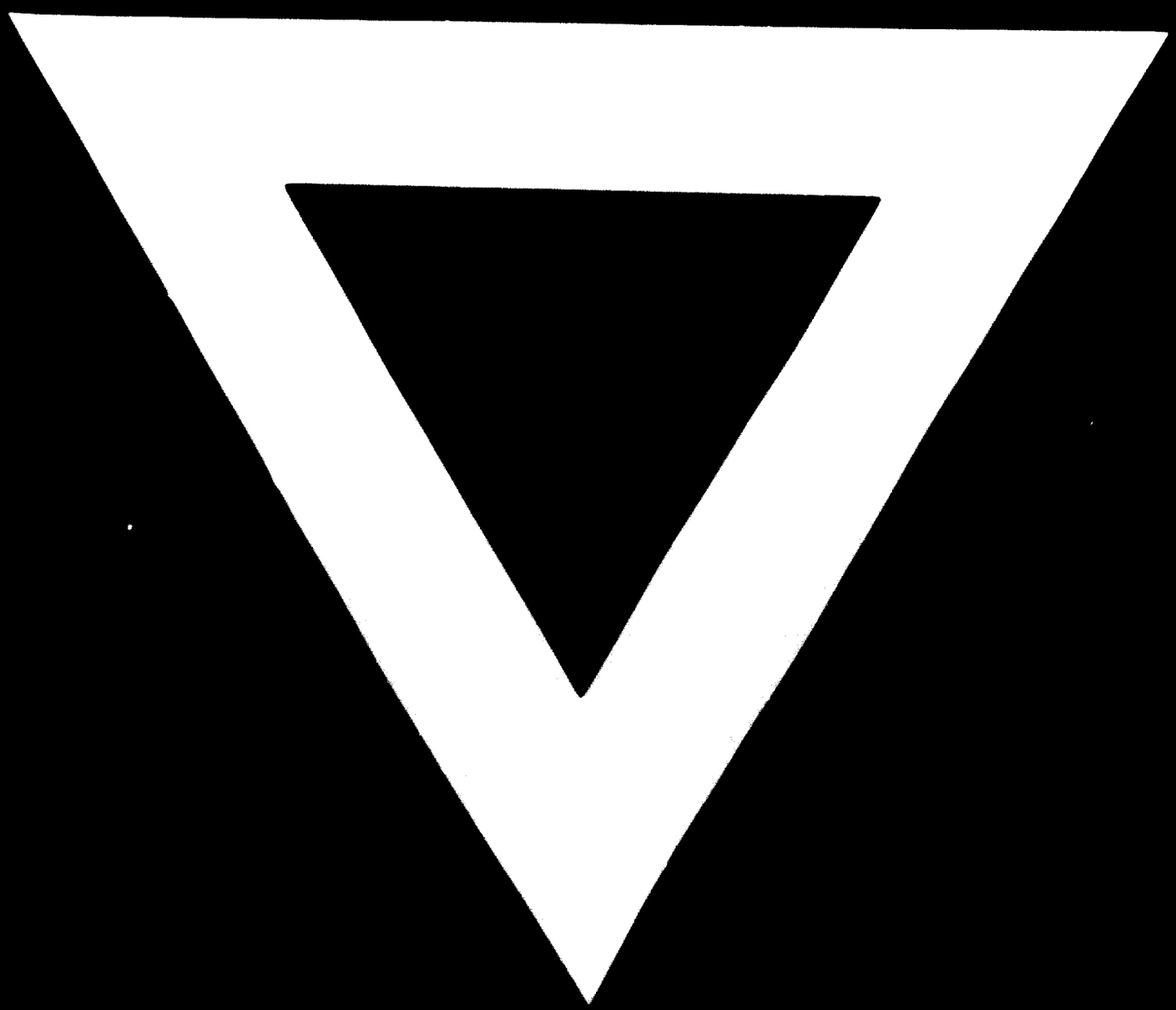
From the outset, UNIDO has maintained assistance activities in the Argentine Republic. Among these should be mentioned the project for the San Francisco Industrial Estate, in which the national, provincial and municipal governments are interested, with the firm support and encouragement of the Association (Unte) industrialists.

The creation of the Argentine Machine Tools Institute is suggested in the ECLA study and this initiative would be carried out with UNIDO research and support and, in particular, by means of the necessary technical assistance, research and development, quality inspection and control.

At the same time, it will be said, a technical nucleus of the industry must be preserved on a permanent basis, with a Department devoted to machine tools at the National University.

In order to create this nucleus, special and related university chairs must be established to constitute an integral and broad-based educational unit devoted to machine tools. If the curriculum is to be effective and durable, it is considered that five years will be required to work it out and another five to consolidate it, and it must be in the charge of top-ranking professors.

With the help of UNIDO, to extend and improve research into foreign markets, including those of the developed countries, in order to gain detailed knowledge of the possibilities for introducing Argentine machine tools, with a quality seal, and to establish the best possible means of promoting and ensuring their introduction.



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