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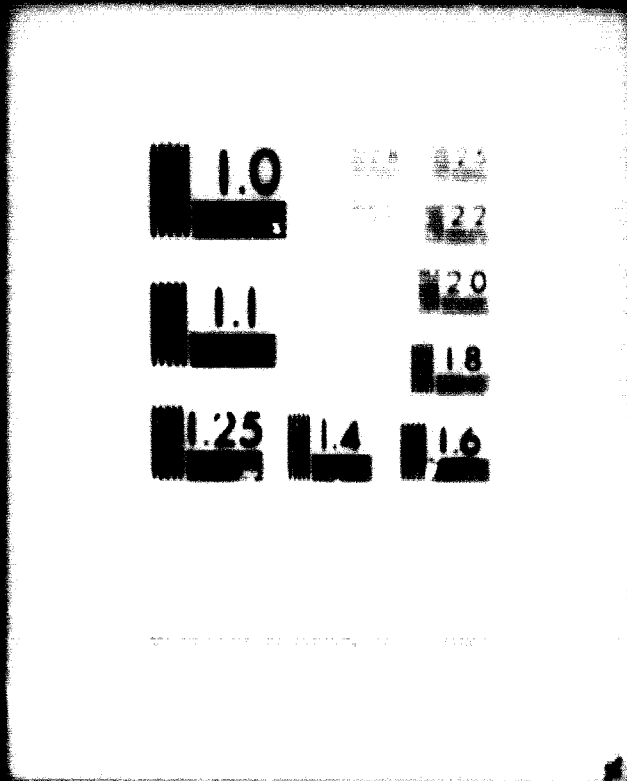
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## 1. INTRODUCTION

### 1.1 Terms of Reference

*Preliminary techno-economic investigations carried out by UNIDO - experts in 1972, revealed amongst other things that there would appear to be adequate scope for setting up production of textile machinery in Mexico.*

*The aim of the present study was to identify those types of textile machinery whose manufacture in Mexico would be an interesting proposition both for the potential investors, whether national or foreign, and for the local textile industry. Accordingly, a detailed feasibility study was to be carried out, in order to identify the most promising machines in this respect*

*At the same time, recommendations were to be made as to the conditions which should be met and the measures which should be taken in order to build up a prospering local textile machinery manufacturing industry.*

### 1.2 Methodology applied

*The problem of identifying textile machines whose local production would show promise was tackled with a systematic approach, the main elements of the system involving investigations as to:-*

- *The Mexican textile industrial scene.*
- *The future will consumption of textile fibres both for the home market and for exports.*
- *Preferences and buying habits of Mexico's textile industrialists as regards textile machinery.*
- *Availability and cost of manpower and other resources needed for the production of textile machinery.*
- *Production of textile machinery in other Latin American countries.*
- *The world market for textile machines. and finally,*
- *The attitude of local machine manufacturing industries in general which might consider diversifying their range of products into the field of textile machinery.*

*The ICME/CONDOR team, basically consisting of three consultants, proceeded to obtain the relevant information by carrying out the following work.*

*Holding personal interviews with:-*

- *Mexican textile industrialists;*
- *Officials of National Chambers in Mexico;*
- *Government officials in Mexico;*
- *Mexican manufacturers of other types of machinery;*
- *Dealers of textile machinery, representing foreign makes of textile equipment;*
- *Manufacturers of textile machinery in Germany and Switzerland;*
- *Brazilian and Argentinian textile industrialists;*
- *Manufacturers of textile machinery in Brazil and Argentina.*

*Carrying out a study of relevant literature, such as:-*

- *NAFINSA's "Bases para la Reestructuración de la Industria Textil", Mexico 1966.*
- *CEPAL's "La Industria Textil en America Latina", 1966.*
- *and a number of other works as referred to in the text of the present report.*

*Carrying out a study of available statistics on the Mexican environment.*

*Holding regular "Progress meetings" with UNIDO's Project Management and NAFINSA's responsible staff members thus enabling all parties concerned to give their comments on the progress of the work. In one such meeting, it was decided to orient the information presented in the report towards two main aims, these being:-*

- *To structure such information according to the decision procedure of potential investors and,*
- *To furnish additional information concerning the world market situation of significant textile machine producers.*

*When estimating future home market and export demand patterns for textile fibres, it was jointly decided to use a more pragmatic rather than a mathematical approach to arrive at the required assessments. Projections of future growth in fibre consumption thus are based on past trends and on sober analysis of the development of those factors and tendencies which influence its future evolution.*

### 1.3 Limitations

*Even during the course of preparing the present report, the world economy is passing through its most difficult phase since World War II.*

*As in the case of most other industries, the textile industry is suffering from a severe setback in its sales turnover and profit margins.*

*Some manufacturers of textile machinery who were still enjoying full employment at the start of this study, in September 1974, had begun to work short hours by January 1975.*

*Naturally, due to this situation ICME/CONDOR was obliged to make certain assumptions concerning the probable future course of the international textile and textile machinery industries before attempting to make projections as to the future demand patterns for textile fibres in Mexico. The main assumption was that a revitalization process for Mexican exports would be applied early in 1976, thus marking the beginning of a new moderate upswing in the normal textile trading cycle.*



## 2. SUMMARY.

### 2.1 Conclusions.

*Any prospective textile machine factory in Mexico must have access to the latest technological developments in the relevant field. The country's textile industrialists today import the most modern equipment available all over the world.*

*Mexico's machinery park in this respect includes about 2.3 million spindles and 46 000 looms. Such key machinery of the country's textile industry, reveals itself to be of an unexpectedly high degree of modernity. Indeed, about 90% of all ringspinning machines and weaving looms can be considered as being modern.*

*Mexico's textile industry imported equipment to the value of over Ps.\$1 400 million in 1971 and over Ps.\$1 200 million in 1972. Between 1965 and 1973, it invested 8% of its total sales turnover in machinery and equipment, compared with the equivalent figure of 4.9% for West Germany. The value of machine imports is steadily increasing.*

*The productivity, both per man hour and per unit of capital invested, is considerably lower in Mexico than in highly industrialized countries. As an example, manpower is utilized less efficiently by some 110% and capital is utilized less efficiently by about 25%, as compared to equivalent utilizations in West Germany.*

*The average size of Mexican textile companies is still far too small. Compared with the 20 000 spindles considered to form the minimum economic size of a spinning department, the average Mexican spinning department comprises only about 6 700 spindles.*

*The per capita consumption of textile fibres, by weight, amounted to 4.877 Kg. in 1973. This is rising at a low but steady rate and for 1980 it is estimated to be 5.10 Kg. Already, the average Mexican consumes more artificial fibre than he does natural fibre, this despite the fact that the country by tradition used to be one of the main cotton growing and exporting countries of the world. However, production*

dropped by nearly 30% since 1965 and exports fell by some 51% during the same time. The main causes of this state of affairs, in many respects deplorable, seem to be the intense investment in production facilities for artificial fibres which has arisen, together with the strong and coordinated marketing efforts made in recent years by the country's producers of man-made fibres.

Mexico's exports of textile manufactures in general have risen by 690% during the last 5 years. Contrary to the situation on the home market, cotton yarn, cotton fabrics and cottonware articles accounted for more than half of such exports, the rest being mainly accounted for by Hennequen yarn and fabrics. All exports accounted for 12% of Mexico's total mill consumption in 1974.

Even assuming the occurrence of significantly lower export rates in the future, Mexico's spinning capacity will still need to be expanded. According to the normal 4-year textile cycle, export growth rates of between 10 and 30% per annum have been assumed: The gap in conventional spinning capacity in the years 1980 and 1985 thus amounts to 250 000 and 170 000 spindles. By the same token, the inventories as all the other types of textile equipment will need to be increased. Accordingly, ring-spinning machines, equipment for non-continuous dyeing, and a range of finishing machines have been found to be of special interest as regards prospective manufacture in Mexico. The latter two groups of equipment show special promise in view of the fact that more and more artificial fibres are being produced in the country.

From a production point of view, no serious difficulties exist in Mexico which would inhibit the manufacture of any type of textile machinery. Only the present limited size of the relevant markets makes it inadvisable to start producing the other types of textile equipment analysed herein.

### 3.2 Recommendations.

It is recommended that the manufacture of the following machinery be taken up in Mexico:

- Ringspinning Machines.
- Dyeing Equipment.
- Finishing Equipment.

Such machinery should be manufactured in three distinct factories. The detailed feasibility study for the manufacture of ringspinning machines shows an internal rate of return for the project of well over 25%, whilst total foreign currency savings/earnings of more than Ps. \$211 million would be achieved. The return on shareholders' investments over the project period would amount to about 28%. Total investments over the project period would amount to Ps. \$57.6 million, the initial investment being Ps. \$36 million. In conformity with a specific Phased Production programme, the market shares for the first five years are estimated to be 24%, 42%, 21%, 29% and 36%, respectively. Thus, ample room for continuing imports in the future has been allowed for. The relatively small market share proposed will significantly increase the achievability of the whole target performance.

It is recommended that the Mexican Government should establish official national policies as regards:

- its future plans to grow more cotton as a textile raw material
- its intention to enter the textile industry on a larger scale;
- its intention positively to implement the nationwide programme for restructuring the textile industry, which is so badly needed;
- its possibilities and plans to help the Mexican textile industry improve its productivity and its quality standards. <sup>1</sup>

In developing and establishing a coherent overall policy on the above recommended lines, the Government would cause Mexico's image as a textile country to be improved and consolidated, thus not only facilitating the country's exports of textile manufactures but also attracting potential foreign investors for the manufacture of textile machines.

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✓ A preliminary outline of such an aid programme was submitted by ICME/CONDOR, to CONACYT (Consejo Nacional de Ciencia y Tecnología).

3. DEFINITION OF "FEASIBILITY" IN THE CONTENT OF THIS PROJECT.

Taking into consideration the aims of the project and the findings concerning:

- the attitudes and buying habits of Mexican textiles industrialists
- the international textile market and trade tendencies
- the international competitive scene of the textiles machinery field
- and technological characteristics of the textile machinery

the following criteria for a "feasible" operation were established.

3.1 "Must" - Conditions

- Any textile machine factory in Mexico must have access to the latest technological developments in its field. The eventual licensor's technology must be of a level which meets that of the brands imported during the last and recent years.
- The quality of locally produced machinery must be of the same grade as that of foreign built machinery.
- The market size for a range of machinery or for any single machine must enable annual production-lot quantities to be planned so that production costs per unit in Mexico will not be more than 25% above that of competing foreign machine manufacturers.
- The textile machine manufacturing operation must compete in price with imports within a period of about 11 years without the aid of protective measures.
- Locally produced textile machines must be sold to the textile industry on terms of payment comparable with those of foreign producers.
- The pay-back period for the capital invested must be shorter than 6 to 8 years. If private capital from Mexico and abroad is to be invested, the pay-back period should not exceed 6 years. This means and ROI of approximately 25 - 35%, depending on inflation

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STUDY

THE POSSIBILITIES OF MANUFACTURING TEXTILE MACHINERY  
IN MEXICO

UNIDO project No. DE/MEX/17/010

By  
the ICAE/CONDOR Consultants  
assisted by  
their SAFENSA counterparts  
and the UNIDO project team.

March, 1976.

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rates prevailing. If public capital is to be invested, the overall benefit for the Mexican economy, i.e. the "national profitability", must be calculated according to Mexican rules.

3.2 "Should" - conditions

- The Mexican built machinery should be of a repute such that it can be exported, mainly to countries of the Central American Continent, 4 to 5 years after production start-up.
- Initial total capital requirement to start production should not exceed Ps. \$ 50 million (Aim: The company should preferably be of a private nature).
- The local manufacture should develop according to a phased programme. In Phase I it should start producing machines of a technological sector common to other types of machinery which can be built in Phase II, using the same or similar production techniques.
- It is essential that designs and drawings, material specifications, tools, jigs, fixtures, gauges, etc., should be in metric units conforming with ISO standards.
- Considering the textile machines already being built in Brazil and the ALALC trade potential between that country and Mexico, it would seem to be of advantage to build textile machines in Mexico which can be complementary to those being built in Brazil.
- The production of textile machines should rely on Mexican suppliers to a significant extent. An integration of 60% should be reached within 4 to 5 years.

## 1. THE MEXICAN TEXTILE INDUSTRY.

### 1.1 General Information.

*Mexico's textile industry is the largest industry of the country. Many of today's mills were founded during the late 19th century. It is estimated that between the two world wars, about 45% of today's mills were already in operation.*

*According to the National Chamber of the Textile industry (CANAINTEX), the total capital invested in the industry amounts to approximately \$28,000 million (pesos) i.e. US\$ 2,240 million. As table 8 shows, the capital invested per employee is still relatively low when compared with, for instance that of the Federal Republic of Germany.*

*The same source also reveals that the country's textile industry gives employment to a total of 225,000 people, which means that about 1.5 million Mexicans depend on the textile industry for their livelihood.*

*There is practically no foreign investment in Mexico's textile industry. More than 88% of all spindles installed, approximately 2.3 million all told, are owned by private parties and about 4.8% are state owned. Some 145,000 spindles, or 6.3% of the total, are installed in textiles cooperatives owned by the workers of the companies. Exhibit 1 shows the names of the cooperatives and the number of spindles installed in each, whilst Exhibit 2 gives the same information for state owned companies.*

*The textile industry is highly competitive. Since 1964, 76 companies have had to close down, leaving some 11,000 workers unemployed. 1)*

*Many officials of the companies visited were complaining about the overcapacity prevalent in the industry but it must be born in mind that the present business cycle is particularly unfavourable for the textile industry. However, as mentioned in section 1.3, "Limitations", the present outlook of the industry's leaders is probably unduly pessimistic. Our own calculations indicate the degree of overcapacity is*

1) Source: "Instituto Mexicano del Seguro Social", Tesorería.

only about half that of 25%, the figure frequently quoted to us during our interviews.

4.2 Raw Materials.

The most striking phenomenon as regards Mexico's consumption of raw materials is the steep increase in the incidence of artificial fibres during the last ten years.

Table 1 which follows, shows the development of the country's total mill consumption of raw materials where, in this case, "Mill consumption" comprises all the raw material that was worked by textile mills, regardless of whether the end product was sold in Mexico or abroad.

Table 1: Mexico's total mill-consumption of fibers for textile use.

Tons	1965	1970	1973	1980 4/
<b>I. Artificial Fibers-Fil. (Tot).</b>	38 092	70 531	133 043	412 000
<b>I.1 Synthetics (Tot).</b>	33 750	61 667	110 980	380 000
Polyamid-Filament	7 872	15 794	21 422	
Polyester-Filament	832 1)	7 765	51 966	
Polypropylin-Filament 2)	—	—	—	
<b>Subtotal Synth. Filament</b>	8 704	23 559	73 426	
Polyamid-Staple Fiber	—	373	535	
Polyester-Staple Fiber	—	8 009	16 775	
Polyacryl-Staple	—	17 580	19 278	
<b>Subtotal Synthetic-Fibers</b>	—	26 732	36 533	
<b>I.2 Cellulosics (Tot).</b>	24 342	28 864	22 044	32 000
Rayon-Filament 3)	6 007	7 000	n. a.	
Acetat-Filament 3)	9 000	12 000	n. a.	
<b>Subtotal Filament</b>	15 000	19 000	n. a.	
Rayon-Staple Fiber 3)	8 342	7 864	n. a.	
Acetat-Staple Fiber 3)	1 000	2 000	n. a.	
<b>Subtotal Cellulosics Fibers</b>	9 342	9 864	n. a.	
<b>II. Wool</b>	11 428	8 860	4 973	6 000
<b>III. Cotton</b>	238 800	172 100	174 922	197 000
<b>Grand Total</b>	382 020	281 491	312 021	412 000

1) Also contains staple fibers. 2) ICIME/CONDOR-estimates.

3) Production started in July 1974. 4) Projections elaborated by ICIME

Source: Banco de México, Dirección de Estadística e Industrias, El Consumo de Textiles en México, 1973, UNCTAD, 1974.



Mexico has become world renowned as a cotton-growing country and, in point of fact, the quality of Mexican-grown cotton compares favourably with good US or Egyptian grades. Mexico has ranked amongst the twelve biggest cotton producers worldwide. On the American Continent it is surpassed only by the US and by Brazil.

For various reasons Mexico's cotton growing areas and production of cotton are diminishing. Table 2, which follows, shows the steady decline in this latter respect.

**Table 2 : Mexico's production and exports of cotton (1 000 Tons).**

Year	Total production	Exports	
		(1 000 Tons)	
1965	515,1	409,0	79,4
1966	559,5	429,5	76,7
1967	447,1	270,5	60,5
1968	525,4	315,9	60,1
1969	417,7	370,2	88,6
1970	323,8	213,8	66,0
1971	352,0	166,1	47,1
1972	395,5	204,0	51,5
1973	363,1	178,6	49,1
1974	n.a.	n.a.	n.a.

**Source:** Unión de Productores de Algodón de la República Mexicana, A.

Not only has cotton been grown in ever decreasing quantities during the last ten years but it has also lost much of its importance as a main source of foreign exchange. While it accounted for 19% of all Mexican exports in 1965, this performance was reduced to only 8% by 1973 (see Exhibit 3 for further details).

The formidable increase in the production of artificial fibres in the last few years appears to have created some competitive difficulties for the local textile industry. IMCE/CONDOR consultants have been shown price lists for Mexican-produced

synthetic fibres which indicate that the home prices are considerably higher, by between 30% and 145%, than those current on the world market. This is in spite of the fact that the quality of the new commodity leaves much to be desired, since it has been established that out of 10 fibre users contacted, 6 have complained about quality problems in this respect, although however, in no instance was reliable substantiation made of such statements.

The following Table 3 shows that by 1973 Mexico's mill-consumption of artificial fibres (synthetic fibres plus cellulosic fibres) was higher than that of cotton. The projection made for 1980 has been based on the assumption that the trend observed during the last ten years would continue.

**Table 3:** Development of Mexico's domestic fibre consumption per type of fibre (%).

	% of Total Domest. Fiber Cons.			
	1965	1970	1973	1980
<b>Cotton</b>	70.1	63.8	46.1	30
<b>Wool</b>	7.2	3.7	1.4	1
<b>Cellulosics</b>	14.1	18.1	9.5	5
<b>Synthetics</b>	7.9	17.3	40.9	68
<b>Others</b>	0.7	2.1	2.1	2
<b>Total</b>	100	100	100	100

**Source:** Figures from table 1 and 4 and ICME/CONDOR projections.

**4.3 Per Capita Consumption of Textile Fibres.**

One of the main indicators for the dynamic state of a country's textile industry is the rate of growth of the per capita consumption of textile fibres. Together with the growth rate of the population, the increase in per capita consumption helps to establish the textile industry's future capacity needs for satisfying the home market.

Table 4, which follows shows the past development of the per capita consumption as well as indicating the manner in which such findings have been calculated

**Table 4 : Mexico's per capita consumption of textile fibres (Tons).**

Values	Year	1965	1970	1973	1980
Mill Consumption (Tons)		182 020	251 491	312 021	615 00
Losses of Raw Mat'l (Tons)		10 800	15 502	17 500	40 00
Exports: (Tons)		28 785	11 276	46 355	235 00
Imports (Tons)		26 066	8 672	14 036	15 00
Net Consumption Inland (Tons)		168 501	233 385	262 202	350 00
Population (Mio)		41,896	48,856	53,763	68.72
Cons. Per Capita (Kg).		4,031	4,777	4,877	5.10

**Source:** Banco de México, Gerencia de Investigaciones Industriales. Consumo de Textiles en México, 1973. Unpublished.

1/ For detailed projections up to 1985, see table 15.

*In the point of fact, the recent growth rate of Mexico's per capita consumption of textile fibres has been quite modest. Bearing in mind the inevitable margin of error that must be allowed for, it has been extremely stable in the years 1970 (1,777 kg), 1971 (1,789 kg), 1972 (1,898 kg) and 1973 (1,877 kg). Nevertheless, the overall increase from 1965 (1,031 kg) to 1973 does however amount to 17.1%.*

*Extensive work is in hand within NAFINSA's Gerencia de Programación Industrial aimed at identifying the determining factors which influence the purchase of textiles by the Mexican population. First results seem to indicate that the correlation between disposable personal income per capita and textile fibre consumption per capita is far more precarious than was originally expected.*

*From personal observations made all over the country, it seems that the marginal propensity to consume textiles is low both within the high income bracket of Mexico's population and within the low income bracket. Obviously, the reasons for this are different. The high income bracket tends to spend less on textiles, from each additional unit of personal income, because its wardrobes will have been already completed at an earlier stage of affluence. The low income bracket on the other hand needs almost all of its extra disposable income in present times to cover alimentary needs since prices for food have undoubtedly risen gradually during the last three years and very sharply in recent months. In accordance with the underlying assumptions as regards the future development of the Mexican economy (see section 1.3, last paragraph), the team of NAFINSA counterparts and IMCE/CONDOR agreed on a future growth rate assessed at 4.1% per annum for the total national consumption of textile fibres. This figure also takes into account:*

- the projections of future increases of personal income as considered to be achievable after many discussions between IMCE/CONDOR and Mexican economists, businessmen and government officials;*
- the prospective results of the efforts being undertaken by governmental and private parties to improve the structure, productivity and distribution system of the Mexican textile industry <sup>1/</sup>;*

*<sup>1/</sup> While the present report is written, the Presidential "Comisión Mixta de la Industria Textil del Algodón," is in the process of finalizing its recommendations.*

- the competition to be faced arising from the economies of scale in the production of synthetic fibres which will have matured in about two or three years time and which are expected to result in lower prices for such fibres (for further details, see Exhibit 4).

**4.1 The structure of the textile industry.**

It is believed that the textile industry comprises about 2,500 companies. As a result of personal visits, reports on previous extensive research work <sup>V</sup> and questionnaire studies presently carried out and collected by NAFINSA and the National Textile Chamber (CANAINTEX), it has been possible to draw up the tables presented in this chapter.

Table 3: Table 3, as follows, shows the results of a first analysis of the Mexican textile industry's structure and degree of integration.

Table 3: Data about the structure and the degree of integration of Mexico's textile industry.

Category of company	Spindles	Looms
Spinning only	411 560	
Weaving only		11 130
Finishing only (n.a.)		
Spinning + Weaving	930 500	19 350
Spinning + Weaving + Knitting	24 300	300
Spinning + Weaving + Knitting + Fin.	24 150	550
Spinning + Weaving + Finishing	486 000	9 500
Spinning + Knitting	13 950	---
Spinning + Knitting + Finishing	4 900	---
Spinning + Finishing	113 000	---
Weaving + Knitting		420
Weaving + Knitting + Finishing		100
Weaving + Finishing		440
<b>Total</b>	<b>approx. 2'3 million</b>	<b>approx. 46 000</b>

Source: Cámara Nacional de Industria Textil, CANAINTEX, March, 1975, unpublished.

<sup>V</sup> "Bases para la Reestructuración de la Industria Algodonera y de Fibras Químicas" drawn up by Nacional Financiera, S.A. and Banco de México, S.A. which was of special importance.

Compared to the industrial structures of developed countries, the Mexican textile industry's degree of vertical integration is quite high. Especially as regards weaving and finishing Mexican production units must be considered in many cases to be below economic size.

#### 4.4.1 Key comparisons between the Textile Industries of Mexico and of West Germany.

One of the results of what can only be called an inadequate industrial structure is that the productivity of Mexico's textile industry is still relatively low.

Although it is not within the scope of the present study to investigate this in a detailed manner, some comparative data together with personal observations in the field indicate that there is considerable potential for improvement in the productivity of both the work force and the capital invested in Mexico, as is shown in the following Table 6.

**Table 6 :** Development of Sales per Employee: Mexico and German Federal Republic (at prevailing prices in US \$ ).

MEXICO	Turnover	Employees	1 : 2	Increase %
	(x 10 US \$)	(1 000)	(US\$ empl)	
	1	2	1:2	
1969	1 096	186	6 924	—
1970	1 224	195	6 276	6
1971	1 368	204	6 706	7
1972	1 536	214	7 177	7
1973	1 720	225	7 644	6

G F R	Turnover	Employees	1 : 2	Increase %
	(x 10 US \$)	(1 000)	(US\$ empl)	
1964	3 126	586	9 280	—
1965	5 418	547	9 905	7
1966	5 434	538	10 100	2
1967	5 038	490	10 281	2
1968	5 787	489	11 831	16

**Sources:**

Arbeitgeberkreis Gesamttextil, Die Textilindustrie in Europa und der Welt, Frankfurt 1970.

Cámara Nacional de la Industria Textil, Memoria Estadística, México 1971.

When comparing the figures for Mexico and for West Germany it must be born in mind that the latter's figures apply to the years 1964 to 1968. Last year's value, as assessed by ICME/CONDOR in a recent study for West Germany, amounts to about U.S. \$18,000. However, these updated figures are influenced by the recent changes in the DM/US\$ exchange rate and thus the old figures of West Germany are given their up-to-date significance. Since the product mixes of the two countries in this case are similar, the inevitable margins of error in such statistics are not aggravated on this score.

**Table 1:** Development of the ratio: Investment \$ per Sales \$ in Mexico and German Federal Republic (at prevailing prices in US \$).

MEXICO	Total Investment (Mio US \$)	Total Sales (Mio US \$)	Inv. \$ per Sales \$ (No dimension)	Increase %
	1	2	1.2	
1969	1 540	1 096	1.41	—
1970	1 685	1 234	1.38	-2.12
1971	1 850	1 368	1.33	-2.17
1972	2 040	1 530	1.38	-1.48
1973	2 340	1 720	1.30	-2.25

G F R				
1964	4 806	5 126	.94	—
1965	5 060	5 418	.93	1.06
1966	5 360	5 434	.99	6.45
1967	5 646	5 038	1.12	1.13
1968	5 575	5 787	1.02	1.08

**Sources:**

Arbeitskreis Gesamttextil, Die Textilindustrie in Europa und der Welt, Frankfurt 1970.

Cámara Nacional de la Industria Textil, Memoria Estadística, México 1974.

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*The figures of Table 7 show that the trend of the Investment: Sales ratio, is promising for Mexico and deteriorating for West Germany. However, the productivity of capital invested in West Germany may still be estimated as being about 25% higher than that of Mexico. Although these are only order-of-magnitude figures, it is interesting to note that Mexico's textile industry uses its financial resources only 25% less efficiently than does West Germany, its human resources are used 100-120% less efficiently.*

*Although such overall comparisons are not to be taken as strictly accurate, they do indeed confirm the findings of ICME/CONDOR'S field work. In the course of our industrial visits, Textile industrialists almost to a man would complain about low productivity of the work force and about its increasing cost.*

### Training

*When asked about training programmes, the typical answer would refer to the high rate of personnel turnover and the even higher wage exigencies of trained people. In point of fact, only in 18% of all companies visited were we shown any training facilities at all.*

*The following Table 8 shows a further feature which also exerts considerable influence on the make-up of the industry's structure i.e. the relatively low rate of investment per employee as occurs in Mexico. However, the modest but steady increase in this rate indicates that Mexican textile industrialists do, indeed, endeavour to steer a mean course between automation intensiveness and labour intensiveness.*

*Table 8, see next page.*

**Table 8 : Development of the ratio: Investment per Employee in Mexico and German Federal Republic ( at prevailing prices in US \$).**

MEXICO	Total Investment (Mio US \$)	Employees ( 1 000)	Invest./ Empl.	Increase %
	1	2	1:2	3
1969	1 540	185	8 350	3.6
1970	1 685	195	8 650	5.0
1971	1 850	204	9 080	5.4
1972	2 040	214	9 550	4.4
1973	2 240	225	9 950	4.2

G F R	Total Investment (Mio US \$)	Employees ( 1 000)	Invest./ Empl.	Increase %
1964	4 806	556	8 640	—
1965	5 060	547	9 250	7.1
1966	5 360	538	9 960	7.1
1967	5 646	490	11 520	13.4
1968	5 878	489	12 010	4.2

**Sources:**

*Arbeitgeberkreis Gesamttextil, Die Textilindustrie in Europa und der Welt, Frankfurt 1970.*

*Cámara Nacional de la Industria Textil, Memoria Estadística, México 1974.*

## 4.1.2 The Structure of the Spinning Sector

The operation of spinning is traditionally considered as the backbone of any textile industry. Efficiently performed, this operation achieves two purposes: it effectively "pulls" behind it the processes of opening, cleaning, carding, drawing and roving, and "pushes" ahead of it the processes of weaving and/or knitting. Spinning equipment thus is considered as being of key importance within any integrated textile operations.

Viewed against this background, the following Table 9 reveals a situation that is little short of alarming.

**Table 9: Breakdown of Mexican ring spinning machine users according to their size.**

Size	Companies		Spindles installed		of which		
	No.	%	No.	%	Short staple	long staple	Irreg.
1	2	3	4	5	6	7	8
-1 000	41	13.7	19 713	0.9	6 261	1 581	11 864
1 001 -1 000	78	26.1	156 218	7.7	78 782	42 080	35 286
1 001 -5 000	51	18.0	214 129	10.7	171 781	37 237	5 108
5 001 -7 000	35	11.7	211 920	10.6	199 590	11 430	900
7 001 -10 000	34	11.4	278 065	13.8	228 877	42 614	6 514
10 001 -15 000	19	6.4	230 977	11.5	217 153	13 824	---
15 001 -20 000	16	5.3	281 812	14.2	249 788	35 024	---
20 001 -35 000	20	6.7	505 112	25.1	505 112	---	---
More	2	0.7	107 888	5.3	107 888	---	---
<b>Total</b>	<b>299</b>	<b>100%</b>	<b>2 008 704</b>	<b>100</b>	<b>1 765 230</b>	<b>183 793</b>	<b>59 672</b>

**Source:** Cámara Nacional de la Industria Textil, CANAINTEK, México, March 1975. Unpublished.

✓ This figure is subject to adjustment in the near future. It may be assumed that the margin of error is about 15%. Therefore, for capacity calculations, a total of 2.3 million spindles was taken.

*In 1966 CEPAL<sup>V</sup> established that the optimum size for a ringspinning operation would involve 20 000 spindles. In countries such as West Germany, the U.S.A. and France, the numbers of spindles considered to be the correct optimum is 29 000 to 31 000, depending on the type of articles produced. Today, only about 7% of all Mexican ring spinning departments are up to CEPAL's optimum size and these operate 30.6% of spindles installed in Mexico.*

*<sup>V</sup> Comisión Económica para América Latina, "La Industria Textil en América Latina", (1966).*

**4.4.3 The Structure of the Weaving Sector**

Mexico's total weaving capacity amounts to approximately 46 400 looms. So in the case of the spinning sector, about 85% of all weaving looms installed may be said to be of modern type, a high degree of modernity indeed. Table 10, which follows, shows the breakdown of the country's weaving loom inventory according to type of machine.

**Table 10: Mexico's weaving capacity. Breakdown according to the types of looms installed.**

Type of Looms	Nº
Automatic looms Single width:	30 684
Automatic looms Double width:	6 263
Mecanic Looms Single width:	3 579
Mecanic Looms Double width:	536
Shuttleless Looms:	1 100
<b>Total</b>	<b>42 162</b>
Margin of error: +10%	4 238
<b>Grand Total</b>	<b>46 400</b>

**Source:** Cámara Nacional de Industria Textil, CANAINTEX, México, March 1975. Unpublished.

*Although no reliable information is presently available to this effect it may be assumed that the structure of Mexico's weaving loom inventory is as deficient as the structure of the spinning sector shown in Table 9.*

#### 4.5 Some Observations of a Technical Nature on Mexico's Textile Industry

As mentioned in section 2.3, the situation of Mexico's textile industry has been critical even during the actual implementation of the present study. From the financial point of view Mexico's textile industry was in much better shape in 1973, when the last available official statistics were compiled. Although ICME/CONDOR's investigation was only able to cover a small part of all spindles and looms installed, the degree of credibility in the findings appears to be significantly enhanced by the very consistency of the statements obtained during the interviewing of approximately 45 persons directly or indirectly connected with the industry.

##### 4.5.1 Articles Produced

Except in the case where they belong to a wholly integrated group such as Comercial de México, Mexico's producers of textiles appear to be controlled by the whims and desires of the distributors. The average number of articles found to be in process at the time of ICME/CONDOR visits has been too high in almost all cases.

The articles produced by the companies visited are considerably varied. However, the time available for the study was not sufficient to allow of investigation in depth as regards the kinds of products manufactured and the sizes of production lots worked. A detailed analysis in this respect is actually in process by a team of NAFINSA and CANAINTEX researchers. Results of this study are expected to be available within a period of about three or four months.

According to ICME/CONDOR's assessment, based on technical field work, general product characteristics may be taken to be as follows:

- Average yarn count: Ne 21  $\frac{1}{2}$
- Average weight of fabric: 130 grammes/m<sup>2</sup>  $\frac{1}{2}$
- Average width of fabric: 1.15 meters  $\frac{1}{2}$

$\frac{1}{2}$  Base: "Bases para la Reestructuración de la Industria Algodonera", NAFINSA and Banco de México, México, D. F. 1966.

The average density of Mexican fabrics, say 63 per 50 threads per inch, would indicate that in general, Mexico produces finer fabrics than, for instance, Brazil does.

The above characteristics have been arrived at bearing in mind the types of products that were being manufactured between September 1974 and March 1975. Although new fashion trends may alter actual product values, the order of magnitude of overall production figures is not likely to be significantly changed.

The main products according to the above mentioned study, are:

- Plain gauze, blanketing, printed fabrics, crelome, unribbed poplin, opaline, organdi.
- Poplin.
- Drill cloth, gabardine, half hunting, satin.
- Canvas.
- Flannel.
- Bed covers.
- Cloths with coloured threads.
- Handkerchief/shawl cloths.
- Special cloths (Bromat; piqué; fantasy; head cloth; corduroy; tapestry (or furniture fabrics) quilting, table cloths, mattress ticking)
- Towelling.

For 1974, a total fabrics production of about 1 600 million<sup>4</sup> has been calculated, of which approximately 52 million m<sup>2</sup> (50 000 Tons) were exported.

Cotton is by far the predominant raw material used for exported fabrics and is estimated to account for about 90 to 95% of raw materials. This explains the fact that, although cotton is still in the lead as regards Mexico's total mill consumption for all fibres (see Table 1), it has been surpassed by artificial fibres as regards the home consumption for all fibres (see Table 3).

Parallel with the steep rise of artificial fibres, the production of knitwear has increased very greatly during the last ten years. As outlined in section 5.1, our study has concentrated mainly on conventional machinery used for the processing of cotton and mixtures thereof. Despite this, we estimate that in 1974 about 20 % of all textile planes were of knitted origin (for further details see Exhibit 6).

#### 4.5.2 Capacity utilization

Figures pertaining to an industry's capacity utilization are bound to

1/ For further details, see Exhibit 5.



*reflect a momentary situation. ICME/CONDOR's field work occupied a period of 6 months.*

*Even within the relatively short time available it was possible to observe a high degree of variation between the performance values at the beginning and those at the end of the investigation.*

*Mexico's "normal traditional" utilization, i. e. 100% time utilization, is 6,350 hours per annum. This represents 73% of the total 8,700 working hours of a calendar year.*

*At the beginning of our investigation the following rates of time utilization were observed, expressed as a percent of normal traditional optimum time utilization:*

- about 85% for spinning operations,*
- about 81% for weaving operations.*

*These rates deteriorated drastically during the first months of 1975, becoming at the end of our investigation:*

- about 72% for spinning operations,*
- about 70% for weaving operations.*

*The rates for circular knitting operations are believed to be even lower.*

*It was not possible to obtain reliable comments as to rates of time utilization in respect of dyeing and finishing operations. Nevertheless our own observations indicate that the rate of time utilization in dyeing and finishing operations diminished in parallel with that of spinning and weaving operations.*

*In general, it was found that old equipment was in use to a considerably lesser degree than modern equipment.*

*The reason for the low rate of time utilization mainly lies in the present situation of the economy worldwide and in the recession of the textile market in particular. In fact, exports of Mexican textile manufactures dropped by at least 50% during the first months of 1971. 1/*

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*1/ Sources: Officials of the National Chamber of the Textile Industry (CANAINTEX).*

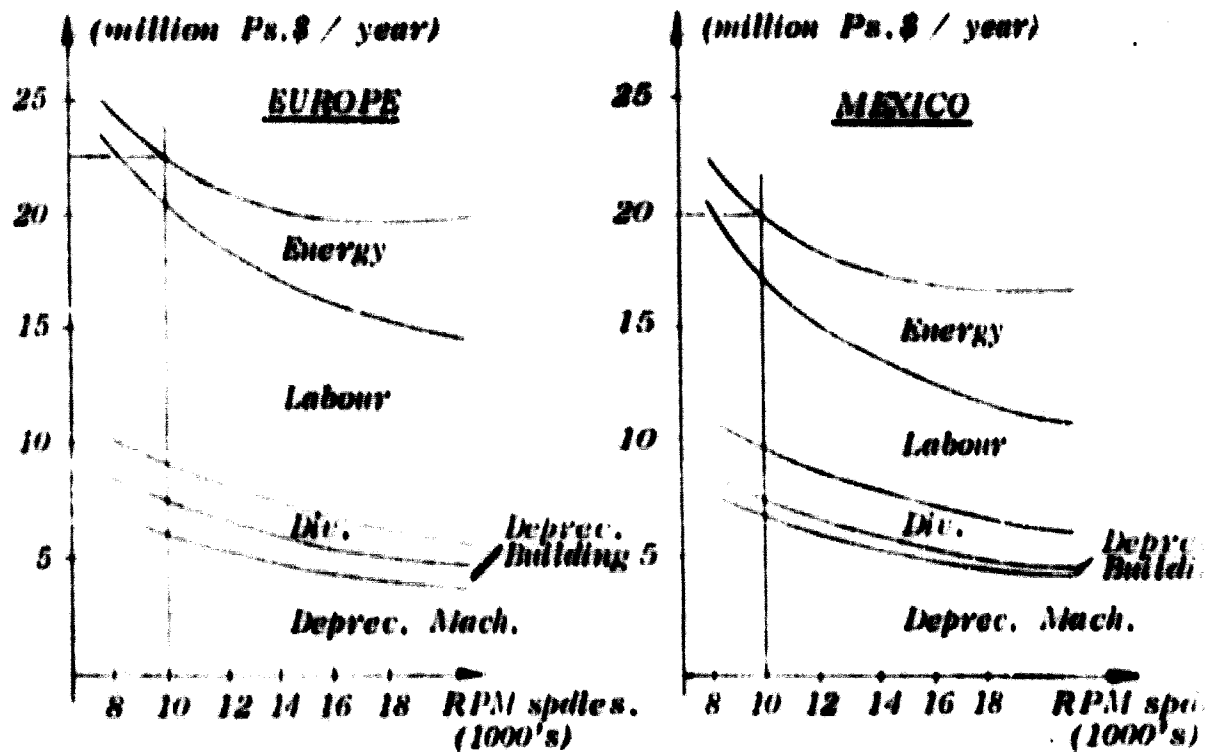
Although Mexico's textile industry appears to be extremely flexible in adapting itself to changing market requirements and article specifications, it could not, however, adapt itself to such a drastic deterioration of its export markets.

**4.3.3 Example: Production costs in ring-spinning departments**

Besides the textile industry's growth in its existing facilities (structural problem), ICME/CONDOR consider that the lack of adequate costing systems is also an important problem. Indeed, only 11% of all the companies visited disposed of what can be considered to be adequate costing systems (direct costing or variations thereof).

The following diagrams compare the compositions of the production costs in European and in Mexican ring-spinning operations. The margin of error as regards the values for Mexico must be considered to be about 15 to 20%, up or down, since they are largely based on estimation.

**Diagram 1: Mexico and Europe: Comparison of Production Cost per year for Production of 500 Kg. yarn Ne 20 per hour. (Million Pesos).**



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Diagram 1 was based on an assumed production rate of 500 kg Ne 20 yarn per hour.

Given Mexico's estimated average production rate of 21.04 grammes per spindle hour<sup>2/</sup> the required quantity of yarn can be produced with approximately 22 000 spindles in Mexico and with about 19 000 spindles in Europe.

Raw material prices have been excluded from all considerations intentionally.

The hourly wage rate, social benefit charges included, amounting to the equivalent of Ps. \$62.50<sup>2/</sup> was assumed to be applicable to Europe, whilst the corresponding Mexican rate, in accordance with the findings of our field work, was assumed to be Ps. \$16.50 (for further details, see Exhibit 7).

The latter rate may not coincide with the official figure due to the fact that many companies do not seem to be paying the legal social contributions in conformity with the new "Contrato Ley".

During discussions with the various textile industrialists, the impression was gained that there is much more awareness of the true cost of a labor force than there is of the true cost of machinery when taking into account capital cost, running cost, amortization, etc. etc.

It would be extremely interesting to study the effect of operational size on the production cost per unit; if such research work were to be carried out in Mexico, for which the estimated man power needs would be 15 to 20 man months, the potential savings of a partial or total, based on the identification of "economies of size", could be calculated in a precise manner.

According to ICME/CONDOR assessments, based on similar studies for individual textile concerns outside Mexico, the overall savings in production cost only for the Mexican spinning sector could amount to at least 23% if the average size of today's individual spinning units were to be increased from 6 750 to 13 000 spindles. (For further details, see Exhibit 8).

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<sup>1/</sup>ICME/CONDOR field investigations and "Bases para la Reestructuración de la Industria Textil Algodonera y de Fibras Químicas", Nacional Financiera, S. r. l., y Banco de México 1966.

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<sup>2/</sup>Source: Arbeitgeberkreis, Gesamttextil, "Die Textilindustrie in Europa und der Welt", Frankfurt, 1972.

#### 4.5.1 Financial situation of the textile industry

Between 1965 and 1973 Mexico's textile industry invested about Ps. \$10,000 million (US \$800 million) in machinery<sup>1/</sup>. As a general rule, it may be assumed that all other investments amounted to about half this sum again, so that all investments between 1965 and 1973 totalled US \$1,200 millions.

This total investment represents more than 8% of the industry's total sales value of US \$10,100 million during the same period. The corresponding rate of investment for the German textile industry during the period 1960 to 1968 was 4.9%.

Although the Mexican textile industry is passing through an extremely difficult situation at present, its relatively high degree of equipment modernization coupled with its high rate of investment in the past would indicate that, by and large, its financial situation has been good up until 1973. At all events, it is a fact that it was able to, and did, reinvest in itself quite forcefully. The reason for this development, however, must be explained in a rationalized manner. Healthy textile firms, with strong marketing facilities, grew into powerful groups.

It was these groups which undoubtedly reinvested in themselves at a far greater rate than normal. Most of the small companies certainly could not afford to invest 8% of their turnover in machinery, buildings, or other facilities.

Their machine inventories alone, as observed, are a pointed testimony to this inability.

Regretably, it has not been possible to analyse in detail the degree of debt financing in Mexico's textile industry.

#### 4.6 Exports of Mexican Textile Manufactures

##### 4.6.1 Past Development

Whereas Mexico's exports of raw cotton have drastically diminished between 1965 and 1973 (see Table 2), the situation is exactly reversed as regards exports of textile manufactures. The following Tables 12

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<sup>1/</sup> Source: Secretaría de Industria y Comercio, Dirección General de Estadística.

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<sup>2/</sup> The National Chamber of the Textile Industry (CANAINTEX), Statistics Department.

and 13 show how Mexico's exports of such manufactures have risen in value and in quantity over the period 1970 to 1973.

**Table 12 :** Mexico's exports of textile manufactures (1 000 US \$).

Exports (1000 US\$)	Year					197 (Jan Jun)
	1965	1970	1971	1972	1973	
Cotton yarn	1 234	5 834	7 450	10 866	27 177	28
Henequen yarn	16 876	10 027	15 476	23 795	36 990	30
Other manl Fibers	113	2 460	5 327	5 307	9 801	7
Cotton fabrics	1 485	4 290	6 556	13 603	43 831	34
Henequen fabrics	1 621	2 006	2 157	2 739	4 174	1
Confection	2 107	3 568	4 695	6 937	23 434	45
Others	5 349	10 115	9 166	14 422	22 250	—
<b>Total</b>	<b>28 785</b>	<b>38 300</b>	<b>50 827</b>	<b>77 669</b>	<b>167 657</b>	<b>171</b>

**Source:** Banco de México, S.A., *Indicadores Económicos*, México, D.F., Noviembre 1974.

The overall in exports between 1965 and 1970 was only about 36%, however, in 1972 the great expansion in this respect really began. In 1973, exports more than doubled over the previous year and they again rose by a further 85% or so last year. In the fourth quarter of 1974, however, the deplorable slump export business began, and by February 1975 the rate of exportation had already dropped by more than 50%.

Table 13, see next page.

**Table 13:** Mexico's exports of textile manufactures per type of raw-material: (Tons).

(TONS)	1970		1971		1972		1973	
	Imp.	Exp.	Imp.	Exp.	Imp.	Exp.	Imp.	Exp.
Cotton	3 201	9 248	2 852	12 430	2 504	19 463	2 028	38 0
Wool	495	197	430	240	445	289	277	
Cellulosics	4 726 )		5 645 )		7 954 )		10 948 )	
	) 1 831		) 2 146		) 3 838		) 7 1	
Synthetics	247 )		579 )		961 )		783 )	
<b>Total</b>	<b>8 672</b>	<b>11 276</b>	<b>9 506</b>	<b>14 816</b>	<b>11 864</b>	<b>23 590</b>	<b>14 036</b>	<b>46 0</b>

Source: Banco de México, Gerencia de Investigaciones Industriales, *El Consumo de Textiles en México, 1973*. Unpublished.

*Cotton is by far the predominant raw material in Mexico's exports of textile manufactures. In 1973, more than 22% of Mexico's total mill consumption of cotton was used for products that were exported.*

4.6.2 Future Possibilities.

*Despite the commendably positive development of Mexico's exports of textile manufactures in the past, some aspects of concern for its future growth rate must be mentioned:*

- *As a consequence of the balance of payments problems in all the industrialized countries with the exception of West Germany, there has been a tendency for extremely strong measures to be taken by such countries for the protection of their local textile industry in recent times. Examples thereto can be cited as follows:*
- *The U.S. imported textiles to the value of US \$2 402 million in 1970<sup>1/</sup>, but its exports in this respect were only valued at US*

<sup>1/</sup> *Source: Neue Zürich Zeitung, "Bedeutung und Probleme der US-Textilindustrie", Zürich, 23. 1. 1972.*

*\$776 million during the same year. There are 3.1 million people working in the U.S. textile industry and as a result of their voice and that of many others additional protection was legislated for the home textile industry.*

*In 1972, bilateral treaties were signed with Japan, South Korea, Formosa, etc. in order to drastically curtail these countries rising exports to the U.S.A.. A strict system of import quotas was instituted so as to limit imports from other countries such as, Mexico, Brazil, Colombia, Ecuador and others. Most influential U.S. Congressmen support such protectionistic measures, as ultimately reflected by the enactment of the foreign trade bill last December.*

- *In 1973, the West German textile industry employed 434 000 people but the country nonetheless imported textiles to the value of Mto 3976 <sup>1/</sup>, equivalent to about US \$ 64.5 worth per inhabitant. Since then, West Germany's textile industry has successfully agitated for a reduction of import quotas accorded to East European and Far Eastern countries.*
- *The chairman of the "Negotiating Group on Textiles" for the GATT (General Agreement on Tariffs and Trade) reported to the Council on December 20th., 1973, that: "...in some importing countries, situations have arisen which, in the view of these countries cause, or threaten to cause, disruption of their domestic markets...." Article point 2, of the "Arrangement Regarding International Trade in Textiles" stipulates: "... The basic objective shall be to achieve the expansion of trade... while at the same time ensuring the orderly and equitable development of this trade and avoidance of disruptive effects in individual markets and on individual lines of production in both importing and exporting countries".*

*Although this Multilateral arrangement is to further eliminate trade barriers, at same time it makes it possible and easy for importing countries to obstruct further exports to them. Practically all the large importing countries have already taken measures to "avoid disruptive effects" in their market, i.e. they institute protection for their own textile industries.*

- *In the country's legitimate efforts to put special emphasis on textile exports, Mexico has to compete with a number of other countries such as Taiwan, Hong Kong, Brazil, Colombia, Greece, Turkey, Yugoslavia, and others.*

*<sup>1/</sup> Verband Gesamttextil, Frankfurt; Presidential Adress 19. Dec. 1974.*



*As Exhibit 7 indicates, this is very difficult since the cost of labour is comparatively high in Mexico.*

*Unfortunately, it is certainly impossible to predict how the potential Mexican export markets, whether favourable or not, will develop in the next five to ten years.*

*Nevertheless, for the purpose of this study, and after extensive discussions with the responsible staff members of Nacional Financiera's Gerencia de Programación Industrial, ICME/CONDOR took the decision to put forward the following projected rates of increase in Mexico's exports of textile manufactures.*

**Table 14: Mexico's exports of textile manufactures per type of raw material: Projection of future growth (Tons)**

	<i>Cotton</i>	<i>Wool</i>	<i>Synthetics</i>	<i>Total</i>
<i>1974</i>	<i>60 000</i>	<i>1 000</i>	<i>11 000</i>	<i>71 000</i>
<i>1975</i>	<i>40 000</i>	<i>1 000</i>	<i>9 000</i>	<i>50 000</i>
<i>1976</i>	<i>71 500</i>	<i>1 500</i>	<i>13 000</i>	<i>86 000</i>
<i>1977</i>	<i>89 500</i>	<i>1 500</i>	<i>21 000</i>	<i>112 000</i>
<i>1978</i>	<i>101 000</i>	<i>2 000</i>	<i>32 000</i>	<i>135 000</i>
<i>1979</i>	<i>137 500</i>	<i>2 500</i>	<i>35 000</i>	<i>175 000</i>
<i>1980</i>	<i>175 000</i>	<i>3 000</i>	<i>47 000</i>	<i>225 000</i>
<i>1981</i>	<i>221 500</i>	<i>3 500</i>	<i>65 000</i>	<i>290 000</i>
<i>1982</i>	<i>266 000</i>	<i>4 000</i>	<i>85 000</i>	<i>355 000</i>
<i>1983</i>	<i>321 000</i>	<i>4 000</i>	<i>120 000</i>	<i>425 000</i>
<i>1984</i>	<i>387 000</i>	<i>5 000</i>	<i>138 000</i>	<i>530 000</i>
<i>1985</i>	<i>415 000</i>	<i>6 000</i>	<i>159 000</i>	<i>580 000</i>

**Source:** *ICME/CONDOR estimates*

*In view of the acute decline of Mexico's exports up until the present (Feb./Mar. 1975), relatively modest growth rates have been projected for future exports. Assuming the advent of a rising business cycle from now on, annual growth rates of between 10 and 30% are estimated.*

*Compared with past values, these estimates may seem to be overly pessimistic. However, because of the erection of possible protective barriers by industrialized countries, coupled with the competition from other textile exporting countries, it is believed that higher growth rates in the future will scarcely be possible.*

**4.7 Projection of Mexico's future total mill-consumption of textile fibres**

*Mexico's total mill consumption, projected up to 1985, is shown in Table 15 which follows.*

**Table 15, see next page.**

**Table 15 : Mexico's total mill consumption of fibers for textile use up to 1985 : Projection of future growth (1000 Tons.)**

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Domestic Consumption <sup>1)</sup>	273	285	297	309	322	336	350	366	384	398	416	435
Exports	71	50	86	112	135	175	225	290	355	425	530	580
Losses of Raw Mkt	25	25	28	30	30	35	40	44	50	50	55	55
Total mill cons.	369	360	411	451	487	546	625	700	786	873	1 001	1 070
Increase (%)		-2.5	11.4	9.7	8.0	12.3	12.5	11.7	12.3	11	14.7	7%

Source: ICME/CONDOR estimates

1) Imports included, because of their relatively small size (approx. 2 - 3%)

The most striking feature of this Table is the size of exports compared with the extent of domestic consumption. This last is estimated to be growing at a rate of 4.1% per annum up to 1980 and at 4.5% per annum from 1980 to 1985. Our estimates are based on a net annual growth of the national income per capita of 5.1% up to 1980 and of 6.4% from 1980 to 1985.

Mexican's marginal propensity to consume textile fibres was estimated as being of 0.8% during the period 1975-1980 and 0.7% for the following 5 year period. The possibilities for Mexico's textile exports have been discussed in the previous report section. Based on the foregoing premise, by 1982/1983 about half of Mexico's total mill consumption will be oriented towards export outlets.

With regard to the raw materials involved in the export trade, much depends on Mexico's future policy concerning the growing of cotton. In the purpose of formulating our projections, we have assumed there will be strong government support for the cotton growing industry in the future.

#### 4.8 Summary of chapter 4

- Mexico's textile industry employs more than 200 000 people.
- Apart from a few efficient companies of truly economic size, the majority of companies are small and operate below optimum conditions.
- During the last decade, the country's textile industry invested around 8% of its total sales earnings in new equipment, buildings and facilities. This figure compares very favourably with West Germany equivalent of 4.9%.
- The productivity of the work force employed in Mexico's textile industry is approximately 100% lower than that of West Germany's.
- Despite the lower wage level, textile prices are comparatively high in Mexico. The main reasons for this lie in the low productivity of the industry, its inappropriate structure, and the inadequacy of its distribution system.
- The average annual growth rate of Mexico's total fibre consumption, according to ICME/CONDOR estimates, will be around 10.5% for the next ten years. Exports will play an important part in this

*development and by 1982/1983 they will account for no less than half of the total fibre consumption.*

- *Mexico's cotton industry appears to be losing the battle against the synthetic fibre industry. Synthetic fibres presently account for more than half of the country's domestic fibre usage.*
  
- *Although the Mexican nation owns about 11% of its total spinning capacity and an equivalent proportion of its textile industry, there does not appear to be any coordination between these publicly owned parts of the entire textile industry. Between the national participation in the cotton trade sector, via Algodonera Comercial Mexicana, S.A., and that in the textile retail trade, via CONASUPO, it is felt that there is a need for a coordinated programme of action in this entire field on an official basis.*

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## 5. THE MACHINERY IN MEXICO'S TEXTILE INDUSTRY

*As pointed out in the preceding chapter, Mexico's textile industry has been investing quite heavily in new machinery during the last ten years. So as a result, the overall degree of modernization is unsuspectedly high. To our knowledge, no governmental agency, or any other official body, exists for the purpose of advising textile industrialists as to the most appropriate equipment which should be used under the special conditions pertaining to Mexico.*

*Thus the wide range of equipment purchased by local textile companies reflects the entire scope of worldwide textile machine supply sources. No attempt whatsoever has been made so far to reach even the most elementary stage of standardization. In view of the modern attitude of Mexican textile industrialists, as well as their uncontrolled freedom of decision up to present, it seems highly unlikely that any attempt of standardization will be successful under present circumstances.*

### 5.1 Types of textile machinery studied

*In collaboration with the staff members of NAFINSA's Gerencia de Programación Industrial, the range of machinery to be covered by this study has been precisely defined.*

*In our "Draft Working Schedule as of Sept. 28, 1974" the following types of machinery were specified as being of interest:*

- *Extension Machines (máquinas de extensión)*
- *Picker and Lap Machines (batientes o balanes)*
- *Cards (cardadoras)*
- *Combing machines (peñadoras)*
- *Draw Frames (estiradoras o manuales)*
- *Roving Frames (reloces o mecheras)*
- *Ringspinning Frames (continuas, tróviles)*
- *Open-End (OE) spinning machines ("OI" hiladora de turbina)*
- *Twisting machines (retorcadoras o torcaleras)*
- *Cone winding machines (coneras)*

- *Beamer (ardidores)*
- *Sizing machines (engomadoras/encoladoras)*
- *Looms (telares)*
- *Circular knitting machines (maquinaria tejedora de punto para tejido de punto)*
- *Finishing machines (maquinaria de acabado)*
- *Auxiliary equipment (eventually)*

*In addition to types of machinery, the new establishment of texturizing machines has also been observed. In the field of "finishing machines", particular attention was paid to practically all types of dyeing machines and stenter frames, also Pad-Steam ranges, Pad-Roll ranges, Foulard and Jiggers. Furthermore, in the case of such finishing machines, "Machine Information" sheets have been drawn up pertaining to each type.*

*The value of the types of machinery we studied accounts for 82% of total Mexican machine imports.*

## **5.2 Methodology applied**

*In carrying out the analysis as to the suitability of machine types for manufacture in Mexico, a process of successive focussing and elimination was employed. Each machine's technical features and product environment were assessed against the set of suitability criteria defined in Chapter 3 herein. As a result, some machines would drop out right at the beginning of the evaluation, others would drop out at a later stage. For the types of machinery able to pass all such screening, economic evaluations were then undertaken. In the order of their importance the screening criteria applied, were as follows:*

- *Future market potential in Mexico*
- *Versatility<sup>1/</sup> of the machine (i. e. are many or a few different types*

---

*<sup>1/</sup>This point is of particular importance in view of the fact that a local textile machine manufacturing operation needs import protection during its first ten years of production. Experience shows that in cases where a wide variety of types does exist textile industrialists invariably "need" just those types that are not produced locally.*



needed in order to satisfy the local demand requirements, or can the machine serve different purposes?)

- Possibility to export the machine to ALALC or other countries
- World market supply and demand situation for the machines with special emphasis on the availability and number of potential "know-how Partners".

The "Machine Information" sheets mentioned in the previous section 5.1 spell out in detail the results of this screening process.

**5.3 Analysis of Mexico's textile machinery imports**

The development of Mexico's total imports of textile machinery is shown in the following Table 16.

**Table 16: Mexico's imports of textile machinery: Past Development**  
(million pesos) <sup>1/</sup>

	1968	1969	1970	1971	1972
Main prod. machinery	445.3	674.8	612.2	1 381.3	1 178.8
Auxiliary machinery	13.4	15.0	18.6	25.5	33.6
Spare parts	35.1	39.2	40.2	62.1	74.0
<b>Total</b>	<b>493.8</b>	<b>729.0</b>	<b>671.0</b>	<b>1 468.9</b>	<b>1 286.4</b>

**Source:** Secretaria de Industria y Comercio, Anuarios Estadísticos. Groupings compiled by Nafinsa, Gerencia de Programación Industrial. <sup>1/</sup> Detailed information per type of machinery is included in the "Machine Information" sheets (see 5.4.2 to 5.4.27)

The breakdown by country of origin for Mexico's total imports of textile machinery during the year 1970 is shown in Table 17, which follows:

**Table 17:** Mexico's imports of textile machinery: Breakdown by country of origin (%).

1.	West Germany	28%
2.	United States of America	25%
3.	Switzerland	12%
4.	Great Britain	9%
5.	France	7%
6.	Italy	5%
7.	Japan	5%
8.	Spain	4%
9.	Belgium	3%
10.	Czechoslovakia	2%
11.	Poland	1%
12.	Others	9%
<b>T o t a l</b>		<b>100%</b>

**Source:** Camara Nacional de la Industria Textil, Memoria Estadística Mexico, D.F., 1974

Import figures obviously vary from year to year. Nevertheless, they do reflect quite pointedly the importance of the countries concerned on the international textile machinery scene, as outlined in section 5 of this report. According to ICME/CONDOR's investigations, West Germany, Switzerland, Spain and Japan have been the most dynamic machinery exporting countries during the years 1973 and 1974.

The import figures also point to the fact that Mexico's textile industry buys from a wide variety of sources and is far from following any form of standardization process.

*The past development of imports by type of machine are shown in the report section which follows.*

**5.4 Key information on the market for Mexico's textile industry**

*For each type of machinery a "Machine Information" sheet has been drawn up. Where additional comments are necessary, they are added separately as the case arises. This applies especially for:*

- ring spinning machines,*
- looms,*
- dyeing equipment, and*
- finishing equipment.*

*The machines will be discussed according to their importance for the present project and not according to their technological sequence.*

*Sources of information used are recorded in the blank "Machine Information" sheet which follows.*

5. 1. 1 Blank "Machine Information" sheet: Sources of information

<u>A. MEXICAN MARKET DATA</u>	<u>INFO. SOURCE</u>
1. No. of machines installed in Mexico	Field work
2. Degree of modernization of equipment installed (%)	Field work
3. Total imports from 1968 to 1972 (units)	SIC <sup>2/</sup>
4. Total imports from 1968 to 1972 (pesos)	SIC (cif-value)
5. Tendency of imports between 1968 and 1972	SIC " "
6. Total imp. of spare parts from 1968 to 1972 (pes.)	SIC " "
7. Average lifetime as considered normal in Mex. (yrs.)	Field work
8. Average sales per year up to 1980 (units)	ICME/COND
9. Average sales per year from 1980 to 1985 (units)	do.
<u>B. WORLD MARKET DATA</u>	
10. Approx. No. of significant producers	ICME/COND
11. Production in developing countries	do. + Field work
12. Normal delivery time (min/max)	3/ ICME/COND
13. Average price 1975 (pesos)	do.
14. Export potential	do.
<u>C. TECHNOLOGICAL ASPECTS</u>	
15. Diversity of types	ICME/COND
16. Future technological prospects	do.
17. Average bought-out parts (% of prod. cost)	Field work.
18. Complexity of fabrication	ICME/COND
<u>D. CONCLUSION</u>	
19.	

1/ The results of our field work were discussed with NAFINSA's Programación Industrial division and in some cases were adjusted to the latest information available to this institution.

2/ Secretaría de Industria y Comercio, Anuarios Estadísticos.

3/ Brazil and Argentina were visited by ICME/CONDOR. See Chapter 6.

5.1.2 Machine Information: Ring spinning machines.

**A. MEXICAN MARKET DATA**

- |   |                      |
|---|----------------------|
| 1. No. of spindles installed in Mexico <sup>1/</sup>    | 2.3 million spindles |
| 2. Degree of modernization of equipment installed (%)   | 90%                  |
| 3. Total imports from 1968 to 1972 (units)              | 220 000              |
| 4. Total imports from 1968 to 1972 (pesos)              | 217 889 000          |
| 5. Tendency of imports between 1968 and 1972            | ↘                    |
| 6. Total imp. of spare parts from 1968 to 1972 (pes.)   | 24 553 000           |
| 7. Average lifetime as considered normal in Mex. (yrs.) | 20                   |
| 8. Average sales per year up to 1980 (units)            | 120 000              |
| 9. Average sales per year from 1980 to 1985 (units)     | 200 000              |

**B. WORLD MARKET DATA<sup>2/</sup>**

- |  |                               |
|--|-------------------------------|
| 10. Approx. No. of significant producers | 35 <sup>3/</sup>              |
| 11. Production in developing countries   | Argentina, 1<br>zil, India, 1 |
| 12. Normal delivery time (min/max)       | 15 months                     |
| 13. Average price 1975 (pesos)           | 1250/spindle                  |
| 14. Export potential                     | good.                         |

**C. TECHNOLOGICAL ASPECTS**

- |  |            |
|--|------------|
| 15. Diversity of types                         | low.       |
| 16. Future technological prospects             | good.      |
| 17. Average bought-out parts (% of prod. cost) | 35         |
| 18. Complexity of fabrication                  | medium/low |

**D. CONCLUSION**

19. Of interest: See Feasibility study Chapter 7.

<sup>1/</sup> One ring spinning machine contains an average about 400 spindles.

<sup>2/</sup> i.e. approximately 559 machines.

<sup>3/</sup> 28 of the 35 producers are described in the World market study of ring spinning machine producers. See Exhibit 9, pages 1 to 28.

<sup>4/</sup> For further details, see Chapter 7.

According to a study presently being undertaken by NAFINSA's *Gerencia de Programación Industrial*, Mexico's total ringspinning capacity amounts to 2 008 704 spindles. Assuming that this figure is pessimistic to the extent of some 15% at the very most, the responsible staff members of NAFINSA and ICME/CONDOR decided to use the rounded figure of 2 300 000 <sup>1)</sup> spindles for future capacity calculations in this report.

Table 18, which follows, shows the numbers of spindles and their degree of modernity used for working long and short, and irregular length fibres.

**TABLE 18:** Mexico's spinning capacity. Breakdown according to the staple length and the degree of modernity<sup>1)</sup>

<b>Specification</b>	<b>Spindles installed</b>
<b>Short staple - Total</b>	<b>1 765 000</b>
modern	1 171 000
semi-modern	521 000
obsolet	73 000
<b>Long staple - Total</b>	<b>184 000</b>
modern	108 000
semi-modern	60 000
obsolet	24 000
<b>Irregular</b>	<b>60 000</b>
<b>Total</b>	<b>2 009 000</b>
<b>Margin of error : + 15%</b>	<b>291 000</b>
<b>Grand total</b>	<b>2 300 000</b>

**Source:** *Cámara Nacional de la Industria Textil, CANAINTEX, México, March 1975. Unpublished.*

**1)** Definition of degree of modernity: see immediately following text

Modern spindles were defined as disposing of a high draft system and a lift of 8.5 inches.

Semi-modern spindles were defined as disposing of a high draft system and a lift of between 7 and 8 inches.

Obsolete spindles were defined as disposing of a normal draft system and a lift of 8 inches or less, or disposing of a high draft system but a lift of less than 6 inches.

In view of the fact, that a relatively new spinning technology, i. e. open-end spinning, has been successfully introduced in recent years, a comparison of this with the traditional ringspinning technique seems appropriate. The following Diagram 3 therefor shows a comparison of relevant cost items in both cases.

**Table 19:** Comparison of cost components for the production of 500 Kg. of Ne 20 yarn per hour on open end spinning machines and on ringspinning machines (Values for West Germany, 1973)

Cost component	Open end spinning (40 000 RPM)	Ring spinning (10 000 RPM)
Energy	14%	10%
Direct labor	20%	51%
Spare parts	12%	5%
Building	8%	6%
Machine cost	44%	26%
Others	4%	2%
<b>Total</b>	<b>100%</b>	<b>100%</b>

Source: ICME/CONDOR study for producers of CE - and ringspinning equipment. Unpublished, 1973.

*The average Mexican ring spindle operates at about 10 000 RPM. It may be assumed that the average open-end (OE) turbine operates at about 40 000 RPM. Although mainly used for coarse yarn counts up to now, OE-spindles will probably be used also for finer yarn counts in the future. The output per spindle is between two and three times higher for OE spindles than for conventional spindles, depending on the yarn count worked.*

*It is believed that in about 20 years time, 30% of all yarns will be spun on OE-spindles throughout the world, although a complete substitution of ring spindles by OE spindles is not anticipated.*

*Financial cost for the production of a quantity of OE yarn is almost double as high as that for an equivalent quantity of conventionally spun yarn. The manpower cost component for the OE-spun yarn, however, is only about a third of that for the conventionally spun yarn.*

*Considering the overall situation of Mexico, it would appear that Open-End spinning is not the most appropriate technology for the years to come. It is therefore suggested that the introduction of Open-End spinning should not be insisted upon when taking up local production of textile machinery, but that on the contrary, production should start right in on conventional ring spinning equipment. Should the future development of the OE-technology progress to such an extent as to really make the traditional ring spinning technique obsolete, then the changeover to the production of OE-spinning machines can be achieved by any of the prospective foreign partners in the joint venture envisaged.*

*It is of interest to note here that this particular policy has been adopted by other large developing countries such as Brazil and Argentina.*



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5.1.3 Machine Information: Conventional Weaving Looms.

A. MEXICAN MARKET DATA

1.	No. of machines installed in Mexico	12 000
2.	Degree of modernization of equipment installed (%)	90%
3.	Total imports from 1968 to 1972 (units)	5 500
4.	Total imports from 1968 to 1972 (pesos)	185 582 000
5.	Tendency of imports between 1968 and 1972	—
6.	Total imp. of spare parts from 1968 to 1972 (pes.)	56 653 000
7.	Average lifetime as considered normal in Mex. (yrs.)	25
8.	Average sales per year up to 1980 (units)	800
9.	Average sales per year from 1980 to 1985 (units)	700

B. WORLD MARKET DATA

10.	Approx. No. of significant producers	4
11.	Production in developing countries	Brazil, India.
12.	Normal delivery time (min/max)	15 months(6/
13.	Average price 1975 (pesos)	105 000
14.	Export potential	low.

C. TECHNOLOGICAL ASPECTS

15.	Diversity of types	medium
16.	Future technological prospects	good.
17.	Average bought-out parts (% of prod. cost)	30%
18.	Complexity of fabrication	low.

D. CONCLUSION

19. Market not large enough. Too diversified. Further upswing of knitwear to be expected.

*It is estimated that about 70% of all weaving looms sold worldwide today are of the conventional shuttle type. In Mexico, shuttleless looms have not even reached 30% of total sales as yet. However, since the versatility of shuttleless looms of all types is steadily improving, it is expected that their rate of penetration worldwide will soon be applicable to the Mexican market.*

*The minimum production lot size for a profitable loom manufacturing operation is around 600 to 700 looms per annum. If this rate of production were to be in Mexico, the producer would encounter serious difficulties in selling his entire production to the Mexican textile industry. This is due to the fact that although the above rate of production is indeed below the country's rate of absorption for such machinery, there will always be a considerable by-passing of the local loom production by imports authorised on the strength of the alleged better appropriateness of such imports.*

*Under this circumstances, an effective control of imports is practically impossible.*

*In view of the above particular circumstances surrounding the use of weaving looms, we recommend that no manufacture of such looms be started in Mexico, our reasons in this respect being summarised as follows:*

- The total market size is barely above the minimum economically viable level of production. As already inferred, it seems highly unlikely that Mexico's textile industry would accept the ensuing forced standardization programme if such local manufacture were to be established.*
- A powerful contender for the dominant position in the textiles market of Mexico has made its appearance in the form of the texturised polyester fibre. This fibre, however, is only used in weaving to a very limited extent here, nearly all of it being for use in knitting machines. It is estimated that at present about 20% of all textile planes are being made on one kind of knitting machinery or another.*

*It may be assumed that the weaving technology will further develop in the matter of obtaining higher production speeds. Nevertheless, high output looms most probably will not be of the shuttle type. They are likely to be highly developed shuttleless looms either of the missile projectile type, for instance, or even of the air or water jet type. Conventional shuttle type looms now appear to have reached their optimum limit as regards production speed.*

## 5.4.4 Machine Information: Shuttleless Looms

### A. MEXICAN MARKET DATA

1.	No. of machines installed in Mexico	1 100 ✓
2.	Degree of modernization of equipment installed (%)	100
3.	Total imports from 1968 to 1972 (units)	1 100
4.	Total imports from 1968 to 1972 (pesos)	150 000 000
5.	Tendency of imports between 1968 and 1972	↗
6.	Total imp. of spare parts from 1968 to 1972 (pes.)	n. a.
7.	Average lifetime as considered normal in Mex. (yrs.)	-
8.	Average sales per year up to 1980 (units)	200
9.	Average sales per year from 1980 to 1985 (units)	300

### B. WORLD MARKET DATA

10.	Approx. No. of significant producers	15
11.	Production in developing countries	no
12.	Normal delivery time (min/max)	20 months (1-)
13.	Average price 1975 (pesos)	250 000-500 000
14.	Export potential	low.

### C. TECHNOLOGICAL ASPECTS

15.	Diversity of types	high.
16.	Future technological prospects	very good.
17.	Average bought-out parts (% of prod. cost)	n. a.
18.	Complexity of fabrication	high.

### D. CONCLUSION

19. Not suitable for production in Mexico in the immediate and near future.

- ✓ 600 missile projectile system.  
 200 rigid rapiers "  
 150 water-jet flexible rapiers system.  
 150 nozzle system.

3.4.5 Machine Information: Winch beams.

**A. MEXICAN MARKET DATA**

- |   |               |
|---|---------------|
| 1. No. of machines installed in Mexico                  | approx. 1 500 |
| 2. Degree of modernization of equipment installed (%)   | 50            |
| 3. Total imports from 1968 to 1972 (units)              | n. a.         |
| 4. Total imports from 1968 to 1972 (pesos)              | n. a.         |
| 5. Tendency of imports between 1968 and 1972            | —             |
| 6. Total imp. of spare parts from 1968 to 1972 (pes.)   | n. a.         |
| 7. Average lifetime as considered normal in Mex. (yrs.) | 15            |
| 8. Average sales per year up to 1980 (units)            | 40            |
| 9. Average sales per year from 1980 to 1985 (units)     | 20            |

**B. WORLD MARKET DATA**

- |  |                           |
|--|---------------------------|
| 10. Approx. No. of significant producers | 21                        |
| 11. Production in developing countries   | Argentina, Brazil, India. |
| 12. Normal delivery time (min/max)       | 6 months (4/8)            |
| 13. Average price 1975 (pesos)           | 0.2-0.65 mil.             |
| 14. Export potential                     | medium.                   |

**C. TECHNOLOGICAL ASPECTS**

- |  |           |
|--|-----------|
| 15. Diversity of types                         | medium.   |
| 16. Future technological prospects             | not good. |
| 17. Average bought-out parts (% of prod. cost) | 20        |
| 18. Complexity of fabrication                  | low.      |

**D. CONCLUSION**

19. *Manufacture in Mexico is advisable. Would form part of product-mix in factory producing dyeing equipment, for pre-feasibility study, Chapter 8.*

5.4.6 Machine Information: Jets

A. MEXICAN MARKET DATA

- |    |  |       |
|----|--|-------|
| 1. | No. of machines installed in Mexico                  | 200   |
| 2. | Degree of modernization of equipment installed (%)   | 100   |
| 3. | Total imports from 1968 to 1972 (units)              | n. a. |
| 4. | Total imports from 1968 to 1972 (pesos)              | n. a. |
| 5. | Tendency of imports between 1968 and 1972            | ↓     |
| 6. | Total imp. of spare parts from 1968 to 1972 (pes.)   | n. a. |
| 7. | Average lifetime as considered normal in Mex. (yrs.) | n. a. |
| 8. | Average sales per year up to 1980 (units)            | 25    |
| 9. | Average sales per year from 1980 to 1985 (units)     | 40    |

B. WORLD MARKET DATA

- |     |                                      |                |
|-----|--------------------------------------|----------------|
| 10. | Approx. No. of significant producers | 11             |
| 11. | Production in developing countries   | Brazil, India  |
| 12. | Normal delivery time (min/max)       | 6 months (4/1) |
| 13. | Average price 1975 (pesos)           | 0.5-1.5 milli  |
| 14. | Export potential                     | high.          |

C. TECHNOLOGICAL ASPECTS

- |     |  |             |
|-----|--|-------------|
| 15. | Diversity of types                         | low.        |
| 16. | Future technological prospects             | very good.  |
| 17. | Average bought-out parts (% of prod. cost) | 30          |
| 18. | Complexity of fabrication                  | medium/low. |

D. CONCLUSION

19. *Manufacture in Mexico is advisable . Would form part of product-mix in factory producing dyeing equipment for pre-feasibility study, Chapter 8.*

5. 1.7 Machine Information: Yarn dyeing <sup>1/</sup> equipment

**A. MEXICAN MARKET DATA**

- |    |  |       |
|----|--|-------|
| 1. | No. of machines installed in Mexico                  | 550   |
| 2. | Degree of modernization of equipment installed (%)   | 50    |
| 3. | Total imports from 1968 to 1972 (units)              | n. a. |
| 4. | Total imports from 1968 to 1972 (pesos)              | n. a. |
| 5. | Tendency of imports between 1968 and 1972            | n. a. |
| 6. | Total imp. of spare parts from 1968 to 1972 (pes.)   | n. a. |
| 7. | Average lifetime as considered normal in Mex. (yrs.) | 10    |
| 8. | Average sales per year up to 1980 (units)            | 20    |
| 9. | Average sales per year from 1980 to 1985 (units)     | 20    |

**B. WORLD MARKET DATA**

- |     |                                      |                           |
|-----|--------------------------------------|---------------------------|
| 10. | Approx. No. of significant producers | 14                        |
| 11. | Production in developing countries   | Argentina, Brazil, India. |
| 12. | Normal delivery time (min/max)       | 5 months (3-7)            |
| 13. | Average price 1975 (pesos)           | 0.5-0.9 million           |
| 14. | Export potential                     | good.                     |

**C. TECHNOLOGICAL ASPECTS**

- |     |  |         |
|-----|--|---------|
| 15. | Diversity of types                         | medium. |
| 16. | Future technological prospects             | medium. |
| 17. | Average bought-out parts (% of prod. cost) | 30      |
| 18. | Complexity of fabrication                  | low.    |

**D. CONCLUSION**

19. *Manufacture in Mexico is advisable. Would form part of product-mix factory producing dyeing equipment for pre-feasibility study, Chapter 8.*

<sup>1/</sup> Yarn drying equipment included

5.4.8 Machine Information: Steeler Frames

A. MEXICAN MARKET DATA

1. No. of machines installed in Mexico	350
2. Degree of modernization of equipment installed (%)	60
3. Total imports from 1968 to 1972 (units)	55
4. Total imports from 1968 to 1972 (pesos)	100 835 000
5. Tendency of imports between 1968 and 1972	↘
6. Total imp. of spare parts from 1968 to 1972 (pes.)	2 612 000
7. Average lifetime as considered normal in Mex. (yrs.)	20
8. Average sales per year up to 1980 (units)	20
9. Average sales per year from 1980 to 1985 (units)	30

B. WORLD MARKET DATA

10. Approx. No. of significant producers	10
11. Production in developing countries	Argentina, Brazil, India.
12. Normal delivery time (min/max)	12 months(10)
13. Average price 1975 (pesos)	4 000 000
14. Export potential	medium.

C. TECHNOLOGICAL ASPECTS

15. Diversity of types	high.
16. Future technological prospects	very good.
17. Average bought-out parts (% of prod. cost)	35
18. Complexity of fabrication	medium.

D. CONCLUSION

19. *Manufacture in Mexico is advisable. Would form the important part of the product-mix in a factory producing finishing equipment. For pre-feasibility study, Chapter 9.*



5. 4.9 Machine Information: Jiggers

**A. MEXICAN MARKET DATA**

- |   |       |
|---|-------|
| 1. No. of machines installed in Mexico                  | 900   |
| 2. Degree of modernization of equipment installed (%)   | 60    |
| 3. Total imports from 1968 to 1972 (units)              | n. a. |
| 4. Total imports from 1968 to 1972 (pesos)              | n. a. |
| 5. Tendency of imports between 1968 and 1972            | n. a. |
| 6. Total imp. of spare parts from 1968 to 1972 (pes.)   | n. a. |
| 7. Average lifetime as considered normal in Mex. (yrs.) | 15    |
| 8. Average sales per year up to 1980 (units)            | 20    |
| 9. Average sales per year from 1980 to 1985 (units)     | 20    |

**B. WORLD MARKET DATA**

- |  |                           |
|--|---------------------------|
| 10. Approx. No. of significant producers | 12                        |
| 11. Production in developing countries   | Argentina, Brazil, India, |
| 12. Normal delivery time (min/max)       | 6 months (3-6)            |
| 13. Average price 1975 (pesos)           | 0.3-0.6 mill              |
| 14. Export potential                     | low.                      |

**C. TECHNOLOGICAL ASPECTS**

- |  |           |
|--|-----------|
| 15. Diversity of types                         | low.      |
| 16. Future technological prospects             | not good. |
| 17. Average bought-out parts (% of prod. cost) | 25        |
| 18. Complexity of fabrication                  | low.      |

**D. CONCLUSION**

19. *Manufacture in Mexico is advisable. Would form part of product-mix in a factory producing finishing equipment. For pre-feasibility study, Chapter 9.*

1.10 Machine Information: Foulards

**A. MEXICAN MARKET DATA**

- |   |      |
|---|------|
| 1. No. of machines installed in Mexico                  | 700  |
| 2. Degree of modernization of equipment installed (%)   | 70   |
| 3. Total imports from 1968 to 1972 (units)              | n.a. |
| 4. Total imports from 1968 to 1972 (pesos)              | n.a. |
| 5. Tendency of imports between 1968 and 1972            | ↗    |
| 6. Total imp. of spare parts from 1968 to 1972 (pes.)   | n.a. |
| 7. Average lifetime as considered normal in Mex. (yrs.) | 15   |
| 8. Average sales per year up to 1980 (units)            | 20   |
| 9. Average sales per year from 1980 to 1985 (units)     | 25   |

**B. WORLD MARKET DATA**

- |  |                           |
|--|---------------------------|
| 10. Approx. No. of significant producers | 5                         |
| 11. Production in developing countries   | Argentina, Brazil, India. |
| 12. Normal delivery time (min/max)       | 6 months (1/2)            |
| 13. Average price 1975 (pesos)           | 0, 25-0, 40 mi            |
| 14. Export potential                     | good.                     |

**C. TECHNOLOGICAL ASPECTS**

- |  |            |
|--|------------|
| 15. Diversity of types                         | medium.    |
| 16. Future technological prospects             | very good. |
| 17. Average bought-out parts (% of prod. cost) | 30         |
| 18. Complexity of fabrication                  | medium.    |

**D. CONCLUSION**

19. *Manufacture in Mexico is advisable. Would form part of product-mix in a factory producing finishing equipment. For pre-feasibility study, Chapter 9.*

### 5.4.11 Machine Information: Continuous Dyeing Ranges

#### A. MEXICAN MARKET DATA

- |    |  |      |
|----|--|------|
| 1. | No. of machines installed in Mexico                  | 60   |
| 2. | Degree of modernization of equipment installed (%)   | 80   |
| 3. | Total imports from 1968 to 1972 (units)              | n.a. |
| 4. | Total imports from 1968 to 1972 (pesos)              | n.a. |
| 5. | Tendency of imports between 1968 and 1972            |      |
| 6. | Total imp. of spare parts from 1968 to 1972 (pes.)   | n.a. |
| 7. | Average lifetime as considered normal in Mex. (yrs.) | 20   |
| 8. | Average sales per year up to 1980 (units)            | 8    |
| 9. | Average sales per year from 1980 to 1985 (units)     | 10   |

#### B. WORLD MARKET DATA

- |     |                                      |                           |
|-----|--------------------------------------|---------------------------|
| 10. | Approx. No. of significant producers | 15                        |
| 11. | Production in developing countries   | Argentina, Brazil, India. |
| 12. | Normal delivery time (min/max)       | 12 months (to 10)         |
| 13. | Average price 1975 (pesos)           | 0.6-1.0 million           |
| 14. | Export potential                     | good.                     |

#### C. TECHNOLOGICAL ASPECTS

- |     |  |             |
|-----|--|-------------|
| 15. | Diversity of types                         | medium/high |
| 16. | Future technological prospects             | very good.  |
| 17. | Average bought-out parts (% of prod. cost) | 25          |
| 18. | Complexity of fabrication                  | medium/low. |

#### D. CONCLUSION

19. *Manufacture in Mexico is advisable. Would form part of product-mix in a factory producing finishing equipment. For pre-feasibility study, Chapter 9.*

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10

3. 1. 12 Machine Information: Continuous Bleaching Ranges

**A. MEXICAN MARKET DATA**

- |   |       |
|---|-------|
| 1. No. of machines installed in Mexico                  | 60    |
| 2. Degree of modernization of equipment installed (%)   | 80    |
| 3. Total imports from 1968 to 1972 (units)              | n. a. |
| 4. Total imports from 1968 to 1972 (pesos)              | n. a. |
| 5. Tendency of imports between 1968 and 1972            |       |
| 6. Total imp. of spare parts from 1968 to 1972 (pes.)   | n. a. |
| 7. Average lifetime as considered normal in Mex. (yrs.) | 20    |
| 8. Average sales per year up to 1980 (units)            | 8     |
| 9. Average sales per year from 1980 to 1985 (units)     | 10    |

**B. WORLD MARKET DATA**

- |  |                           |
|--|---------------------------|
| 10. Approx. No. of significant producers | 15                        |
| 11. Production in developing countries   | Argentina, Brazil, India. |
| 12. Normal delivery time (min/max)       | 12 months (10)            |
| 13. Average price 1975 (pesos)           | 0.8-0.8 million good.     |
| 14. Export potential                     |                           |

**C. TECHNOLOGICAL ASPECTS**

- |  |             |
|--|-------------|
| 15. Diversity of types                         | medium/high |
| 16. Future technological prospects             | very good.  |
| 17. Average bought-out parts (% of prod. cost) | 25          |
| 18. Complexity of fabrication                  | medium/low. |

**D. CONCLUSION**

19. *Manufacture in Mexico is advisable. Would form part of product-mix in a factory producing finishing equipment. For pre-feasibility study, Chapter 9.*

10

5.4.13 Machine Information: Continuous Washing Ranges

**A. MEXICAN MARKET DATA**

1. No. of machines installed in Mexico	80
2. Degree of modernization of equipment installed (%)	70
3. Total imports from 1968 to 1972 (units)	15
4. Total imports from 1968 to 1972 (pesos)	24 326 000
5. Tendency of imports between 1968 and 1972	
6. Total imp. of spare parts from 1968 to 1972 (pes.)	189 000
7. Average lifetime as considered normal in Mex. (yrs.)	20
8. Average sales per year up to 1980 (units)	10
9. Average sales per year from 1980 to 1985 (units)	13

**B. WORLD MARKET DATA**

10. Approx. No. of significant producers	15
11. Production in developing countries	n.a.
12. Normal delivery time (min/max)	10 months(6/)
13. Average price 1975 (pesos)	0.65-0.95 mil.
14. Export potential	good.

**C. TECHNOLOGICAL ASPECTS**

15. Diversity of types	medium.
16. Future technological prospects	good.
17. Average bought-out parts (% of prod. cost)	30
18. Complexity of fabrication	low.

**D. CONCLUSION**

19. *Manufacture in Mexico is advisable. Would form part of product-mix in a factory producing finishing equipment. For pre-feasibility study, Chapter 9.*

5. 4. 11 Machine Information: Extrusion Machines

<b>A. <u>MEXICAN MARKET DATA</u></b>	
1. No. of machines installed in Mexico	30
2. Degree of modernization of equipment installed (%)	100
3. Total imports from 1968 to 1972 (units)	
4. Total imports from 1968 to 1972 (pesos)	184 593 000
5. Tendency of imports between 1968 and 1972	↗
6. Total imp. of spare parts from 1968 to 1972 (pes.)	7 605 000
7. Average lifetime as considered normal in Mex. (yrs.)	n. a.
8. Average sales per year up to 1980 (units)	n. a.
9. Average sales per year from 1980 to 1985 (units)	n. a.
<b>B. <u>WORLD MARKET DATA</u></b>	
10. Approx. No. of significant producers	10
11. Production in developing countries	no
12. Normal delivery time (min/max)	26 months (1
13. Average price 1975 (pesos)	n. a.
14. Export potential	low.
<b>C. <u>TECHNOLOGICAL ASPECTS</u></b>	
15. Diversity of types	high.
16. Future technological prospects	very good.
17. Average bought-out parts (% of prod. cost)	n. a.
18. Complexity of fabrication	very high.
<b>D. <u>CONCLUSION</u></b>	
19. Too complex; demand too low.	

5. 1.15 Machine Information: Picker and Lap machines

A. MEXICAN MARKET DATA

- |    |  |            |
|----|--|------------|
| 1. | No. of machines installed in Mexico                  | 400        |
| 2. | Degree of modernization of equipment installed (%)   | 65         |
| 3. | Total imports from 1968 to 1972 (units)              | 35         |
| 4. | Total imports from 1968 to 1972 (pesos)              | 58 650 000 |
| 5. | Tendency of imports between 1968 and 1972            | →          |
| 6. | Total imp. of spare parts from 1968 to 1972 (pes.)   | n. a.      |
| 7. | Average lifetime as considered normal in Mex. (yrs.) | 30         |
| 8. | Average sales per year up to 1980 (units)            | 7-10       |
| 9. | Average sales per year from 1980 to 1985 (units)     | 12-15      |

B. WORLD MARKET DATA

- |     |                                      |                           |
|-----|--------------------------------------|---------------------------|
| 10. | Approx. No. of significant producers | 18                        |
| 11. | Production in developing countries   | Argentina, Brazil, India. |
| 12. | Normal delivery time (min/max)       | 9 months (1/2)            |
| 13. | Average price 1975 (pesos)           | 1. 25-2. 00 mil           |
| 14. | Export potential                     | low/medium.               |

C. TECHNOLOGICAL ASPECTS

- |     |  |             |
|-----|--|-------------|
| 15. | Diversity of types                         | high.       |
| 16. | Future technological prospects             | good.       |
| 17. | Average bought-out parts (% of prod. cost) | 25%         |
| 18. | Complexity of fabrication                  | medium/low. |

D. CONCLUSION

19. Manufacture of textile machinery should not be started with this type of equipment. Production could possibly be started after ringspinning manufacture has proved to be successful.



5.4.16 Machine Information: Cards

A. MEXICAN MARKET DATA

1.	No. of machines installed in Mexico	6 000
2.	Degree of modernization of equipment installed (%)	59
3.	Total imports from 1968 to 1972 (units)	280
4.	Total imports from 1968 to 1972 (pesos)	80 148 000
5.	Tendency of imports between 1968 and 1972	—
6.	Total imp. of spare parts from 1968 to 1972 (pes.)	350 000
7.	Average lifetime as considered normal in Mex. (yrs.)	30
8.	Average sales per year up to 1980 (units)	60
9.	Average sales per year from 1980 to 1985 (units)	80

B. WORLD MARKET DATA

10.	Approx. No. of significant producers	19
11.	Production in developing countries	Brazil, India.
12.	Normal delivery time (min/max)	18 months(12
13.	Average price 1975 (pesos)	500 000
14.	Export potential	good.

C. TECHNOLOGICAL ASPECTS

15.	Diversity of types	low.
16.	Future technological prospects	very good.
17.	Average bought out parts (% of prod. cost)	25
18.	Complexity of fabrication	high.

D. CONCLUSION

19. Manufacture of textile machinery should not be started with this type of equipment. Production could possibly be started after ringspinning manufacture has proved to be successful.

## 5. 1. 17 Machine Information; Combing Machines

### A. MEXICAN MARKET DATA

1.	No. of machines installed in Mexico	600
2.	Degree of modernization of equipment installed (%)	75
3.	Total imports from 1968 to 1972 (units)	150
4.	Total imports from 1968 to 1972 (pesos)	49 000 000
5.	Tendency of imports between 1968 and 1972	
6.	Total imp. of spare parts from 1968 to 1972 (pes.)	3 000 000
7.	Average lifetime as considered normal in Mex. (yrs.)	30
8.	Average sales per year up to 1980 (units)	75
9.	Average sales per year from 1980 to 1985 (units)	85

### B. WORLD MARKET DATA

10.	Approx. Nr. of significant producers	12
11.	Production in developing countries	no
12.	Normal delivery time (min/max)	12 months (8)
13.	Average price 1975 (pesos)	450 000
14.	Export potential	low.

### C. TECHNOLOGICAL ASPECTS

15.	Diversity of types	low.
16.	Future technological prospects	very good
17.	Average bought-out parts (% of prod. cost)	30
18.	Complexity of fabrication	extremely hi

### D. CONCLUSION

19. Too complicated; market too small.

5.4.18 Machine Information: Draw Frames

**A. MEXICAN MARKET DATA**

1. No. of machines installed in Mexico	4 100
2. Degree of modernization of equipment installed (%)	90
3. Total imports from 1968 to 1972 (units)	70 000 000
4. Total imports from 1968 to 1972 (pesos)	450
5. Tendency of imports between 1968 and 1972	→
6. Total imp. of spare parts from 1968 to 1972 (pes.)	4 000 000
7. Average lifetime as considered normal in Mex. (yrs.)	15
8. Average sales per year up to 1980 (units)	50
9. Average sales per year from 1980 to 1985 (units)	60

**B. WORLD MARKET DATA**

10. Approx. No. of significant producers	14
11. Production in developing countries	Brazil, India
12. Normal delivery time (min/max)	12 months(8/
13. Average price 1975 (pesos)	120 000
14. Export potential	medium.

**C. TECHNOLOGICAL ASPECTS**

15. Diversity of types	low.
16. Future technological prospects	good.
17. Average bought-out parts (% of prod. cost)	25
18. Complexity of fabrication	medium/low.

**D. CONCLUSION**

19. *Manufacture of textile machinery should not be started with this type of equipment. Production could possibly be started after ringspinning manufacture has proved to be successful.*

5.1.19 Machine Information: Flyers

**A. MEXICAN MARKET DATA**

1. No. of spindles installed in Mexico <sup>1/</sup>	150 000
2. Degree of modernization of equipment installed (%)	50
3. Total imports from 1968 to 1972 (units)	10 000 spindle
4. Total imports from 1968 to 1972 (pesos)	19 388 000
5. Tendency of imports between 1968 and 1972	—
6. Total imp. of spare parts from 1968 to 1972 (pes.)	3 562 000
7. Average lifetime as considered normal in Mex. (yrs.)	20
8. Average sales per year up to 1980 (units)	3 000 spindle
9. Average sales per year from 1980 to 1985 (units)	3 000 spindle

**B. WORLD MARKET DATA**

10. Approx. No. of significant producers	14
11. Production in developing countries	Brazil, India.
12. Normal delivery time (min/max)	12 months (8/2)
13. Average price 1975 (pesos)	7 000 spindle
14. Export potential	low.

**C. TECHNOLOGICAL ASPECTS**

15. Diversity of types	low.
16. Future technological prospects	medium.
17. Average bought-out parts (% of prod. cost)	25
18. Complexity of fabrication	medium.

**D. CONCLUSION**

19. Too small market.

1/ One machine averages about 120 spindles

**5.4.20 Machine Information: Conventional Cone Winders**

**A. MEXICAN MARKET DATA**

- |   |                |
|---|----------------|
| 1. No. of spindles installed in Mexico <sup>1/</sup>    | 29 000         |
| 2. Degree of modernization of equipment installed (%)   | 70             |
| 3. Total imports from 1968 to 1972 (units)              | 1 300 spindles |
| 4. Total imports from 1968 to 1972 (pesos)              | 25 000 000     |
| 5. Tendency of imports between 1968 and 1972            | ↘              |
| 6. Total imp. of spare parts from 1968 to 1972 (pes.)   | 6 000 000      |
| 7. Average lifetime as considered normal in Mex. (yrs.) | 15             |
| 8. Average sales per year up to 1980 (units)            | 300 spindles   |
| 9. Average sales per year from 1980 to 1985 (units)     | 200 spindles   |

**B. WORLD MARKET DATA**

- |  |                  |
|--|------------------|
| 10. Approx. No. of significant producers | 8                |
| 11. Production in developing countries   | India.           |
| 12. Normal delivery time (min/max)       | 12 months (8/12) |
| 13. Average price 1975 (pesos)           | 1 060/spindle    |
| 14. Export potential                     | low.             |

**C. TECHNOLOGICAL ASPECTS**

- |  |         |
|--|---------|
| 15. Diversity of types                         | high.   |
| 16. Future technological prospects             | poor.   |
| 17. Average bought-out parts (% of prod. cost) | 30      |
| 18. Complexity of fabrication                  | medium. |

**D. CONCLUSION**

19. Conventional cone winders are used less and less.  
80 to 90 % of all imported cone winders are automatic.

---

<sup>1/</sup> One machine may have from 12 to 48 spindles (Average: 40 spindles)

## 5.1.21 Machine Information: Automatic Cone Winders

### A. MEXICAN MARKET DATA

- |   |                |
|---|----------------|
| 1. No. of spindles installed in Mexico <sup>1/</sup>    | 15 000         |
| 2. Degree of modernization of equipment installed (%)   | 95             |
| 3. Total imports from 1968 to 1972 (units)              | 9 000 spindle. |
| 4. Total imports from 1968 to 1972 (pesos)              | 218 968 000    |
| 5. Tendency of imports between 1968 and 1972            | ✓              |
| 6. Total imp. of spare parts from 1968 to 1972 (pes.)   | 18 055 000     |
| 7. Average lifetime as considered normal in Mex. (yrs.) | 15             |
| 8. Average sales per year up to 1980 (units)            | 2 000 spindle. |
| 9. Average sales per year from 1980 to 1985 (units)     | 2 500 spindle. |

### B. WORLD MARKET DATA

- |  |                |
|--|----------------|
| 10. Approx. No. of significant producers | 5              |
| 11. Production in developing countries   | India.         |
| 12. Normal delivery time (min/max)       | 12 months(6    |
| 13. Average price 1975 (pesos)           | 25 000/spindle |
| 14. Export potential                     | good.          |

### C. TECHNOLOGICAL ASPECTS

- |  |             |
|--|-------------|
| 15. Diversity of types                         | medium/high |
| 16. Future technological prospects             | very good.  |
| 17. Average bought-out parts (% of prod. cost) | 35          |
| 18. Complexity of fabrication                  | high.       |

### D. CONCLUSION

19. Polarised market rather restricted.  
Almost Oligopolistic market.  
Very complicated to manufacture.

<sup>1/</sup> Machines can have from 10 to 96 spindles.

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## 5.4.22 Machine Information: Twisting Machines

### A. MEXICAN MARKET DATA

- |   |            |
|---|------------|
| 1. No. of spindles installed in Mexico <sup>1/</sup>    | 280 000    |
| 2. Degree of modernization of equipment installed (%)   | 70         |
| 3. Total imports from 1968 to 1972 (units)              |            |
| 4. Total imports from 1968 to 1972 (pesos)              | n.a.       |
| 5. Tendency of imports between 1968 and 1972            | ↗          |
| 6. Total imp. of spare parts from 1968 to 1972 (pes.)   | 13 937 000 |
| 7. Average lifetime as considered normal in Mex. (yrs.) | 25         |
| 8. Average sales per year up to 1980 (units)            |            |
| 9. Average sales per year from 1980 to 1985 (units)     |            |

### B. WORLD MARKET DATA

- |  |                           |
|--|---------------------------|
| 10. Approx. No. of significant producers | 14                        |
| 11. Production in developing countries   | Argentina, Brazil, India. |
| 12. Normal delivery time (min/max)       | 8 months (6-12)           |
| 13. Average price 1975 (pesos)           | 750/spindle               |
| 14. Export potential                     | medium.                   |

### C. TECHNOLOGICAL ASPECTS

- |  |       |
|--|-------|
| 15. Diversity of types                         | high. |
| 16. Future technological prospects             | good. |
| 17. Average bought-out parts (% of prod. cost) | 30    |
| 18. Complexity of fabrication                  | low.  |

### D. CONCLUSION

19. Structure of these machines is similar to that of ring spinning machines. Production can be added to that of ringspinning equipment.

<sup>1/</sup> One machine averages about 400 spindles.



3.4.23 Machine Information: Pira-Winders

**A. MEXICAN MARKET DATA**

1. No. of spindles installed in Mexico <sup>1/</sup>	22 000 <sup>2/</sup>
2. Degree of modernization of equipment installed (%)	60
3. Total imports from 1968 to 1972 (units)	2 800 spind
4. Total imports from 1968 to 1972 (pesos)	16 625 000
5. Tendency of imports between 1968 and 1972	—
6. Total imp. of spare parts from 1968 to 1972 (pes.)	1 127 000
7. Average lifetime as considered normal in Mex. (yrs.)	25
8. Average sales per year up to 1980 (units)	400
9. Average sales per year from 1980 to 1985 (units)	300

**B. WORLD MARKET DATA**

10. Approx. No. of significant producers	15
11. Production in developing countries	Brazil, India
12. Normal delivery time (min/max)	8 months (10)
13. Average price 1975 (pesos)	20 000/spin-
14. Export potential	low.

**C. TECHNOLOGICAL ASPECTS**

15. Diversity of types	low.
16. Future technological prospects	medium/low
17. Average bought-out parts (% of prod. cost)	35
18. Complexity of fabrication	medium.

**D. CONCLUSION**

19. Demand too low. Tendency towards use of UNIFIL. Not needed for shuttleless weaving.

<sup>1/</sup> One machine can have from 6 to 100 spindles.

<sup>2/</sup> about 2 000 Unifil spindles installed.

5.1.21 Machine Information: Beavers <sup>1/</sup>

**A. MEXICAN MARKET DATA**

1.	No. of machines installed in Mexico	850
2.	Degree of modernization of equipment installed (%)	65
3.	Total imports from 1968 to 1972 (units)	
4.	Total imports from 1968 to 1972 (pesos)	45 618 000
5.	Tendency of imports between 1968 and 1972	↗
6.	Total imp. of spare parts from 1968 to 1972 (pes.)	2 644 000
7.	Average lifetime as considered normal in Mex. (yrs.)	25
8.	Average sales per year up to 1980 (units)	15
9.	Average sales per year from 1980 to 1985 (units)	20

**B. WORLD MARKET DATA**

10.	Approx. No. of significant producers	10
11.	Production in developing countries	Brazil, India
12.	Normal delivery time (min/max)	12 months (6
13.	Average price 1975 (pesos)	1 200 000
14.	Export potential	medium.

**C. TECHNOLOGICAL ASPECTS**

15.	Diversity of types	high.
16.	Future technological prospects	good.
17.	Average bought-out parts (% of prod. cost)	35
18.	Complexity of fabrication	high.

**D. CONCLUSION**

19. Diversity of types too extensive. Total demand too low.  
Highly specialized firms controlling world market.

<sup>1/</sup> Direct and sectional warping considered.

## 3.1.25 Machine Information: Sizing Machines

### A. MEXICAN MARKET DATA

1.	No. of machines installed in Mexico	1 050- 1 100
2.	Degree of modernization of equipment installed (%)	60
3.	Total imports from 1968 to 1972 (units)	16
4.	Total imports from 1968 to 1972 (pesos)	21 919 000
5.	Tendency of imports between 1968 and 1972	
6.	Total imp. of spare parts from 1968 to 1972 (pes.)	1 338 000
7.	Average lifetime as considered normal in Mex. (yrs.)	25/30
8.	Average sales per year up to 1980 (units)	1
9.	Average sales per year from 1980 to 1985 (units)	5

### B. WORLD MARKET DATA

10.	Approx. No. of significant producers	12
11.	Production in developing countries	Brazil, India
12.	Normal delivery time (min/max)	15 months
13.	Average price 1975 (pesos)	2 200 000
14.	Export potential	low.

### C. TECHNOLOGICAL ASPECTS

15.	Diversity of types	medium.
16.	Future technological prospects	good.
17.	Average bought-out parts (% of prod. cost)	25
18.	Complexity of fabrication	medium.

### D. CONCLUSION

19. Market too small.

5.4.26 Machine Information : Texturizing Machines

**A. MEXICAN MARKET DATA**

1.	No. of spindles installed in Mexico <sup>1/</sup>	150 000
2.	Degree of modernization of equipment installed (%)	80
3.	Total imports from 1968 to 1972 (units)	28 000 spdl
4.	Total imports from 1968 to 1972 (pesos)	247 674 000
5.	Tendency of imports between 1968 and 1972	↑
6.	Total imp. of spare parts from 1968 to 1972 (pes.)	23 937 000
7.	Average lifetime as considered normal in Mex. (yrs.)	n.a.
8.	Average sales per year up to 1980 (units)	70/100
9.	Average sales per year from 1980 to 1985 (units)	100/120

**B. WORLD MARKET DATA**

10.	Approx. % of significant producers	14
11.	Production in developing countries	Brazil (1970)
12.	Normal delivery time (min/max)	12 months <sup>1/</sup>
13.	Average price 1975 (pesos)	9 500/spin
14.	Export potential	good.

**C. TECHNOLOGICAL ASPECTS**

15.	Diversity of types	low.
16.	Future technological prospects	very good <sup>2/</sup>
17.	Average bought-out parts (% of prod. cost)	35
18.	Complexity of fabrication	medium.

**D. CONCLUSION**

19. Market size should become interesting in about eight to ten years time.

<sup>1/</sup> One machine averages 196 spindles.

<sup>2/</sup> For Draw Texturizing Machines (Ratio: approx. 1: 1'67)

5.4.27 Machine Information: Circular Knitting Machines

**A. MEXICAN MARKET DATA**

1. No. of machines installed in Mexico	6 500
2. Degree of modernization of equipment installed (%)	90
3. Total imports from 1968 to 1972 (units)	1 500
4. Total imports from 1968 to 1972 (pesos)	648 446 000
5. Tendency of imports between 1968 and 1972	↑
6. Total imp. of spare parts from 1968 to 1972 (pes.)	13 789
7. Average lifetime as considered normal in Mex. (yrs.)	n. a.
8. Average sales per year up to 1980 (units)	100
9. Average sales per year from 1980 to 1985 (units)	150

**B. WORLD MARKET DATA ↓**

10. Approx. No. of significant producers	25
11. Production in developing countries	Brazil.
12. Normal delivery time (min/max)	6 months (1)
13. Average price 1975 (pesos)	450 000
14. Export potential	low.

**C. TECHNOLOGICAL ASPECTS**

15. Diversity of types	medium.
16. Future technological prospects	good.
17. Average bought-out parts (% of prod. cost)	30
18. Complexity of fabrication	very high.

**D. CONCLUSION**

19. Mexico disposes of considerable over capacity in this type of machine. Many old machines, or others which have not given satisfactory service, are being withdrawn from service.

1/ World wide machine producing capacity amounts to approximately 16,500 machines per year.  
In 1971 total sales amounted to 4 800 machines.

*The steep rise in the use of artificial fibres in Mexico has naturally caused a considerable expansion in the country's inventory of texturizing machines and circular knitting machines. It is believed in fact, that Mexico now disposes of a 25 to 30% overcapacity in knitting machinery.*

*Export possibilities for knitwear are limited for two reasons:*

- *Circular knitting machines are fairly expensive, with the result that the production of knitwear is extremely capital intensive, a feature not conducive to favouring Mexican exports which are usually based on labour-intensiveness.*
- *Prices for synthetic fibres are generally speaking, much higher in Mexico than abroad.*

*Mexico's competitive advantage in normal business operations resides in its relatively low labour costs and in its availability of raw material, especially cotton. Therefore, it is evident that the export of knitwear cannot show much promise for the future since knitwear mainly uses artificial fibres as raw material.*

5.5 Summary of Chapter 5: Identification of textile machines deemed to be suitable for manufacture in Mexico

*The main feasibility criteria<sup>1/</sup> applied to the types of machinery studied are as follows:*

- *Future market potential in Mexico*
- *Versatility*
- *Complexity of fabrication*
- *Attainable degree of integration*
- *Possibility to export*
- *Worldmarket situation*

*Subject to the above criteria, local production on the following lines shows promise in the immediate future:*

<sup>1/</sup> For further details, see Chapter 3.

### 5.5.1 Factory 1

- Ringspinning machines.
- Twisting machines.

*Planing and costing for the fabrication of these two types of machinery is shown in the detailed feasibility study of Chapter 7.*

### 5.5.2 Factory 2

- Winch becks.
- Jets.
- Yarn dyeing and drying apparatus.
- Sample dyeing and drying equipment.
- Centrifugal dryers.

*A pre-feasibility study for the manufacture of the above machines and equipments is given in Chapter 8.*

### 5.5.3 Factory 3

- Steeler frames.
- Thermosol dyeing ranges.
- Pad-Steam dyeing ranges.
- Pad-Roll bleaching and dyeing ranges.*
- Jiggers.
- Foulards.
- Continuous washing ranges.

*A pre-feasibility study for the manufacture of the above machines is given in Chapter 9.*

#### 5.5.4 Future possibilities for the manufacture of textile machines in Mexico

*In view of its geographical and economic situation, Mexico is undoubtedly destined to export both to the United States and to Latin America. For obvious commercial reasons, the United States of America, Brazil and Argentina must be excluded as prospective recipients of Mexican built textile machinery. There remain, however, Central America and the rest of South America as potential export markets for Mexican textile machine manufacturers. The total machine inventories in these markets amount to more than 1,6 million spindles and 33 191 looms.*

*In the event that Mexican built machinery could be freely exported to such markets, possibilities for additional manufacture of textile machines could arise in the case of, for example:*

- *Picker and Lap machines.*
- *Cards.*
- *Draw Frames.*
- *Flyers.*

**NOTE:** *These machines could be produced by the prospective manufacturer of ringspinning equipment, a particularly appropriate feature in view of the existing trend for purchasers to order the entire spinning line from the same producer.*

- *Sizing machines.*
- *Conventional cone winders.*



6. PRODUCTION OF TEXTILE MACHINERY IN LATIN AMERICA

6.1 Brazil

6.1.1 Background Data

Brazil's textile industry has been growing very forcefully during the past five years. Table 20 which follows, shows the development of the country's total mill consumption.

Table 20: Brazil's total mill consumption of fibres for textil use (1000's of Tons.).

	1969	1970	1971	1972	1973
<b>Colton</b>	289.0	291.3	298.6	325.0	388.8
<b>Wool</b>	11.0	13.8	15.6	15.2	13.0
<b>Cellulosics</b>	49.1	50.6	57.9	52.5	60.8
<b>Synthetics</b>	38.8	61.5	82.1	106.4	111.9
<b>Total:</b>	387.9	417.2	554.2	499.1	594.5

Source: Sindicato da Industria de Fiacno e Tecelagem em Geral, no Estado de Sao Paulo.

The main driving force for Brazil's textile industry during this period has been the incentive to export. Such exports, by value, amounted to:

- 10.3% of the total fibre consumption in 1970,
- 12.2% " " " " " " 1971,
- 16.7% " " " " " " 1972, and
- 22.6% " " " " " " 1973.

## ACKNOWLEDGEMENTS

*The present report was entirely edited by UNIDO Industrial Engineer Roy Hargreaves. Without his help many parts of this report would have appeared as "Double Dutch" to the reader.*

*At the start of the study work, the general form that the report should take was discussed in detail with the UNIDO Project Leader, Krishna Singh, who also made possible our rapid and intensive introduction to the Mexican environment.*

*All Economic Analysis were carried out with the help of UNIDO Economist Per Blouell, whose help in the final stage of the study was especially appreciated.*

*As a direct result of the cordial and fruitful discussions we had with Messrs. Bazzresch, Larranaga and Velez we were able to include in our report the points of special interest to our counterpart hosts, Nacional Financiera, S.A whose entire facilities were always generously placed at our disposal.*

*The excellent counterpart contribution of Messrs. Juárez and Rodríguez greatly facilitated our introduction to, and understanding of, the Mexican textile scene. Their work in preparing the many statistical tables used in this report is greatly appreciated.*

*Last but not least we should like to thank all the UNIDO experts who were working with us shoulder to shoulder. Their experience accumulated in other industrial fields was of considerable help in broadening our understanding of the Mexican industrial sector.*

**Bruno SIMMA,  
Team Leader**

*Brazil's per capita consumption of textile fibres over the years has been as follows:-*

4.66 kg.	in 1960	(69.72 million inhabitants)
4.01 kg.	in 1965	(81.01 " " )
4.14 kg.	in 1967	(85.75 " " )
4.59 kg.	in 1970	(93.39 " " )
4.55 kg.	in 1971	(96.08 " " )
4.48 kg.	in 1972	(98.85 " " )

*It is evident from the above that the material per capita consumption is practically stagnant.*

*The attractions of Brazil for foreign textile companies 1/ are:*

- *the relatively cheap labour,*
- *the liberal economic policy of the country, and*
- *the export incentives. In this last respect, maximum export percentage refunds amount to twice the percentage of the domestic excise tax, i.e. refunds are:*

*24% for machine tools  
20% for textile machinery, and more than  
20% for textiles.*

*The total inventory of short staple spindles installed in the country has been as follows:-*

3,320 million	in 1969
3,369 "	" 1970
3,420 "	" 1971
3,500 "	" 1972
3,610 "	" 1973 and
3,840 "	" 1974

*1/ Japanese companies own about 382 000 spindles, i.e. 10% of all spindles installed in Brazil. Two of the largest West German textile groups are in the process of installing new factories with more than 25 000 spindles each.*

The total inventory 1/ of looms in operation, was:-

128 047 in 1969

130 467 in 1970

133 132 in 1971 and

135 400 in 1973

## 6.1.2 Textile Machinery Industry

As pointed out in our "Report on trip to Brazil and Argentina...." 2/ of 10 February 1975, the range of machinery produced in Brazil includes:-

- Looms (5 600 produced in 1974, 5 companies)
- Ringspinning machines (1000 machines produced in 1973, 3 companies)
- Picker and Lap machines (3 companies)
- Cards ( 4 companies)
- Draw frames ( 1 company)
- Flyers ( 1 company)
- Conventional cone winders ( 4 companies)
- Twisting machines ( 7 companies)
- Pirn winders ( 2 companies)
- Beamer's ( 3 companies)
- Sizing machines ( 1 company)
- Mercerizing machines ( 2 companies)
- Dyeing equipment ( 10 companies)
- Finishing equipment ( 7 companies)

---

1/ Source: IFCATI, Zurich.

2/ This report also contains detailed information on imports and exports of textile machines.

*Due to this impressive programme of local textile machine manufacturers, imports of textile machines decreased in the last few years as follows:*

- <i>Picker and lap machines:</i>	89 units in 1971
	47 " " 1972
	30 " " 1973
- <i>Cards:</i>	305 units in 1971
	211 " " 1972
	180 " " 1973
- <i>Ring spinning machines:</i>	285 units in 1971
	214 " " 1972
	210 " " 1973
- <i>Looms, shuttleless:</i>	444 units in 1971
	470 " " 1972
	500 " " 1973
- <i>Looms, shuttle:</i>	421 units in 1971
	400 " " 1972
	250 " " 1973

*Brazil is already considered to be self sufficient in conventional spinning equipment, conventional weaving equipment, dyeing equipment and finishing equipment. Nevertheless the following companies are in process of installing further new factories in Brazil.*

- *Shubert & Slazer: will produce*
  - . *Picker and lap machines*
  - . *Cards*
  - . *Flyers*
  - . *Ringspinning machines*
- *SACM: will produce flexible rapiers looms*
- *Trutzschler: will produce picker and lap machines*
- *SOTEXA: will produce texturizing machines 1/*

---

**1/** *These are the first textile machines for the processing of synthetic fibres to be built in a developing country.*

- BARMAG: will produce:
  - . Texturizing machines 1/
  - . Extrusion machines 1/
- SAURER, Rieter are seriously considering setting up operations in Brazil

The total employment in the 35 companies of Brazil producing textile machines amounts to 10 450 persons. The average size per company thus amounts to approximately 300 persons. This relatively high figure is mainly caused by Brazil's main producer, HOWA, who alone employs more than 2000 people.

## 6.2 Argentina

### 6.2.1 Background Data

Argentina's population is about 29 million. It enjoys Latin America's highest per capita income, i. e. approximately US \$ 1 300 per annum in 1971 \*1/.

The country's textile industry operates approximately 1.3 million ring spindles and 26 000 looms, although it is presently suffering an apparent stagnation of local demand as well as encountering stiff competition in its export markets.

### 6.2.2 Textile machinery industry

The range of machinery produced in Argentina includes:

- Ringspinning machines (98 machines produced in 1974, 1 company).
- Cotton cleaning machines (60 machines produced in 1974, 1 company).
- Dyeing machinery (practically full range of machinery produced, 6 companies).

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1/ These are the first textile machines for the processing of synthetic fibres to be built in a developing country.

\*1/ Source: World Bank Atlas, IBRD, Washington, 1973.

- *Finishing machinery (practically full range of machinery produced, 5 companies).*

*Importation of the above mentioned types of machinery is very difficult being penalized by approximately 120% import duties as well as other special fees.*

*The total employment in Argentina's 12 machine manufacturing companies amounts to 140 persons.*

*To our knowledge, no existing textile machine manufacturer is planning to set up any new manufacturing operation in Argentina.*

### **6.3 Summary of Chapter 6**

*Brazil and Argentina must be excluded as potential export markets for Mexican-built textile machinery. Indeed, because of the oversubscribed supply facilities in Brazil as regards textile machinery, strong and increasingly effective measures will be taken by Brazilian machine manufacturers to export their products to Mexico. Already, exports of Brazilian built textile machines are subsidised to the extent of 20% of their job-value. Furthermore, the recent changes in Mexico's "Regla 14" will, if anything, favour imports from ALALC countries even more. 1/*

*The obvious reason for the extraordinary inflow of foreign textile machinery know-how into these two countries mainly lies in the parent companies desire to be present in what appears to be a dynamic market. This is in spite of the fact that production costs are, for instance, 5 to 20% higher in Brazil than in Germany. The main reasons for such higher costs are: smaller production lot sizes, more expensive raw materials and lower productivity of the local labour.*

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*1/ For further details as regards textile machinery trade with ALALC countries, see Exhibit 10.*

## 7. MANUFACTURE OF RINGSPINNING MACHINES

*All the programmes and projections in this Chapter apply only to ring-spinning machines. It is possible, but by no means certain that twisting machines will be produced in the same factory. More often than not, twisting machines have the same cast iron frame construction and main drive components as ringspinning machines. This means that, for all practical purposes, the same production machinery is used for the manufacture of both machine types.*

*However, not all producers of ringspinning machines also manufacture twisting machinery.*

*Some of the potential foreign partners for a local ringspinning manufacture would thus not be able to provide the know-how necessary for the manufacture of twisting machines.*

*Demand projections and other pertinent data for twisting machines are given in section 5.4.22 of this report. It is considered that the production of this type of machines cannot be undertaken in Mexico on an economic basis unless it is associated with the production of other machinery, such as ringspinning machines in particular.*

*The investment study for the exclusive production of ringspinning machines, included in this report, shows very favourable results. Should the foreign partner be such that he disposes of twisting machine know-how in addition to that of ringspinning then the production of twisting machines be envisaged. In such case of course, the operating results of the entire venture would be even better.*

*The specifications of the machine to be produced, are:*

- 396 spindles,
- main ring  $\phi$  : 52 mm, approximately,
- center distances : 75 mm, "
- weight: approx. 5 500 kg, "

### 7.1 Demand for ringspinning machines in Mexico

*Table 15 of Chapter 4 shows the growth projections of Mexico's total mill consumption.*

*Based on these figures and on the assumptions listed hereafter, the*



*calculation of the country's future needs in respect of ringspinning capacity was arrived at, results of which are shown in Table 21,*

*The aforementioned assumptions are as follows:*

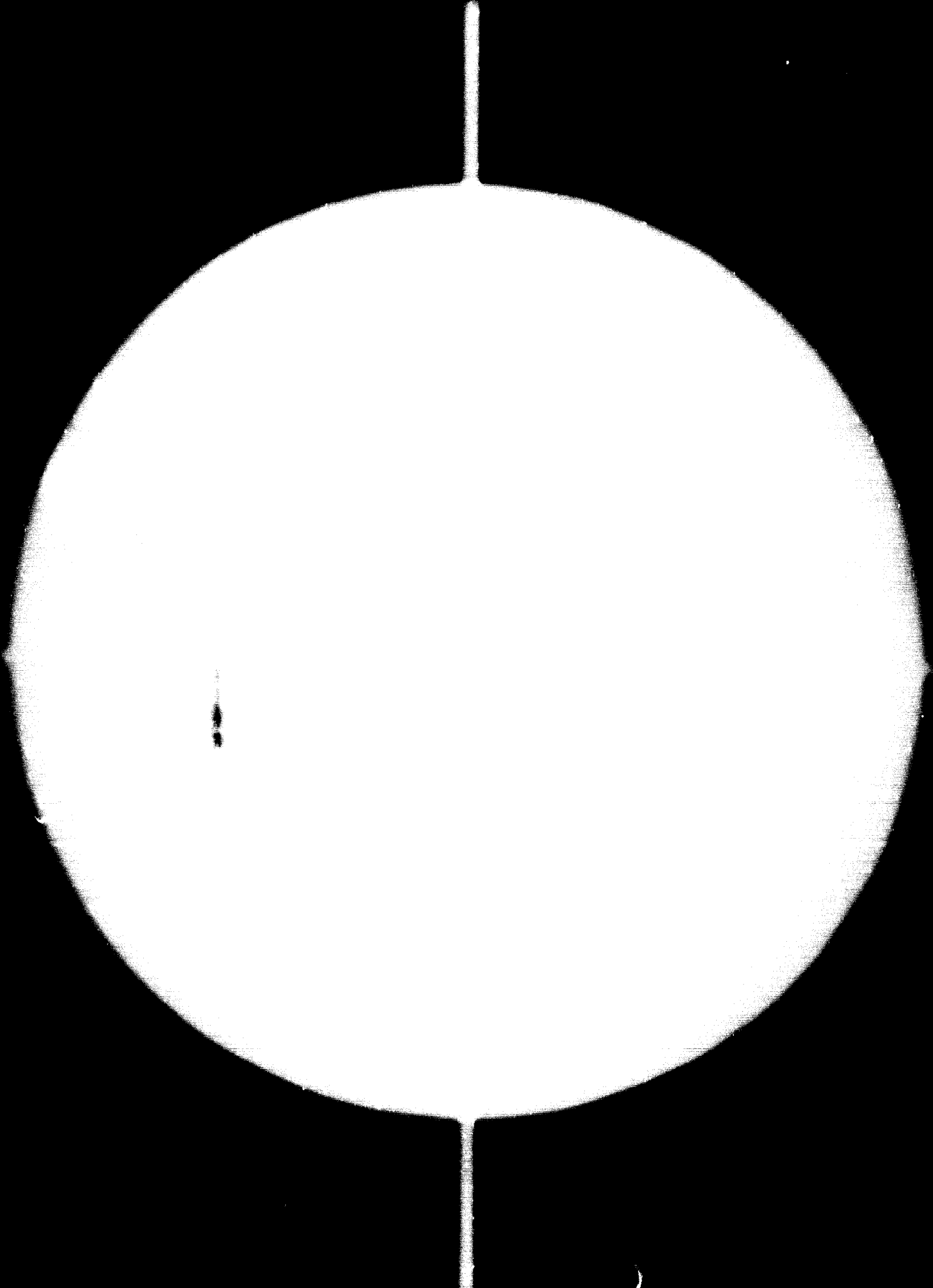
- *100% of today's obsolete spindles will have been discarded by 1980.*
- *20% of today's semi-modern spindles will have been replaced by 1980.*
- *A further 30% of today's semi-modern spindles will be replaced between 1980 and 1985.*
- *By 1980 12% of Mexico's total spinning capacity needs will be met by Open-End spinning. By 1985 this OE share will amount to 20%.*
- *The annual growth in Mexico's texturizing capacity will be 8% up to 1980 and 5% in the next five-year period.*
- *Only short staple fibres are considered in the present context.*
- *The increase in output per spindle-hour is shown on Table 21, which follows:*

*Table 21, see next page.*

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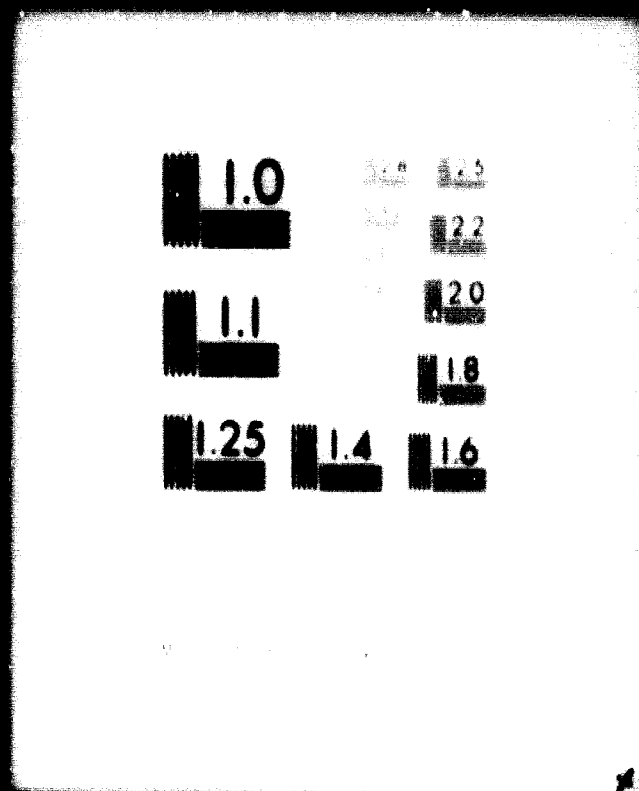


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D

As a result of such analysis, the following three cost alternatives were arrived at:

Alternative 1: Ps. \$ 2,000 per month per person, plus 75% social charges.

- Cost of direct labour in Phase 1: Ps. \$ 4, 650,000
- " " " " Phase 2: Ps. \$ 8, 610,000

Alternative 2: Ps. \$ 2,200 per month per person, plus 75% social charges.

- Cost of direct labour in Phase 1: Ps. \$ 5, 100,000
- " " " " Phase 2: Ps. \$ 9, 471,000

Alternative 3: Ps. \$ 2,200 per month per person, plus 100% social charges.

- Cost of direct labour in Phase 1: Ps. \$ 5,860,800
- " " " " Phase 2: Ps. \$ 10,824,000

In accordance with normal accounting practice, the most expensive alternative, the third, was adopted for the present purpose.

### 7.3.3.2 Indirect labour plus staff

The labour force required in this respect was calculated as follows:

#### Production Phase 1

- |   |                |                              |
|---|----------------|------------------------------|
| - Internal Material Handling and Stock Control: | 8 men.         |                              |
| - Auxiliary service (cleaning, etc.):           | 8 men.         |                              |
| - Maintenance, packaging, etc.:                 | 12 men.        |                              |
| - Production planning and control               | 9 men.         | } staff memb. of prod. dept. |
| - Purchasing department                         | 7 men.         |                              |
| - Training                                      | <u>7 men.</u>  |                              |
| <b>Total</b>                                    | <b>51 men.</b> |                              |

Production Phase 2

- Internal Transports, Material Handling and Stock Control	9 men	
- Auxiliary services (cleaning, etc)	12 men	"Indirect Labour"
- Maintenance, packaging, etc.	24 men	
- Production planning and control	12 men	} Staff members of production department.
- Purchasing department:	12 men	
- Training	<u>7 men</u>	
<b>Total</b>	<b>76 persons.</b>	

The total costs arrived at for the above work force units was Ps. \$ 3,542,400 for Phase 1 and Ps. \$ 5,476,000 for Phase 2, using, as said earlier, an average monthly wage rate of Ps. \$ 2,200 plus 100% social charges.

Thus, the total annual cost for manpower in production would amount to:

Ps. \$ 8,403,200 in Phase 1, and  
Ps. \$ 16,300,000 in Phase 2.

**7.3.4 Other Factory Manpower Needs <sup>1/</sup>**

A recent survey of textile machine manufacturers has shown that, for the type of operation as is being suggested, the following Sales and Management personnel would be required:

	Phase 1	Phase 2
<u>General Manager:</u>	1	1
<u>Departmental Managers:</u>	3	3
Plant	1	
Administration	1	
Sales	1	
<u>Sales Department:</u>	12	19

(Pre-sales consultation, running sales, clerical work, after-sales service).

---

<sup>1/</sup> A prospective organization chart of the company is shown in Exhibit 12.

**The total cost arrived at for the management and administrative personnel is:**

**Ps \$ 4 300 000 in Phase 1, and  
Ps \$ 5 900 000 in Phase 2.**

**In calculating the above, an average cost per person of Ps \$ 100 000, fringe and social benefits included, was taken into account.**

### 7.3.5 Space Requirements

For the production rate as suggested for the present project, the space requirement has been assessed as follows:-

	<u>Area in m<sup>2</sup></u>	
	<u>Prod. Phase 1</u>	<u>Prod. Phase 2</u>
Machine tool shop	1680	2800
Assembly shop	960	1600
Material storage	360	600
Production storage	840	1400
Packaging and despatch	360	600
<hr/>		
Total production area	4200	7000
<hr/>		
Office area	600	1000
<hr/>		
Parking area, green area, expansion area	11200	8000
<hr/>		
<b>TOTAL</b>	<b>16000</b>	<b>16000</b>

Assuming that the proposed factory site will be located on "Zona 2" land, the following investment considerations will ensue: ✓

<u>Production Phase 1:</u>	<u>16000 m<sup>2</sup></u>
<u>Price per m<sup>2</sup>:</u>	<u>35 Pesos</u>
<u>Investment</u>	<u>Ps\$ 560000</u>
<u>Contingency</u>	<u>Ps\$ 100000</u>
<b>TOTAL</b>	<b>Ps\$ 660000</b>

The above price allows for land having infrastructural facilities such as roadworks for transportation, main drainage, electricity and water mains, etc.

✓ All cost estimates are in line with the values applied in the case of other sub-sectors of the UNIDO/NAFINSA's Capital Goods Project.



The costs for the buildings required are estimated to be as follows:-

<u>Production Phase 1:</u>	<u>Ps.\$ millions</u>
- 4200 m <sup>2</sup> of normal ground, floor construction, at Ps.\$ 2 000/m <sup>2</sup>	8.80
- 600 m <sup>2</sup> of office construction at Ps\$ 3 000/m <sup>2</sup>	1.80
- 1000 m <sup>2</sup> of parking space at Ps.\$ 150/m <sup>2</sup>	0.15
- Remainder of site preparation at, say, Ps.\$ 30/m <sup>2</sup>	0.65
<b>Total initial investment</b>	<b>Ps\$ 11.40</b>

<u>Production Phase 2:</u>	<u>Ps.\$ millions</u>
- Additional 2300 m <sup>2</sup> of normal ground, floor construction at Ps.\$ 2 000/m <sup>2</sup>	4.60
- Additional 400 m <sup>2</sup> of office construction at Ps\$ 3 000/m <sup>2</sup>	1.20
- Further site Preparation at, say Ps\$ 30/m <sup>2</sup>	.20
<b>Total additional investment</b>	<b>6.00</b>

### 7.3.6 Production Equipment Requirements

For the production of the parts, as necessary for 20 machines per month, listed in sub-sector 7.3.2. herein, the following machinery will be called for:

## 7.3.6.1 Machinery for the Machine Tool Shop

	<u>Ps. \$</u>
1 Power saw, non-automatic	25,000 *
1 Power saw, automatic	85,000
3 Center Lathes	700,000 *
2 Semi automatic lathes	550,000
1 Universal Press, Hydraulic	150,000
1 Universal Milling machine	450,000
1 Horizontal Milling machine	450,000
2 Vertical Milling machines	800,000
1 Two-spindle Boring Machine, Horizontal	450,000
1 Multi-spindle Boring Machine	400,000
2 Radial Boring Machines	400,000
4 Boring Machines, Colum-Type	250,000 *
1 Threading Machine	800,000
1 Surface grinding machine (large)	1,000,000
1 Surface grinding machine (small)	280,000
3 Universal grinding machines	1,000,000
Contingency	5,421,000 (*)

---

**TOTAL** 13,211,000

---

The above complement of machinery would enable the production of all the general parts of a ringspinning machine to be manufactured. However the machinery for gearcutting or for sheet metalwork has not been included.

All prices shown are on the basis of cif-Mexico.

Machines marked with an \* are produced in Mexico.

## 7.3.6.2 Machine Tools for the making of Frames for Ringspinning Machines

1 Double Spindle Horizontal Milling Machine	450,000
1 Special 3 - Spindle Milling Machine	450,000
1 Horizontal Double Head Milling Machine	450,000
2 Multi-Spindle Boring Machines	500,000
Contingency	400,000 (*)

---

**TOTAL** 2,250,000

---

None of the foregoing highly specialized machinery is produced in Mexico.

**7.3.6.3 Machine Tools for the Manufacture of Rifle cylinders, Spindle Shafts and Spindle Heads.**

	<u>Ps. \$</u>
<b><u>Rifle cylinders:</u></b>	
4 Hydraulic Aligning Presses	300,000
1 Manual Aligning Press	30,000
1 Power Saw, automatic	50,000
1 Copying Lathe	300,000
1 Turret Lathe	800,000
3 Center Grinding machines	1,700,000
1 Polishing Bank	15,000
1 Chromizing Range	500,000
<b><u>Spindle Shafts:</u></b>	
1 Center Lathe	80,000
2 Copying Lathes	600,000
2 Surface grinding machines	1,300,000
1 Hardening Oven incl. Accessories	1,500,000
<b><u>Spindle Heads:</u></b>	
1 Turret Lathe	150,000
1 Hydraulic Aligning Press	125,000
1 Copying Lathes	1,200,000
1 Boring Machine	80,000
Contingency	1,870,000 (*)
<hr/>	
<b>TOTAL</b>	<b>10,800,000</b>

**7.3.6.4 Tools, Fixtures and Tools grinding Equipment**

In addition to the aforementioned machinery, provision has been made for:

	<u>Ps. \$</u>
- Tool grinding machines	100,000
- 1 Degreasing Range	250,000
- 1 Paint shop	200,000 and
- 1 Enamel firing oven	180,000
- 1 Miscellaneous fixtures	2,157,000
Contingency	1,200,000
<hr/>	
<b>TOTAL</b>	<b>4,687,000</b>

7.1 Economic Aspect in the Manufacture of Ringspinning Machines

The basis for all economic considerations are the projected sales figures.

Two factors, the price per unit obtainable and the total number of units sold, have the highest degree of influence in any sensitivity analysis of cost calculations.

Because of their extreme influence on the outcome of the present study, these two factors are discussed first and foremost in the present report section.

7.4.1 Price structure of Mexican-built ringspinning machines

All estimates are based on average prices of 400-spindle ringspinning machines current in February/March 1975.

Since 80% of all Mexican imports of ringspinning equipment originate from Europe, transportation costs have been calculated as applying from Europe.

Price ex-factory Europe: Ps. \$ 530,000

Sea cargo packaging	3.5%	
FOB European port	2.5%	
Sea freight to Veracruz	7.5%	
Customs Duty	7.0% <sup>1/</sup>	
Re-assembly charge	3.5%	
<b>Total installed</b>	<b>24.0% i.e.</b>	<b>Ps. \$ 127,000</b>

Total cost of imported machine in Mexico Ps. \$ 657,000

Permissible markup for production in Mexico (25%) Ps. \$ 165,000

**Total Price "made in Mexico" Ps. \$ 824,000**

The above price would be permitted for the years 1 to 5 of production. During the production years 6 to 10, a markup of 20% over world market price has been allowed for. For this last period the highest permissible price is Ps. \$ 792,000

<sup>1/</sup> This rate was used despite the recent change of "Regla 14" which makes the customs duty about 5% higher for equipment destined for Zone 1.

After the first ten years of Mexican production, such protection of the local manufacturing operation ceases. Thus, the price from year 11 onwards would be Ps. \$ 657,000.  
All the above price assessments are based on a price level being fixed at the Feb/Mar. 1975 index.

#### 7.4.2 Total Home and Export Market Potential for Ringspinning machines

As pointed out in detail in Table 21 the suggested local production of ringspinning machines would absorb the following shares of the Mexican home market:-

1977	24%
1978	12%
1979	21%
1980	29%
1981	36%
1982	41%
1983	35%
1984	20%
1985	30%

Although, inevitably, the accuracy of any total market projection is bound to be only approximate, there is nevertheless a considerable margin of security for any local manufacturer in the fact that his anticipated sales figures, or total turnovers, have been based on the above very conservative rates of market penetration.

Furthermore, it is believed that there is considerable export potential for Mexican-built ringspinning machines. Such exports are planned to begin 5 years after production start-up and should reach 10%, 14%, 18%, 18%, 18% and 20% of total production respectively, in the 6 subsequent years.

Table 23, which follows, shows the number of machines produced and the total turnover in each of the two Production Phases.

Table 23:- See next page.

Table 23. Development of the number of machines produced by the proposed manufacturing operation and financial summary (Rs. in lakhs)

- YEAR	Prep. Stage		Production Phase 1					Production Phase 2				
	1	2	3	4	5	6	7	8	9	10	11	12
WT. machines produced			60	84	118	188	240	252	264	264	264	277
Increase				40%	40%	40%	30%	5%	5%	0%	0%	5%
Sales to Domestic market			60	84	118	188	216	216	216	216	216	222
Export Sales			-	-	-	-	24	36	48	48	48	55
Sales replacement parts (% of total machine value)			1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
Total Sales (million Rs.)			60.0	70.7	102.0	161.3	207.9	211.6	223.7	225.8	227.9	231.3



### 7.1.3 Total Investments Needs

In accordance with the planning of the operation, as outlined in section 7.3 herein, the total investments will be:

- Production Phase 1: Ps.\$ 36.0 million
- Production Phase 2: Ps.\$ 21.6 million in addition

Table 24, which follows, gives a breakdown of total investments as suggested for the whole manufacturing operation.

As stated earlier, these investments of a completely new factory are on a "green field" basis, located in Zone 2". Should an existing manufacturer of the machinery decide to enter the field of textile machinery, he would of course, deduct those items of the total investment make-up which are available to him already.

**Table 24:** Total investments for suggested manufacture of ring spinning machinery. (Million Pesos).

		Prod. Phase 1	Prod. Phase 2	Total
<b>Preparatory Stage</b>	<b>1.0</b>			<b>1.0</b>
Land Purchase	0.6			0.6
<b>Erection Stage</b>	<b>2.0</b>			<b>2.0</b>
<b>Subtotal</b>	<b>3.6</b>			
<b>Buildings</b>				
Production		8.4	8.6	14.0
Administ.		1.8	1.2	3.0
Surv. Area		0.3	0.3	0.6
Contingency		0.9	0.8	1.4
<b>Production Equipment</b>				
Machine Tools		12.6	10.8	23.1
Tools and fixtures		2.8	1.9	4.7
Cranes, fork lift trucks		1.0	0.6	1.6
Contingency		4.6	1.0	5.6
<b>Subtotal</b>		<b>32.4</b>	<b>21.6</b>	
<b>Total for Prod. Phase 1</b>	<b>36.0</b>			
<b>Total (both Phases)</b>			<b>57.6</b>	<b>57.6</b>



## 7.1.1 Total Industrial Costs and Operating Statement

The following directly and not directly contributable cost components have been explained in detail in sub-chapter 7.3

### Directly contributable cost components

- Materials Ps.\$ 351 800 per machine 1/
- Direct Labour Ps.\$ 48 400 per machine 2/

### Indirect cost components

- Indirect labour 3/
- Production Staff 3/
- Management and Administrative Personnel 4/

The following cost components will be discussed after showing the operating results in Table 25

- Interest charges on Capital Invested
- Interest charges on Working Capital
- Depreciation
- Utility costs
- Sales Expenses
- Royalties
- Taxes.

All these charges have been calculated on the basis of a 30 machines per month production rate. For the initial years of the project in which the production lot size are smaller, the charges have been reduced as stated in each case.

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1/	For details, see sub-chapter	7.3.2
2/	" " " " "	7.3.3
3/	" " " " "	7.3.3
4/	" " " " "	7.3.4

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Table 25. Operating results of manufacturing operation (million pesos).

	-- YEAR --										
	1	2	3	4	5	6	7	8	9	10	11
Machines Produced	60	81	120	188	241	252	261	261	261	277	271
Machine Sales	49.5	69.3	99.0	153.1	198.0	199.6	203.1	203.1	203.1	219.4	193.1
Sales Spare Parts	0.5	1.4	3.0	6.2	9.9	12.0	14.6	16.7	18.8	21.9	19.2
<b>Total Sales</b>	<b>50.0</b>	<b>70.7</b>	<b>102.0</b>	<b>161.3</b>	<b>207.9</b>	<b>211.6</b>	<b>217.7</b>	<b>225.8</b>	<b>227.9</b>	<b>241.3</b>	<b>212.3</b>
Material for machines	21.1	29.6	42.2	66.1	81.4	88.7	92.9	92.9	92.9	97.4	103.1
Material for spare parts	0.2	0.6	1.3	2.6	4.2	5.3	6.5	7.4	8.4	9.7	10.2
Direct Labour	2.9	4.1	5.9	8.5	10.8	11.1	11.9	11.9	11.9	12.5	15.1
Indirect Labour	0.9	1.2	1.7	1.9	2.4	2.5	2.6	2.6	2.6	2.8	2.9
Staff prov. dept.	1.8	1.8	1.8	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
<b>Cost of Capital Invested</b>	<b>2.3</b>	<b>2.3</b>	<b>2.3</b>	<b>3.8</b>	<b>3.8</b>	<b>3.8</b>	<b>3.8</b>	<b>3.8</b>	<b>3.8</b>	<b>3.8</b>	<b>3.8</b>
<b>Cost of Working Capital</b>	<b>2.1</b>	<b>3.1</b>	<b>4.9</b>	<b>7.7</b>	<b>9.8</b>	<b>10.3</b>	<b>10.8</b>	<b>10.8</b>	<b>10.8</b>	<b>11.3</b>	<b>11.9</b>
Depreciation	2.1	2.1	2.1	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Cost of utilities	1.0	1.4	2.0	3.1	4.0	4.2	4.4	4.4	4.4	4.6	4.8
<b>Production Costs</b>	<b>34.7</b>	<b>46.5</b>	<b>64.2</b>	<b>100.3</b>	<b>128.0</b>	<b>132.8</b>	<b>139.5</b>	<b>140.4</b>	<b>141.4</b>	<b>148.7</b>	<b>155.7</b>
Sales Costs	1.1	1.9	2.7	3.4	4.4	4.6	4.8	4.8	4.8	5.2	5.3
Manufact and Admin. Costs	3.6	3.6	3.6	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Royalties	1.5	2.1	3.1	4.8	6.2	6.3	6.7	6.8	6.8	7.2	7.3
<b>Industrial Costs</b>	<b>41.2</b>	<b>54.1</b>	<b>73.6</b>	<b>113.5</b>	<b>141.6</b>	<b>148.7</b>	<b>151.0</b>	<b>157.0</b>	<b>158.0</b>	<b>166.1</b>	<b>172.3</b>
Profit Before Taxes	8.8	16.6	28.4	47.8	66.3	62.9	67.7	68.8	69.9	75.2	20.5
Taxes	6.4	8.3	14.2	23.9	33.2	31.5	33.9	34.4	35.0	37.6	19.3
<b>Net Profit 1</b>	<b>4.4</b>	<b>8.3</b>	<b>14.2</b>	<b>23.9</b>	<b>33.1</b>	<b>31.4</b>	<b>33.8</b>	<b>34.4</b>	<b>34.9</b>	<b>37.6</b>	<b>19.5</b>
<b>Refunds for Exports</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2.3</b>	<b>3.3</b>	<b>4.5</b>	<b>4.5</b>	<b>4.6</b>	<b>5.3</b>	<b>4.6</b>
<b>Net Profit 2</b>	<b>4.4</b>	<b>8.3</b>	<b>14.2</b>	<b>23.9</b>	<b>35.4</b>	<b>34.7</b>	<b>38.3</b>	<b>38.9</b>	<b>39.5</b>	<b>42.9</b>	<b>24.1</b>

## 7.4.4.1 Interest Charges on Capital Invested

Total investments amount to Ps.\$ 36 million in Phase 1 and Ps.\$ 57.6 million in Phase 2.  
(For detailed breakdown, see Table 24).

Applying an interest rate of 13% over both periods, the total interest charges are as follows:-

### Production Phase 1

Total Investment	Ps.\$ 36.0 million
Debt Capital (50% of above)	Ps.\$ 18.0 million
Interest on DC at 13%	Ps.\$ 2.4 million per annum

### Production Phase 2

Total Investment	Ps.\$ 57.6 million
Debt Capital (50% of above)	Ps.\$ 28.8 million
Interest on DC at 13%	Ps.\$ 3.8 million

## 7.4.4.2 Interest Charges on Working Capital

The working capital required to run the operation will be as follows:- <sup>1/</sup>

### Material

	Annual requirements (million Ps.\$)	Stock Turnover Period (months)	Working Capital requirement (million Ps.)
Imported parts:	29.5	6	14.8
Bought-out parts:			
Standard	14.6	2	2.4
special	20.6	4	6.9
Own manufacture:	19.7	5	9.1
<b>TOTAL</b>			<b>Ps.\$ 33.2 mil</b>

<sup>1/</sup> For further details, see section 7.3.2 herein.

Work in Process

It has been reckoned that the average duration for the manufacture of one machine would be six months. The working capital requirement is thus one quarter of the total annual production cost.

Total annual production cost:	Ps.\$ 120 million
i.e. Proportion needed for working capital:	Ps.\$ 30 million

Spare Parts

In this case the working capital requirements are only applied to the spare parts which are produced in Mexico. Those to be imported are included in the preceding section headed "Materials", "Imported Parts".

For year 5 of production in which the factory output is 20 machines per month, 5% of total production costs has been allowed to cover spare parts.

Total production cost:	Ps.\$ 60.0 million
Spare parts cost (5% of above)	3.0 "
In-stock cost (8 months supply)	2.0 "

The total sum of requirements for working capital is thus as follows:-

- Material	Ps.\$ 33.1 millions
- Work in Progress	30.0 "
- Spare Parts	2.1 "

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Total working capital	Ps.\$ 65.2 "
15% interest charge	Ps.\$ 9.8 " per annum

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Naturally, the above interest charge varies directly in accordance with any variation in the rate of production.

### 7.4.4.3 Depreciation Charges

The following annual depreciation rates have been adopted (Straight line method):

- Land: no depreciation
- Preparatory + Erection Stage: 3%
- Buildings: 3%
- Production machinery: 8%
- Transport equipment: 20%

#### Depreciation charges for Production Phase 1

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- Preparation + Erection Stage:	Ps.\$ 90 000 p.a.
- Buildings:	Ps.\$ 342 000 p.a.
- Production Machinery:	Ps.\$1680 000 p.a.

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<b>TOTAL</b>	<b>Ps.\$2 112 000 p.a.</b>
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#### Depreciation charges for Production Phase 2

- Preparation + Erection Stage:	Ps.\$ 90 000 p.a.
- Buildings:	Ps.\$ 570 000 p.a.
- Production machinery:	Ps.\$2 752 000 p.a.
- Transport equipment:	Ps.\$ 120 000 p.a.

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<b>TOTAL</b>	<b>Ps.\$3 532 000 p.a.</b>
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#### 7.4.4.4 Utility Charges

These charges are reckoned to be 2% of the total annual sales turnover. They are in respect of:

- Electricity
- Water
- Fuel
- Miscellaneous

For year 1 of the production, utility charges amount to Ps. \$ 1 million, and for year 5, to about Ps. \$ 4 million.

#### 7.4.4.5 Royalties

3 percent of the total annual sales turnover has been allowed for royalty payments. The actual percentage that will be paid to the technology supplier will, of course, be mutually agreed upon by all partners in the venture.

#### 7.4.4.6 Taxes

The rates of depreciation used for buildings, production machinery and transport equipment have been based on Mexican tax legislation presently in force. Land is not subject to depreciation. The following items have been included:

- Company income tax at 42%
- Employees' profit sharing tax at approximately 8%.

Other contributions for payment by the employer have been included under the heading of fringe benefit costs (see section 7.3.4 herein).

Taxes thus account for an overall 50% of the gross profit.

#### 7.4.5 Profits

Although modest, profit can be achieved even in the first year of production. The main reason for this is that, at first, the selling price for Mexican built machinery is

calculated to be 25% above that for imported machinery. Only after 10 years of production would the price of locally built machinery be the same as that of imported machinery.

The higher price would be acceptable in view of the beneficial effects the project has on the national economy. These effects are described in section 7.4.10 of the present chapter.

#### 7.4.6 Cash - Flow Statement

The following calculation of cash inflow and outflow was carried out in accordance with the guidelines set forth in other sectorial reports of UNIDO/NAFINSA's capital goods project.

Table 26 (See next page)

No provisions have been made for financing of customer debts. It is assumed that "FONEI" of the Banco de Mexico, e. g., will provide the necessary funds to the customers of the ring spinning machine factory. This is an extremely important aspect of the project and will be discussed later in section 7.4.8 herein.

#### 7.4.7 Financial Return Calculations

##### 7.4.7.1 Internal Rate of Return

This is the rate of return, expressed in percent, at which the present value of the project is zero. All outlays and incomes are discounted to the first year of the project in which the rate of return is applied. The method provides a convenient tool, in the form of a simple percent figure, to compare different projects. The higher the internal rate of return, the more viable is the project.

The internal rate of return after payment of taxes has been calculated on the basis of the cash-flow statement presented in Table 26. No differentiations have been made as regards the actual source of capital.

Table 26. Cash Flow Statement. (Million Euros)

	-- YEAR												
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Prep. Invest. Stage												
+ Investment, including training and construction	2.1	33.9	-	-	31.6	-	-	-	-	-	-	-	-
+ Interest payments	0.3	6.4	-	-	-	-	-	-	-	-	-	-	-
+ Input of working capital	-	-	2.4	1.0	1.5	2.8	2.2	0.5	0.5	-	0.5	0.5	-
+ Net Sales	-	-	59.6	70.7	102.0	161.3	207.9	211.6	223.7	225.8	227.9	211.3	211.3
+ Net production cost	-	-	34.4	46.3	64.3	94.5	124.5	131.1	137.9	138.9	139.9	147.5	153.1
Gross Cash Flow	-2.4	-30.3	13.2	23.4	14.6	69.0	81.2	80.0	85.3	86.9	88.0	93.0	57.7
+ Taxes	-	-	4.4	8.3	14.2	23.9	33.2	31.5	33.9	34.4	35.0	37.6	19.5
+ Export Refund	-	-	-	-	-	2.3	3.3	4.5	4.5	4.5	4.6	5.3	4.6
Net Cash Flow	-2.4	-30.3	8.8	15.1	0.4	36.1	50.3	51.8	55.9	57.0	57.6	61.0	43.3



In accordance with the above circumstances, the internal rate of return works out to be well above 25%.

Discounting the net cash inflow over the project duration even at the high rate involved, the positive residual present value of the project amounts to Ps \$ 41.6 million.

This means, that the rate of return on the entire capital invested in the project is more than twice as high as the maximum interest rate currently being paid by the Mexican banks.

#### 7.4.7.2 Return on Shareholders' Equity

The following basic industrial operating policies have been assumed:-

50% of all the investments required would be financed by equity capital;

50% of the net profit would be retained in the company, the remainder being paid out to shareholders as dividends.

The return on the shareholders' equity thus amounts to more than 23%.

Taking into account the safety margins which have been built into the cost calculations and, above all, the modest rate of market penetration which has been allocated to the locally produced ringspinning machines providing for additional safety as regards target turnover achievement, this investment may be considered to be of positive interest both by Mexican and by foreign standards.

#### 7.4.7.3 Payback Period

The payback period is defined as the number of years it takes before the investor gets back his cash outlay in the form of aggregate dividends.

Assuming that 50% of the profit after taxes is being paid out in dividends, and discounting the dividend inflow over the years at the rate of 15%, the payback period will be:

6 years after production start-up, or,  
8 years after project start.

## 7.2 Export potential for ringspinning machines made in Mexico

The international market for textile machinery is extremely competitive.

Nevertheless, if only for reasons of keeping abreast with international technological developments in the field, it would be a grave error to conceive of the local production of ringspinning machines as being exclusively for the Mexican market. Furthermore, the prestige of any product on the home market greatly increases if such product can also be successfully sold abroad.

Export potential would undoubtedly exist for a good Mexican-built ringspinning machine. Table 22, which follows, shows the number of spindles and looms installed in other ALALC countries, in the United States of America, Canada, Cuba and Salvador. The total number of spindles installed in ALALC countries outside of Brazil and Argentina, amounts to about 70% of the capacity installed in Mexico. For Continental America's fibre consumption, see Exhibit 11.

**Table 22** Number of spindles and looms installed in ALALC countries, U.S.A., Canada, Cuba and Salvador, (1970)

Country	Spindles (1 000)	Looms
Argentina	1 070	19 000
Bolivia	n.d.	n.d.
Brazil	3 500	130 000
Colombia	649	12 760
Chile	463	8 449
Ecuador	116	2 722
Paraguay		
Peru	268	6 660
Uruguay	190	2 800
Mexico	2 200	68 000
<b>Total ALALC</b>	<b>6 803</b>	<b>240 791</b>
<b>Total without Mexico</b>	<b>6 203</b>	<b>182 791</b>
<b>Total, without Me., Argent., Brazil.</b>	<b>1 643</b>	<b>33 191</b>

U.S.A.	19 500	250 400
Canada	733	10 600
Cuba, Salvador	300	8 000

Source: International Textile Bulletin, Zurich, 1971.

#### 7.4.8 Customer Debt Financing

*The international trade in textile machines is extremely export oriented. Export sales rates of 90 to 95% output are common for producers of textile machinery in, say, West Germany, Switzerland and Great Britain.*

*In all of today's main exporting countries of textile machinery, export-subsidiary banks provide funds for the financing of textile machine manufactures for export. The terms of payment generally applied today by such banks are as follows:*

*20% down payment when ordering the machine (s)*

*15% " " on delivery of machine (s)*

*65% credit financing for 3 to 5 years at annual interest rates varying between 10% (e.g. France) and 12% (e.g. Austria).*

*The calculation in Table 27 which follows shows, that one of the main factors ensuring the success of a Mexican manufacturer operation is for the above type of support to be made available to it right from the beginning. Such support could be furnished through the auspices of, say, Banco de Mexico's FONEL, or through NAFINSA itself as an expansion of the first five years financing which this last institution would be furnishing in any case.*

*Table 27, see next page.*

**Table 27. Need of Bank-Support to Finance Customers' Debt (Million Pesos).**

	YEAR									
	1	2	3	4	5	6	7	8	9	10
Machine Sales	49.5	69.3	99.0	155.1	198.0	199.6	209.1	207.1	209.1	219.4
Credit	32.2	45.0	64.5	100.5	129.8	130.0	135.2	135.2	135.2	142.0
Downpayments	17.3	24.3	34.7	54.6	68.2	69.6	73.9	73.9	73.9	77.4
Credit-Amortization (Total)	-	10.7	25.7	47.2	70.1	98.2	119.9	131.5	133.3	135.2
Year 1		10.7	10.7	10.7	15.0	21.5	35.3	43.2	43.2	45.2
Year 2			15.0	15.0	21.5	33.6	43.3	45.3	45.0	45.0
Year 3				21.5	33.6	43.3	43.3	45.0	45.0	45.0
Balance of Customers' Debt / Cus.'s advance payments p.a.	-14.9	-10.0	-3.9	+1.3	+8.5	+37.9	+58.6	+70.2	+72.0	+110.6
Customers' Debt / Customers' advance payments accumulated	-14.9	-24.9	-28.8	-27.5	-19.0	+18.8	+77.4	+147.6	+219.6	+330.2

*The figures reveal that if the local machine producer had to finance his own manufacturing operation, his liquidity requirements would rise to a level that any company of his size could scarcely be expected to bear.*

*Even if it may be assumed that the cost of financing the customer's debts can be passed over to the customer himself, the entire project would be jeopardized if no bank guarantee were available to underwrite such financing.*

## **7.5 Macro Economic Aspects**

### **7.5.1 Degree of Domestic Integration**

*All the key raw materials as mentioned in section 7.3.2 of this report can be purchased locally.*

*The only parts special to r. s. machines which have to be imp are the high-precision spindle bearings, the draw mechanism and the pendulum arm (see 7.3.2.1), all of which are produced in extremely large quantities by highly specialized firms. In addition, there are a number of parts not so special to ring-spinning machines but which would still have to be imported, such as:*

- Production counters.*
- Tachometers.*
- Hydraulic hoses.*
- Special springs.*
- Special sleeves.*

*All the foregoing imported parts represent a value of Ps. \$ 123,200 per machine.*

*All other materials listed in section 7.3.2 herein can be purchased locally, their value per machine amounting to Ps. \$ 228,600. Parts whose manufacture will be sub-contracted out to Mexican machine shops represent a value of Ps. \$ 85,800 per machine.*

The rate of domestic integration is stable throughout the whole project, right from the start, and is calculated in the following manner.

Value of:

- Imported Production Parts	Ps. \$ 300 million
- Imported Spare Parts	15 "
- Material for manufacture of special bought-out parts (50% must be imported)	<u>80 "</u>
<b>Total Imports</b>	<b>Ps. \$ 395 "</b>
<b>Total Industrial Costs (100%)</b>	<b>Ps. \$ 141.6 million</b>

$$\begin{aligned}
 \text{Rate of domestic integration} &= \frac{141.6 - 39.5}{141.6} \\
 &= \frac{102.1}{141.6} \times 100\% \\
 &= 72.2\%
 \end{aligned}$$

### 7.5.2 Value added to the National Economy

Besides the beneficial qualitative aspects of the project, the following value that is added to the national economy can be calculated as is shown below for a typical year:

Total production costs:	Ps. \$ 126.0 million
" material " :	Ps. \$ 84.4 million
" spare parts " :	Ps. \$ 4.2 "
" utility " :	<u>Ps. \$ 4.0 "</u>
Less	<u>Ps. \$ 92.6 "</u>
<b>Value Added:</b>	<b>Ps. \$ 33.4 millio.</b>

i. e. VA = 26.5% of total production cost.

The total value added even the first 13 years of operation amounts to Ps. \$ 2 291.6 million, made up as follows:

<u>Year of operation</u>	<u>Value Added Ps, \$ millions</u>
1	9.0
2	21.2
3	37.8
4	63.9
5	96.7
6	131.2
7	167.5
8	204.0
9	240.7
10	279.4
11	319.9
12	360.4
13	400.9

The above figures do not take into account the Value Added in respect of the subcontractor's work.

**7.5.3 Foreign Currency Statement**

The purpose of the following analysis is to show the potential net foreign currency earnings (in the form of savings) achieved by the project.

To arrive at values for such earnings, the percentages which follow must be deducted from the total turnover of each period referred to, thus:

<u>On account of:</u>	<u>DEDUCT from relevant period turnover:</u>		
	<u>for years 1 to 5</u>	<u>for years 6 to 10</u>	<u>for years 11 on</u>
Tariff protection:	20.0%	18.4%	0
Imported materials:	18.4%	18.4%	18.4%
Royalties:	2.9%	2.9%	2.9%
<b>Total DEDUCTIONS:</b>	<b>41.3%</b>	<b>39.7%</b>	<b>21.3%</b>

From which, the total foreign currency earnings per period will be seen to amount to the following proportions of the corresponding period turnover:

58.7%	60.3%	78.7%
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**Table 28. Foreign Currency Earnings (Million Pesos).**

YEAR	Prep. Exch. Stage											
	1	2	3	4	5	6	7	8	9	10	11	
Total Sales	-	50.0	70.7	102.0	161.3	207.9	211.6	223.7	225.8	227.9	241.3	211.7
÷ Imported Prod. machines		9.4		6.2								
÷ Imported Tools and Fixtures		2.8		1.9								
→ 5% resp. 5% of Total Sales		26.0	36.8	53.0	83.3	108.1	120.6	127.5	128.7	130.0	137.5	162.7
→ Exports						20.2	28.5	38.0	38.0	38.0	43.5	38.5
Net foreign exchange savings		-12.2	26.0	36.8	44.9	128.3	149.1	165.5	166.7	168.0	181.0	201.0

Total over the first 11 years of operation Ps. \$244.5 million. (Not discounted).

In drawing up this Table, the entire value (i.e. 100%) of all exported machinery has been added to the foreign currency earnings.



## 7.6 Comparison of Production Costs between Mexico and Europe

Since production costs vary widely, not only from country to country but also from one company to another, it is not practically possible to give precise cost comparisons in this respect. However, there undoubtedly do exist substantial differences with regard to certain cost items, between Mexico and, for example, the highly industrialized countries of Europe. Such differences, in the main, will be discussed in the present section of the report. It should be reiterated here, that the figures for Europe quoted below are to be considered as order-of-magnitude values. They are derived from comparing the Mexican "full scale"-operation in year 5 with companies of similar scales of production in Europe  $\frac{1}{2}$ . Productivity are being taken care of as discussed in sub-chapter 7.3.3 of this report.

	<u>Mexico</u>		<u>Europe</u>
<b>Material costs</b>			
Imported parts	123,200		96,200
Standard bought-out parts	61,200		51,000
Special bought-out parts	85,800		73,000
Raw material for own fabrication	<u>81,600</u>	351,800	<u>70,500</u> 289,700
<b>Direct Labour</b>		45,000	86,000
<b>Indirect Labour</b>		7,900	{ 15,500
<b>Staff prod. dep't</b>		12,900	
<b>Cost of Capital</b>		49,000	39,500
<b>Depreciation</b>		14,600	14,600
<b>Utilities</b>		16,600	16,600
<b>Production Costs</b>		<b>497,800</b>	<b>461,900</b>

$\frac{1}{2}$  See Exhibit 9: "World market data of main Ring spinning machine producers".

*It may be pointed out that the production costs per machine in Mexico are merely 10% higher than in Europe. Unfortunately the selling costs, management and administration costs, as well as the high rates of taxation are too diversified in European countries to permit the allocation of reasonable representative or even average values to them.*

## **7.7 Summary of Chapter 7**

*When carrying out an overall evaluation of any project such as the present, two main aspects should be born in mind:*

- What are the assumptions and/or projections which have the greatest influence on the positive (or negative) outcome of the project ("Sensitivity Analysis").*
- What is the "National profitability" of the project.*

### **7.7.1 Sensitivity Analysis**

*In the present project, the most important influencing factors are:*

*Price of the machine: The highest permissible price for a normal ring spinning machine was considered, i.e. 25% above the current CIF Mexico price for the first five years and 20% above same for the next five year period. From year 11 onwards, no further price differential is foreseen.*

*Market for the machine: The size of the potential Mexican market for the ringspinning machine depends mainly on the growth of Mexico's total mill consumption of short staple fibres.*

*No sales of ringspinning machines for the long staple fibre have been projected. In point of fact, this provides an additional safety margin as regards the demand projections. The growth in Mexico's per capita fibre consumption was estimated to be 0.6% per annum up to 1980 and 0.9% from 1980 to 1985. Despite the much stronger past development of Mexico's exports of textile manufactures, the future growth rates were conservatively estimated to be only 10 to 20% per annum, depending on the situation of the textile cycles.*

*On the basis of the foregoing and planning up for the manufacturing operation to start and expand on production lot sizes being achieved by other manufacturers ringspinning machines, very modest market share targets were conceived for the project. These are, over the*

relevant 9 years, 24%, 42%, 21%, 29%, 36%, 41%, 35%, 20% and 50%. Taking into consideration the cautiousness of the growth projections, these modest market share targets significantly improve the prospect of achievement and therefore increase the forecast safety margin.

Cost of the machine: When calculating the production and industrial costs of the machine, the following assumptions were made:

- Productivity can be expected to be 60 to 70% of that in Europe during the first years of operation.
- Prices of standard and special bought-out parts will be 20 to 25% higher in Mexico than in Europe.
- Imports will be subject to import tax of 25%.
- Production machinery and equipment will be of normal European performance.
- Average wage per man of Ps. \$ 2,200 per month in the production department has been increased by 100% to allow for social charges.

It is felt that the foregoing assumptions reflect the country's cost situation in a reasonable manner.

Customers' Debt Financing: It is understood that the local manufacturer of ringspinning machines must be competitive against foreign manufacturers, as regards the availability to him of credit facilities. This means that the Mexican company needs help from a bank until year 7 of the operation. (See Table 27).

#### 7.7.2 National Profitability

Mexico imports ringspinning equipment to the value of some Ps. \$40 to 50 million a year. This figure is likely to increase in the future.

The foreign currency earnings of the prospective manufacturing enterprise are estimated to be Ps. \$ 244.5 million over the next ten years.

The Value Added to the national economy will be around Ps. \$ 280 million during this period.

The internal rate of return for all the capital invested is well above 25%.

*Thus, in the eyes of the nation, the project can be considered to be highly viable from both the economic and the social points of view.*

### **7.3 Start-up planning and costing**

*In order to be aware of absolute optimum cost conditions, at least in the first instance, for a new production start-up operation, it is of course essential to consider such an operation as being established on a "green field" site.*

*As it is the case in other industrial fields, it is highly desirable that one of the existing machine manufacturers should take up the production of ringspinning machines rather than that a green field operation should be established in this respect. The possibility of absorbing such additional work naturally varies between one potential production and another, as does the need for expansion with regard to production and administrative space, production machinery, manpower, etc.*

*Any suitable Mexican manufacturer of machinery, other than textile, could be considered for taking on the new production of ringspinning machinery as a diversification. In such case, the green field site cost analysis dealt with later in this chapter can be used as the basis for calculating all start-up and operational costs pertaining to the diversification in question. All that needs to be done is to discount existing facilities and resources, which can be used for the new ringspinning machine production, against the schedule of green field site requirements, so as to arrive at a new reduced capital cost and investment commitment, hence to a new reduced production cost and so, ultimately, to new, improved, operating results.*

#### **7.3.1 Phased Programme for new production operation**

*The green field site cost calculations are based on a phased programme comprising:*

##### **Preparatory Stage (6 months)**

- Negotiations with Mexican authorities*
- Incorporation of the firm (legal aspects)*
- Negotiations on financing conditions*
- Plant site selection and purchase of land*
- Layout of factory*

## 8. MANUFACTURE OF DYEING EQUIPMENT ( PREFEASIBILITY STUDY)

*As mentioned in section 5 of this report, there is room for producing not only ringspinning equipment in Mexico, but also dyeing equipment and finishing equipment.*

*In this Chapter some of the more important aspects as regards the production of dyeing equipment are touched upon. This cannot be described as a feasibility study since it only deals with:*

- *The production mix*
- *The total turnover in years 1 and 4 of the operation, and*
- *The estimated cost structure of the factory and its profit potential.*

### 8.1 Production Mix

*Taken into account the Mexican market <sup>1/</sup> for discontinuous dyeing operations the local manufacture of the following equipment appears to be promising:*

- *Yarn dyeing, drying and bleaching ranges*
- *Jets*
- *Centrifugal Dryers*
- *Sample Dyeing Apparatus*
- *Sample Drying Apparatus*
- *Winch becks*

*These equipment are considered to be assured of a steady market in the near and in the intermediate future. Moreover, potential foreign technological partners, such as Jagri, Mezzern, Scholl, etc., dispose of the know-how for the complete product mix in this respect.*

*As to the type of production and the basic material used these*

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<sup>1/</sup> For further details see "Machine Information sheet" Nos. 5.4.5 to 5.4.7

apply mainly to sheet metal fabrication involving stainless steel. Although stainless steel is not produced in Mexico as yet, it is considered that the manufacture of the equipments in question would be highly beneficial to the country. In two years from now, Mexico itself will be producing its own supplies of stainless steel.

**8.2 Estimated Development of the proposed Factory's Turnover**

The turnover has been calculated for the years 1 and 4 of the operation. As in the case of ringspinning machines prices are again 25% higher than today's c.i. Mexico rates similar machines presently being imported.

Type of machine	No. of Units sold in years 1, (4)	Price per Units (Ps\$ 1000's)	Turnover Year 1 (year) (Ps\$ 1000's)
Yarn Dyeing + Drying ranges	7 (14)	640	4 480 (8 960)
Jets	7 (14)	1 565	10 955 (21910)
Centrif. Dryers	2 (4)	225	450 ( 900)
Simple Dyeing App.	5 (10)	155	775 (1 550)
Simple Drying App.	5 (10)	50	250 ( 500)
Winch Becks	10 (20)	569	5 690 (11380)
<b>Total Turnover</b>			<b>22 600 (45200)</b>

With regard to the total Mexican market size shown in the "Machine Information" sheets, the target number of units to be sold by the proposed factory is modest. On the other hand, production lot sizes are also modest, especially at the beginning of the operation. More often than not, these types of machines are custom-built in any case and this rules out batch manufacture in lengthy series under whatever conditions of demand.

**8.3 Estimated Cost Structure and Profit Potential of the Proposed Factory.**

The cost estimates shown hereafter are only to be considered as rough estimates. They were arrived at by comparing the economic situation of similar factories in Brazil and Argentina

with that of the factory proposed for Mexico. All figures are in Ps\$ million.

		Year 1	Year 4
<b>Total Sales (a)</b>		<b>22.6</b>	<b>45.2</b>
<b>Direct Costs</b>			
Subcontracting	7.4	13.7	13.6
Material costs	3.6		6.5
labour	2.7		5.2
<b>Overhead Costs</b>		3.7	4.0
Supervision			
Capital costs	1.8		2.0
Utilities costs			
Sales costs	0.7		0.8
Genl. Mgt. Adm.	1.2		1.2
<b>Royalties (3%)</b>		0.7	1.4
<b>Total Industrial Costs (b)</b>		<b>18.1</b>	<b>30.7</b>
<b>Profit before tax (a)(b)</b>		<b>4.5</b>	<b>14.7</b>
<b>Tax</b>		<b>2.3</b>	<b>7.4</b>
<b>Net profit</b>		<b>2.2</b>	<b>7.3</b>

In view of the high content of subcontracted work in its product, the factory as such can be equipped fairly economically.

Indeed, the total investment in production machinery could be limited to roughly Ps\$ 10 million, whilst the space requirement could be limited to about 5 000 m<sup>2</sup>. The total employment force has been estimated to be 45 persons, 30 of whom are direct labour.



## 9. MANUFACTURE OF FINISHING EQUIPMENT (PREFEASIBILITY STUDY)

The products to be manufactured in the finishing equipment factory mainly serve for the washing, bleaching, dyeing, drying and finishing of fabrics on a continuous basis. Because of the economic advantages of the continuous processing system, i.e. processing in very large quantities, the type of dyeing and finishing equipment used in this system is of increasing importance.

### 9.1 Production Mix

The following machines are normally included in the manufacturing programmes of firms such as ARTOS, FAMATEX, MORRISON, etc. Recent import tendencies <sup>1/</sup> show that such machines are of increasing importance for Mexico's finishing sector: -

- Steeler Frames
- Thermosol Ranges incl. Hot Flue
- Pad Steam Dyeing Ranges
- Pad Roll Bleaching Ranges
- Jiggers
- Foulards
- Continuous Washing Machines.

Compared to the case as regards the types of machinery described in Chapter 8, the content of conventional machine tool work in the case of finishing equipments is considerably higher. Practically all these last dispose of transport cylinders for the woven or knitted fabric. In view of the fact that synthetic fibres account for an ever increasing proportion of Mexico's total fibre consumption, the importance of these machines will certainly increase in the future.

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<sup>1/</sup> For further details, see "Machine Information" sheets Nos. 5.4.8 to 5.4.13

## 9.2 Estimated Development of the Factory's Turnover

Again as before, the turnover was calculated for the years 1 and 4, assuming that the production size reached in year 4 would be near to the final size required to be reached in the whole operation.

Type of machine	No. of Units sold in year 1 (year 4)	Price per Unit (Ps\$ 1000's)	Turnover Year 1 (year 4) (Ps\$ 1000's)
Stenter Frames	6 (12)	5 000	30 000 (60 000)
Thermosol incl. Hot Flow	2 (4)	4 100	8 200 (16 400)
Pad Steam Dyeing Rge.	2 (4)	4 900	9 800 (19 600)
Pad Roll Bleaching Rge.	2 (4)	3 900	7 800 (15 600)
Jiggers	3 (6)	625	1 875 ( 3 750)
Foulards	5 (10)	400	2 000 ( 4 000)
Cont. Washing Machines	3 ( 6)	5 000	15 000 (30 000)
<b>Total Turnover</b>			<b>74 600 (149 300)</b>

## 9.3 Estimated Cost Structure and Profit Potential of the Factory

The following cost estimates are rough approximations, all figures being given in Ps\$ million.

	<u>Year 1</u>	<u>Year 4</u>
<b>Total sales (a)</b>	<b>74.6</b>	<b>149.3</b>
<b>Direct Costs</b>	<b>35.0</b>	<b>63.7</b>
Subcontracting	22.2	40.0
Material Costs	6.4	11.5
Labour	6.4	12.2
<b>Overhead Costs</b>	<b>15.0</b>	<b>21.6</b>
Supervision		
Capital Costs	9.4	
Utilities Costs		
Sales Costs	2.0	
Gen. Mgt. Adm	3.6	
Royalties (3%)	2.2	4.4
<b>Industrial Costs (b)</b>	<b>52.2</b>	<b>89.7</b>

<i>Profit before Tax (a)-(b)</i>	<i>22.4</i>	<i>59.6</i>
<i>Tax</i>	<i>11.2</i>	<i>29.8</i>
<i>Net Profit</i>	<i>11.2</i>	<i>29.8</i>

*Because of the relative simplicity of many parts of its products, the factory can rely heavily on subcontracted work. Therefore the total investment in production machinery can be limited to only about Ps\$ 12 -15 million.*

*Total space requirements are estimated to be 6 000 m<sup>2</sup> and total manpower will amount to 110 persons of whom 80 are direct labour.*

## INDEX OF EXHIBITS

- Exhibit 1:** *"Cooperativas Textiles" in Mexico.*
- Exhibit 2:** *Mexico's state owned textile companies.*
- Exhibit 3:** *Cotton's part of total Mexican exports. (%)*
- Exhibit 4:** *Development of Mexico's production of artificial fibres. (Tons).*
- Exhibit 5:** *Calculation of Mexico's production of woven textile planes in 1974.*
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- Exhibit 10:** *Mexico's Bi- and Multilateral Conventions with other ALALC Countries with regard to Textile Machines.*
- Exhibit 11:** *Continental America's total fibre consumption.*
- Exhibit 12:** *Tentative Organization Chart for Ringspinning Machine Manufacturing.*

Exhibit I: "Cooperativas Textiles" in Mexico

	<i>Personal</i>	<i>Spindles</i>	<i>Looms</i>
<i>Bellavista (Tepic, Nay.)</i>	<i>300</i>	<i>8 636</i>	<i>340</i>
<i>La Virgen (Cd. Hidalgo, Mich.)</i>	<i>257</i>	<i>8 568</i>	<i>267</i>
<i>La Providencia (Uruapan, Mich.)</i>	<i>160</i>	<i>6 038</i>	<i>178</i>
<i>San Pedro (Uruapan, Mich.)</i>	<i>122</i>	<i>5 544</i>	<i>98</i>
<i>Nueva Galicia (Guadalajara, Jal.)</i>	<i>54</i>	<i>3 772</i>	<i>-</i>
<i>San Carlos (Guadalajara, Jal.)</i>	<i>90</i>	<i>4 032</i>	<i>-</i>
<i>Progreso del Sur (Atoyac de Alvarez, Gro.)</i>	<i>127</i>	<i>5 000</i>	<i>146</i>
<i>Samuel O'Yudico (Santa Cruz, Tlax.)</i>	<i>208</i>	<i>4 476</i>	<i>86</i>
<i>La Guadalupe (Tenancingo, Mex.)</i>	<i>40</i>	<i>1 512</i>	<i>-</i>
<i>La Constancia Mexicana (Puebla, Pue.)</i>	<i>614</i>	<i>10 824</i>	<i>443</i>
<i>San José Ella (Ella, Oax.)</i>	<i>280</i>	<i>4 934</i>	<i>232</i>
<i>Soledad de Vista Hermosa (Ella, Oax.)</i>	<i>n.d.</i>	<i>1 952</i>	<i>115</i>
<b>T O T A L</b>	<b>2 252</b>	<b>144 952</b>	<b>3 721</b>

Source: NAFINSA, Gerencia de Programación Industrial

Exhibit 2: Mexico's state owned textile companies

	<i>No. Spindles (short staple)</i>	<i>No. Spindles (wool)</i>	<i>No. Spindles (wool combed)</i>
<i>Ayolla Textil</i>	<i>58 200</i>		
<i>Nimatex</i>	<i>18 080</i>		
<i>Comercial de telas</i>	<i>13 160</i>		
<i>Avantram Mexicana</i>		<i>48 000</i>	<i>2 740</i>
<i>Operadora Textil</i>		<i>2 464</i>	
<b>TOTAL</b>	<b>89 440</b>	<b>7 264</b>	<b>2 740</b>

Source: NAFINSA, *Gerencia de Programación Industrial*

Exhibit 3: Cotton's part of total Mexican exports. (X).

(Mill U S \$)	1965	1970	1971	1972	1973
<b>Total Mex. Exports</b>	<b>1 113</b>	<b>1 373</b>	<b>1 474</b>	<b>1 665</b>	<b>2 063</b>
<b>Cotton raw mat'l exp.</b>	<b>0 212</b>	<b>0 124</b>	<b>0 120</b>	<b>0 147</b>	<b>0 166</b>
<b>Cotton in % of total exp.</b>	<b>19</b>	<b>9</b>	<b>8</b>	<b>9</b>	<b>8</b>

**SOURCE:** Banco de México, S.A., *Indicadores Económicos*, México, D.F., Noviembre 1974.

- Total cost for this phase is estimated to be **Ps. \$ 1 million**, excluding cost of land.

**Erection Stage** (18 months)

- Construction of buildings
- Purchase of production machinery
- Recruitment of personnel and training
- Start of publicity and sales activities
- Start and completion of entire erection
- Total cost for this stage is estimated to be **Ps. \$ 2 million**, excluding cost of land and machinery.

**Production Phase 1** (3 years)

- Production and sales, exclusively to the Mexican market, of 60,84 and 118 machines during years 1, 2 and 3 respectively.
- For cost statements, see Table 25.

**Production Phase 2** (4 years)

- Production of 188, 240, 252 and 264 machines during years 4, 5, 6 and 7 respectively.
- Exports of about 20% of total production to Central American market.
- For cost statements, see Table 25.

**7.3.2 Main Parts of a typical Ringspinning Machine**

The production rate of 20 machines per month is considered to be an economic production lot size today.

In accordance with the assessed market size in Mexico, the local manufacture of 240 ringspinning machines per annum should be reached in Production Phase 2 of the project.



1)

**Exhibit 1 : Development of Mexico's production of artificial fibres**

(tons.)

Years	Total Prod.	Origin		Use	
		Cel.	Spun	Textil	Other
1965	38 477	29 395	9 082	32 774	5 703
1966	43 218	29 530	13 688	36 677	6 541
1967	46 965	31 069	15 896	40 294	6 671
1968	59 292	39 270	20 022	47 327	11 965
1969	65 863	34 945	30 918	59 703	6 160
1970	82 214	36 096	46 118	73 919	8 295
1971	99 677	37 007	62 670	91 454	8 223
1972	122 065	36 868	85 197	112 650	9 415
1973	<u>144 328</u>	39 743	104 585	133 495	10 833

**Source: Secretaría de Industria y Comercio. Dirección General de Estadística**

1) **The figures of this table do not fully coincide with those of table 1, because it also shows the quantities of fibres produced for non-textile use.**

Exhibit 5: Calculation of Mexico's production of woven textile planes in 1974.

Total mill consumption:	327 000 Tons
- losses (8%)	26 000 Tons
- Synthetic fibres for knitting	60 000 Tons
- Exports of yarn	36 000 Tons

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Went into woven fabrics: 205 000 Tons

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Average RPM/min. of looms:	180 (i.e. 85% efficiency)
Average width:	1.15 meters
Average production per hour:	5.20 linear meters
Average working hours per year:	5 500
Average weight per m <sup>2</sup> :	130 grams

---

Total production per year:	1 520 million m <sup>2</sup>
Margin of error $\pm$ 5%:	1 470 to 1 600 million m <sup>2</sup>

---

$\frac{\text{Total fibre cons. (grams)}}{\text{Total m}^2 \text{ of textile planes (m}^2\text{)}}$	=	128 to 139 grams/m <sup>2</sup>
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Exhibit 6: Calculation of Mexico's production of knitted textile planes in 1974.

Total production of filaments:	80 000 Tons	
- losses	3 000 Tons	
Were texturized	66 000 Tons	(i.e. 85% of 77 000)
Went into weaving	6 000 Tons	

---

Went into knitting	60 000 Tons
--------------------	-------------

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90% of 60 000 Tons were knitted on Circular Knitting Machines.

Average width of knitwear:	1'45 m.
Average production:	18,0 linear meter per hour
Average weight per m <sup>2</sup> :	160 grams

---

Total production per year:	360 million m <sup>2</sup>
Margin of error $\pm$ 10%:	330 to 400 million m <sup>2</sup>

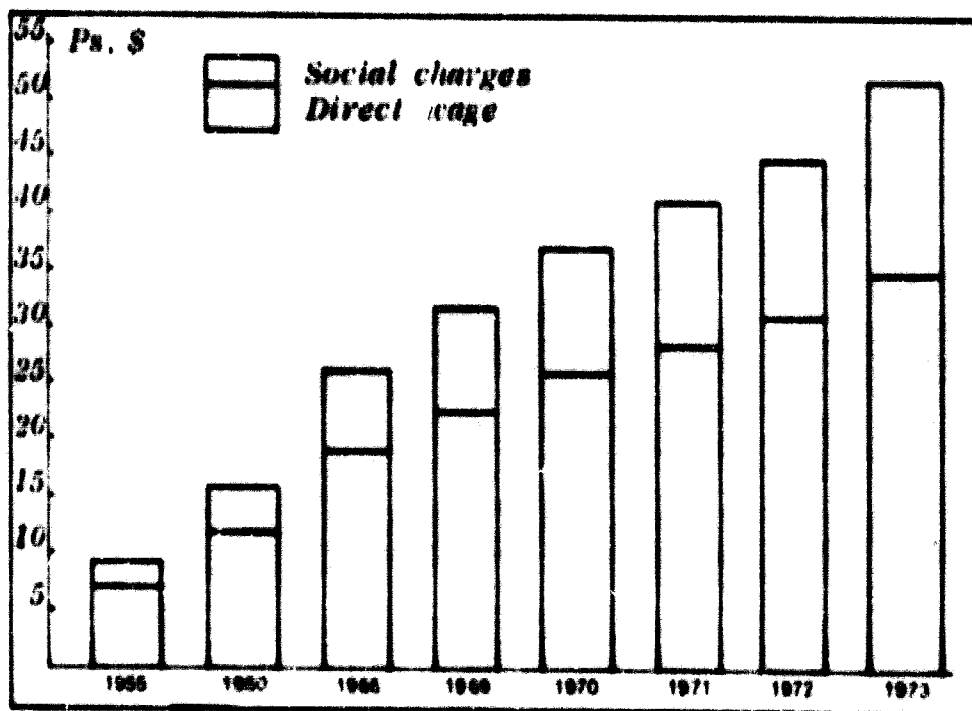
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$\frac{\text{Total fibre consumption (grams)}}{\text{Total m}^2 \text{ of knitted textile planes (m}^2\text{)}}$	= 153 to 165 grams/m <sup>2</sup>
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**Exhibit 7: Textile industry: Cost per Man-hour in Selected Countries (Pesos)**

The following graph, edited by the "Arbeitgeberkreis Gesamttextil" shows the development of the total costs per hour for Germany's textile workers. It may be assumed the labour cost has risen in a similar way in other industrialized countries. (Exchange rate: Ps. \$ 5 per DM 1, constant over total period shown)



The following rates <sup>1/</sup> may be somewhat biased by the recent changes of the USA - Dollar value. They do indicate, however, orders of magnitude of the respective hourly costs of labour. (Social chargers are not included) The rates were valid in mid-1974.

<sup>1/</sup> Source: Survey of a Swiss manufacturer of looms, 1974, adjusted by ICME/CONDOR, 1975.

<i>Indonesia, India, Argentina:</i>	<i>Ps\$ 6. -</i>
<i>Taiwan:</i>	<i>Ps\$ 8. -</i>
<i>Hongkong:</i>	<i>Ps\$ 10. -</i>
<i>Brazil</i>	<i>Ps\$ 12. -</i>
<i>Mexico:</i>	<i>Ps\$ 13. -</i>
<i>South Africa:</i>	<i>Ps\$ 13. -</i>
<i>Japan, Italy, Great Britain</i>	<i>Ps\$ 23. -</i>
<i>Switzerland, Germany, USA</i>	<i>Ps\$ 45. -</i>
<i>Sweden</i>	<i>Ps\$ 52. -</i>

*No allowances for the countries' different productivities were made.*

Exhibit 8: Rough estimate of potential savings  
of Mexico's spinning sector after an  
eventual restructuration.

Today's average size of spinning operation: 6 750 spindles  
Optimum size for Mexico: 20 000 spindles/company  
Assumed average size after restructuration: 13 000 spindles/company

Experience shows, that total cost decreases

- about 4% per additional 1 000 spindles installed,  
between 5 000 and 10 000 spindles,
- about 3% per additional 1 000 spindles installed,  
between 10 000 and 15 000 spindles.

The approximate savings would thus amount to:

- 13% for the increase up to 10 000 spindles  
( 10 000 - 6 750 = 3 250 increase;  $3\,250 \times 4\% = 13\%$ ) plus
- 9% for the increase between 10 000 spindles  
and 13 000 spindles ( $3\,000 \times 3\% = 9\%$ ), i.e.

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Total potential savings: ~ 22%

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Exhibit 9: World market data of main Ringspinning machine producers

COMPANY: **CARNI** **OGGIONO** **ITALY**

TYPE OF MACHINES		R 11B Cotton	9 12 Carded Wool	C 20 Combed Wool
Ø of ring (mm)		45-48-51-54- 60-65-75 90%	80-90-100-110 127-133-140 90%	48-51-55-60 65 90%
Annual Production	Spindles	56 000	10 000	30 000
	Machines	120 machines	50 machines	70 machines
DELIVERY TIME <sup>1/</sup>		18 months		
Address		Oggiono, Italy		
Licences	Company	No		
	Country			
Turnover MADE	Home Country (%)	10%		
	Export (%)	90%		
IMPOR- TANCE OF EXPORT MARKETS	1°	Far East		
	2°	United States		
	3°	European Economic Community		
	4°	East Europe		
	5°	Latin America		

<sup>1/</sup> Third Quarter of 1971.

Exhibit 9: World market data of main Ringspinning machine producers

COMPANY: CASTELLA Y CIA. SABADELL SPAIN

<b>TYPE OF MACHINES</b>		<b>Combed Wool</b>
<b>Ø of ring (mm)</b>		56 ↘ 60% ↘      60 ↘ 30% ↘      64 ↘ 10% ↘
<b>Annual Production</b>	<b>Spindles</b>	30 000
	<b>Machines</b>	70 machines
<b>DELIVERY TIME <sup>1/</sup></b>		18
<b>Address</b>		Sabadell, Spain
<b>Licences</b>	<b>Company</b>	Earlier: Zinser Licensee
	<b>Country</b>	West Germany
<b>Turnover MADE</b>	<b>Home Country (%)</b>	60%
	<b>Export (%)</b>	40%
<b>IMPORTANCE OF EXPORT MARKETS</b>	1°	Portugal
	2°	Mexico
	3°	
	4°	
	5°	

<sup>1/</sup> Third Quarter of 1971.



Exhibit 9: World market data of main Ringspinning machine producers

COMPANY: CEMSA SERRA AIGUAFREDA SPAIN

TYPE OF MACHINES		CS 7 Cotton	HEI-HE Combed Wool	Special Mach.
Ø of ring (mm)		48- <u>51</u> -57	50- <u>55</u> -65	
Annual Production	Spindles	18'000	10'000	2'000
	Machines	40	25	15
DELIVERY TIME <sup>1/</sup>		2 years		
Address		Aiguafreda and Manlleu, Spain		
Licences	Company	No		
	Country			
Turnover	Home Country (%)	90%		
MADE	Export (%)	10%		
IMPORTANCE OF EXPORT MARKETS	1°	Argentina		
	2°	Mexico		
	3°	Peru		
	4°			
	5°			

<sup>1/</sup> Third Quarter of 1974.

Exhibit 9: World market data of main Ringspinning machine producers

COMPANY: COMELOR FOUGEROLLES FRANCE

<b>TYPE OF MACHINES</b>		<i>EUR for short and long staple</i>
<b>Ø of ring (mm)</b>		50-51 <u>55-57</u> 60-65
<b>Annual Production</b>	<b>Spindles</b>	53 000
	<b>Machines</b>	120
<b>DELIVERY TIME <sup>1/</sup></b>		14-15 months
<b>Address</b>		<i>Fougerolles, France</i>
<b>Licences</b>	<b>Company</b>	No
	<b>Country</b>	
<b>Turnover MADE</b>	<b>Home Country (%)</b>	30%
	<b>Export (%)</b>	70%
<b>IMPOR-TANCE OF EXPORT MARKETS</b>	1°	<i>Portugal</i>
	2°	<i>Africa</i>
	3°	
	4°	
	5°	

<sup>1/</sup> Third Quarter of 1974.

The following classification of parts has been followed in the process of planning the manufacturing operation:

1. Parts which must be imported.
2. Parts which can be bought in Mexico, i.e.
  - Standard parts
  - Parts which must be manufactured by third parties, according to the specifications of the originator of the ringspinning machines.
3. Parts which are manufactured by the producer of the ringspinning machines.

#### **7.3.2.1 Parts which must be imported**

The vast majority of these are parts which are always bought out by most of today's ringspinning machine producers. Such parts are made in extremely large quantities by specialized supplier firms, e.g. SKF, Suessen, etc.

Main items under this heading are:

- Pendulum arms.
- Spindle bearings.
- Draw mechanisms.

Other usually bought-out parts include:

- Production unit counters.
- Spindle revolution counters.
- Hydraulic hoses.
- Special springs.
- Special sleevelets.

The total cost of such parts in fully industrialized countries represents about 20 to 24% of the total cost of a ringspinning machine. Their share of the world market price of a mach

Exhibit 9: World market data of main Ringspinning machine producers

COMPANY: COMES SABADELL SPAIN

TYPE OF MACHINES		Combed Wool	Carded Wool	Semi Combed Wool
Ø of ring (mm)		55-60-65-70 80-90%	80-90-120-140 90%	80-90-120-140 80%
Annual Production	Spindles	28 000	3 000	3 400
	Machines	77	10	15
DELIVERY TIME <sup>1/</sup>		12 months		
Address		Sabadell, Spain		
Licences	Company	No		
	Country			
Turnover MADE	Home Country (%)	90%	90%	100%
	Export (%)	10%	10%	---
IMPORTANCE OF EXPORT MARKETS	1°	Latin America (Venezuela, Colombia, Chile, Peru)		
	2°	Mexico		
	3°	Israel		
	4°	France (carried)		
	5°			

<sup>1/</sup> Third Quarter of 1974.



Exhibit 9: World market data of main Ringspinning machine producers

COMPANY: ELITEX PRAGUE CSSR

<b>TYPE OF MACHINES</b>		BD 200 For short staple (up to 40 mm)
<b>Ø of ring (mm)</b>		
<b>Annual Production</b>	<b>Spindles</b>	250 000 turbines
	<b>Machines</b>	1250
<b>DELIVERY TIME <sup>1/</sup></b>		12 months
<b>Address</b>		Usti nad Orlici, CSSR
<b>Licences</b>	<b>Company</b>	Toyoda - Nuova San Giorgio
	<b>Country</b>	Japan Italy
<b>Turnover MADE</b>	<b>Home Country (%)</b>	18%
	<b>Export (%)</b>	82%
<b>IMPOR- TANCE OF EXPORT MARKETS</b>	1°	Russia
	2°	East Germany
	3°	
	4°	
	5°	

<sup>1/</sup> Third Quarter of 1974.

Exhibit 9: World market data of main Ringspinning machine producers

COMPANY:                      GAUDINO                      COSSATO                      ITALY

TYPE OF MACHINES		Carded Wool FCT <sup>1</sup> 350	Carded Wool Selfstiro	Carded Wool Kolossal	Semi Com. FPK/450
Ø of ring (mm)		65-75-80-90 70%	75-90 80%	90-110-127- 140 → 50%	90-110-127 140 → 95%
Annual Production	Spindles	4 400	11 000	4 400	900
	Machines				
DELIVERY TIME <sup>1/</sup>		14 months			
Address		Cossato, Italy			
Licences	Company	No			
	Country				
Turnover	Home Country (%)	25%			
MADE	Export (%)	75%			
IMPOR- TANCE OF EXPORT MARKETS	1°	France			
	2°	Belgium			
	3°	G. B.			
	4°	Portugal			
	5°	Greece			

<sup>1/</sup> Third Quarter of 1974.

Exhibit 2: World market data of main Ringspinning machine producers

COMPANY:                    *INGOLSTADT*            *INGOLSTADT*    *WEST GERMANY*

TYPE OF MACHINES		<i>RB 17</i> <i>Cotton</i>	<i>RW 21</i> <i>Wool</i>	<i>RK 10</i> <i>Short Staple</i>	<i>RL 10</i> <i>Long Staple</i>
Ø of ring (mm)		<i>40-15-18-50-52</i> 80%	<i>50-60</i> 95%	Ø turbine 55 mm	Ø turbine 131 mm
Annual Production	Spindles	220 000	20 000	31 000	
	Machines	500	50	200	Very few
DELIVERY TIME <sup>1/</sup>		18 months		18-20 months	18-20 months
Address		<i>Ingolstadt,</i> <i>W. Germany</i>		do.	do.
Licences	Company	<i>Suessen</i>		No	No
	Country	<i>Brazil</i>		-	-
Turnover MADE	Home Country (%)	20%		25%	-
	Export (%)	80%		75%	-
IMPORTANCE Of	1°	<i>Latin America</i>	<i>Asia</i>	<i>Italy</i>	-
	2°	<i>Hong Kong</i>	<i>Corea</i>	<i>Spain</i>	-
	3°	<i>Corea</i>	<i>Australia</i>	<i>Portugal</i>	-
EXPORT MARKETS	1°	<i>Turkey</i>	<i>Chile</i>	<i>France</i>	-
	5°	<i>South Africa</i>		<i>North America</i>	-

<sup>1/</sup> Third Quarter of 1974.



Exhibit 9: World market data of main Ringspinning machine producers

COMPANY: **HEBERLEIN- HISPANO GENEVE SWITZERLAND**

TYPE OF MACHINES		Hispanatic Cotton	Hispanatic Wool
Ø of ring (mm)		67,5 → 45	75 → 52
		75 → 52	81,5 → 60
		84,5 → 60	96,5 → 72
		96,5 → 72	
Annual Production	Spindles	110 000	
	Machines	250 machines ( 75 and 84,5)	
DELIVERY TIME <sup>1/</sup>			
Address		Elisabethen-Glasenebach, Austria	
Licences	Company	Ferreirinha et Irmao, Sant' Andrea Novara, Hispa Catala, Osaka Kiko.	
	Country	Portugal.	Italy, Spain, Japan
Turnover	Home Country (%)		
MADE	Export (%)	100%	
IMPOR- TANCE OF	1°	Formosa	Turkey
	2°	France	France
	3°	Greece	Hungaria
EXPORT MARKETS	1°	Peru	Formosa
	5°		

<sup>1/</sup> Third Quarter of 1974.

Exhibit 9: World market data of main Ringspinning machine producers

**COMPANY:** HISPA- CATALA TORELLO SPAIN

<b>TYPE OF MACHINES</b>		Hispanatic Wool
<b>Ø of ring (mm)</b>		52- 55- 60 20% 60% 20%
<b>Annual Production</b>	<b>Spindles</b>	11 000
	<b>Machines</b>	40
<b>DELIVERY TIME <sup>1/</sup></b>		1 year
<b>Address</b>		Torello, Spain
<b>Licences</b>	<b>Company</b>	Joint venture, licence heberline - Hispano
	<b>Country</b>	Suisse
<b>Turnover MADE</b>	<b>Home Country (%)</b>	100%
	<b>Export (%)</b>	
<b>IMPOR- TANCE OF EXPORT MARKETS</b>	1°	
	2°	
	3°	
	4°	
	5°	

<sup>1/</sup> Third Quarter of 1974.

Exhibit 9: World market data of main Ringspinning machine producers

COMPANY: **HUJO DE F. JUNYENT TARRASSA SPAIN**

<b>TYPE OF MACHINES</b>		<b>Carded Wool FLK</b>
<b>Ø of ring (mm)</b>		75 <del>100</del> 135 50%
<b>Annual Production</b>	<b>Spindles</b>	3 800
	<b>Machines</b>	10
<b>DELIVERY TIME <sup>1/</sup></b>		12
<b>Address</b>		<b>Tarrassa, Spain</b>
<b>Licences</b>	<b>Company</b>	
	<b>Country</b>	
<b>Turnover MADE</b>	<b>Home Country (%)</b>	80%
	<b>Export (%)</b>	20%
<b>IMPOR- TANCE OF EXPORT MARKETS</b>	1°	Portugal
	2°	Mexico
	3°	Peru
	4°	Colombia
	5°	

<sup>1/</sup> Third Quarter of 1974.

Exhibit 9: World market data of main Ring spinning machine producers

**COMPANY:**                    **HOUGET DUESBERG BOSSON**                    **BELGIUM**

<b>TYPE OF MACHINES</b>		<i>Carded Wool Type CBP CBY</i>	<i>Semi combed MSB</i>
<b>Ø of ring (mm)</b>		75-90-110- <del>127-140-180</del> 70%	75-90-110- <del>127-140</del> 70%
<b>Annual Production</b>	<b>Spindles</b>	33 000	12 000
	<b>Machines</b>	150	80
<b>DELIVERY TIME <sup>1/</sup></b>		10 months	
<b>Address</b>		Enstical- Verboers, Belgium	
<b>Licences</b>	<b>Company</b>	No	
	<b>Country</b>		
<b>Turnover MADE</b>	<b>Home Country (%)</b>	7%	
	<b>Export (%)</b>	93%	
<b>IMPORTANCE OF EXPORT MARKETS</b>	1°	European Economic Community (GB, Scandinavia) etc	
	2°	South Africa	
	3°	New Zealand	
	4°	South Asia	
	5°	Eastern Countries	

<sup>1/</sup> Third Quarter of 1974.

Exhibit 9: World market data of main Ring spinning machine producers

**COMPANY:** LA METALURGICA TEXTIL, S.A. BARCELONA SPAIN

<b>TYPE OF MACHINES</b>		13 RM-1 Cotton
<b>Ø of ring (mm)</b>		45-48-50-54 45% 45%
<b>Annual Production</b>	<b>Spindles</b>	17 000
	<b>Machines</b>	90
<b>DELIVERY TIME <sup>1/</sup></b>		20 months
<b>Address</b>		Maurea, Spain
<b>Licences</b>	<b>Company</b>	Licence Zinser
	<b>Country</b>	
<b>Turnover MADE</b>	<b>Home Country (%)</b>	100%
	<b>Export (%)</b>	
<b>IMPORTANCE OF EXPORT MARKETS</b>	1°	
	2°	
	3°	
	4°	
	5°	

<sup>1/</sup> Third Quarter of 1974.

amounts to around Ps. \$ 102,000. The corresponding cost in Mexico is estimated to be about Ps. \$ 123,200 per machine.

#### **7.3.2.2 Standard bought-out parts obtainable in Mexico**

*These parts mainly consist of expendables such as bolts, nuts, washers, locator pins and all such metalware in common use.*

*Other larger accessories in less common use are also included in this category, such as normal ball bearings, electric motors, electrical components, toothed and V-beltting, belt pulleys, etc. etc.*

*The total cost of such parts normally amounts to between 10 and 13% of the overall material cost of the machine. However, allowing for the generally higher ceiling of prices pertaining in Mexico, a specially calculated percentage of 17.4% has been used in this case, giving a value of i. e. Ps. \$ 61 200 per machine for the parts in question.*

#### **7.3.2.3 Special bought-out parts manufactured in Mexico according to specifications (by Sub-contractors)**

*These parts include the following (approximate percentage share of the machine's overall material cost, indicated in brackets):*

- Air suction devices (8%)
- Sheet metalwork (3%)
- Plastic mouldings (2%)
- Gearings, including 1 set of spares (3%)
- Electrical control panel (3%)
- Etc.

*The total cost of these special bought-out parts usually amounts to between 17 and 20% of the machine's overall material cost. In the present case, however, are based on a percentage of 24%, i. e. representing a value of Ps. \$ 85 800 per machine.*

Exhibit 9: World market data of main Ringspinning machine producers

COMPANY: MARZOLI PALAZZOLO-SULL'OGGIO ITALY

<b>TYPE OF MACHINES</b>		RC Cotton
<b>Ø of ring (mm)</b>		45-48-50-54-60-70 80
<b>Annual Production</b>	<b>Spindles</b>	220 000
	<b>Machines</b>	550
<b>DELIVERY TIME <sup>1/</sup></b>		28-30 months
<b>Address</b>		Palazzolo Sull'oglio, Italy
<b>Licences</b>	<b>Company</b>	MKE Turchia
	<b>Country</b>	Turkey
<b>Turnover MADE</b>	<b>Home Country (C)</b>	35%
	<b>Export (C)</b>	65)
<b>IMPOR-TANCE OF EXPORT MARKETS</b>	1°	Formosa
	2°	Greece
	3°	Venezuela
	1°	Portugal
	5°	Argentina

<sup>1/</sup> Third Quarter of 1974.

Exhibit 9: World market data of main Ringspinning machine producers

COMPANY: OSAKA KIKO CO., LTD OSAKA JAPAN

<b>TYPE OF MACHINES</b>		<i>HNC - 1</i> <i>Cotton</i>	<i>HW - 6</i> <i>Combed Wool</i>
<b>Ø of ring (mm)</b>		47	50-55 60-40
<b>Annual Production</b>	<b>Spindles</b>	4 000	70 000
	<b>Machines</b>	10	180
<b>DELIVERY TIME <sup>1/</sup></b>		20	20
<b>Address</b>		Itanicity, Japan	
<b>Licences</b>	<b>Company</b>	Licence Heberlein-Hispano-Suiza	
	<b>Country</b>	Switzerland	
<b>Turnover MADE</b>	<b>Home Country (%)</b>	60%	
	<b>Export (%)</b>	100%	40%
<b>IMPOR-TANCE OF EXPORT MARKETS</b>	<b>1°</b>	Iran	Corea
	<b>2°</b>		Philippines
	<b>3°</b>		Hong Kong
	<b>4°</b>		Guatemala
	<b>5°</b>		Taiwan

<sup>1/</sup> Third Quarter of 1974.



Exhibit 9: World market data of main Ringspinning machine producers

COMPANY:                      PLATT                      ACCRINGTON                      GREAT BRITAIN

TYPE OF MACHINES		Sup. spinner type 800 Cotton	Sup. spinner KUS KUT Combed Wool	MWR1 MWR5 822, 823 Carded Wool	type 880 Semi- combed
Ø of ring (mm)		41, 5-17, 6-50, 8-60, 70, 57, 2-63, 5	63, 5-70-89-101	76-177	101-110
Annual Production	Spindles	100,000			
	Machines	1 100			
DELIVERY TIME <sup>1/</sup>		20 months	18	12	-
Address		Accrington, G. B.	Accrington, G. B.	Oldham, G. B.	-
Licences	Company	No	Mitsubishi	No	No
	Country	-	Japan	-	-
Turnover	Home Country (%)	-	-	-	-
MADE	Export (%)	-	-	-	-
IMPOR- TANCE OF EXPORT MARKETS	1°	-	-	-	-
	2°	-	-	-	-
	3°	-	-	-	-
	4°	-	-	-	-
	5°	-	-	-	-

<sup>1/</sup> Third Quarter of 1974.



Exhibit 9: World market data of main Ringspinning machine producers

COMPANY: REIOSA, S.A. MONCADA SPAIN

<b>TYPE OF MACHINES</b>		Combed Wool
<b>Ø of ring (mm)</b>		55-51-60-65-70 80% 20%
<b>Annual Production</b>	<b>Spindles</b>	22 500
	<b>Machines</b>	50
<b>DELIVERY TIME <sup>1/</sup></b>		12
<b>Address</b>		Moncada, Spain
<b>Licences</b>	<b>Company</b>	Licence Cogne
	<b>Country</b>	Italy
<b>Turnover MADE</b>	<b>Home Country (%)</b>	100%
	<b>Export (%)</b>	
<b>IMPOR- TANCE OF EXPORT MARKETS</b>	1°	
	2°	
	3°	
	4°	
	5°	

<sup>1/</sup> Third Quarter of 1974.

Exhibit 9: World market data of main Ringspinning machine producers

COMPANY:                      RIETER                      WINTERTHUR                      SWITZERLAND

<b>TYPE OF MACHINES</b>		<i>Gottardo</i> GO P Cotton	<i>Sempione</i> Long Staple
<b>Ø of ring (mm)</b>		40-45- <del>48-54</del> -57-63 90%	51-55-57-60-65-70 <del>90%</del> 70%
<b>Annual Production</b>	<b>Spindles</b>	565 500	
	<b>Machines</b>	1 300 machines (70% Cotton) 30% Wool	
<b>DELIVERY TIME <sup>1/</sup></b>		24	
<b>Address</b>		Winterthur, Switzerland	
<b>Licences</b>	<b>Company</b>	<i>Famatex (Spare parts)</i>	<i>Rieter Sud- America</i>
	<b>Country</b>	<i>Italy</i>	<i>Argentina</i>
<b>Turnover</b>	<b>Home Country (%)</b>	5%	
<b>MADE</b>	<b>Export (%)</b>	95%	
<b>IMPORTANCE OF EXPORT MARKETS</b>	1°	<i>Whole world</i>	
	2°	<i>West Germany</i>	
	3°	<i>North and South America</i>	
<b>EXPORT</b>	1°		
<b>MARKETS</b>	2°		

<sup>1/</sup> Third Quarter of 1974.



Exhibit 9: World market data of main Ringspinning machine producers

COMPANY: S. A. C. M. MULHOUSE FRANCE

TYPE OF MACHINES		CF 6 Short staple	CLF 2M Long staple
Ø of ring (mm)		<del>42-52</del> , 52-57; 57-65 95%	50-57; 57-65; 65-90 95%
Annual Production	Spindles	126 000	
	Machines	275	
DELIVERY TIME <sup>1/</sup>		12 months	
Address		Mulhouse, France	
Licences	Company	No	
	Country		
Turnover MADE	Home Country (%)	5%	70%
	Export (%)	95%	30%
IMPOR- TANCE OF EXPORT MARKETS	1°	Marocco	Turkey
	2°	Corea	Poland
	3°	Pakistan	
	4°		
	5°		

<sup>1/</sup> Third Quarter of 1974.



Exhibit 9: World market data of main Ringspinning machine producers

COMPANY: SCHLUMBERGER GUEBWILLER FRANCE

TYPE OF MACHINES		Combed wool or semi combed wool			
		CF 28	CF 23	CF 24	CF 25
Ø of ring (mm)		140	93	55-57-60-65 90%	51-53-55-57 90%
Annual Production	Spindles	47'000			
	Machines	practically nothing	35	100	
DELIVERY TIME <sup>1/</sup>		21			
Address		Guebwiller, France			
Licences	Company	No			
	Country				
Turnover	Home Country (%)	60%			
MADE	Export (%)	40%			
IMPOR- TANCE OF EXPORT MARKETS	1°	Belgium			
	2°	Eastern Countries (Rumania, Yugoslavia, CSSR, Pol.)			
	3°	Great Britain			
	4°	Morocco			
	5°	Mexico, Spain			

<sup>1/</sup> Third Quarter of 1974.



### 7.3.2.4 Parts produced by the locally established factory

These would include the following items:

- Driving head.
- Spindle carrier frames.
- Riffel cylinder-Splined cylinders.
- Upper part of spindles. Spindle heads.
- Bobbin holders.
- Carriers for drawing mechanisms.
- Intermediate frames.

The total cost of the raw material for these parts will amount to Ps. \$ 81 600 or about 23% of the machine's overall cost of materials.

### 7.3.2.5 Overall cost of materials per machine

The overall cost of materials for each machine item amounts to Ps. \$ 351 800 made up as follows:

Imported parts:	Ps. \$ 123 200
Standard bought-out parts:	61 200
Special bought-out parts:	85 800
Material for own prod.	<u>81 600</u>

T o t a l                      Ps. \$ 351 800

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### 7.3.3 Mandower needs for Production

#### 7.3.3.1 Direct labour

A direct labour content of some 550 to 600 man-labours per machine is normally accounted for in established factories for the production of ringspinning machines. Allowing for a productivity loss of about 30 to 40% due to start-up problems and in plant training needs for many of the workers, the direct man-labours required per machine would amount to about 800 in the present case.

Exhibit 9: World market data of main Ringspinning machine producers

COMPANY: **SERRA SACO-LOWELL BARCELONE SPAIN**

<b>TYPE OF MACHINES</b>		<b>Cotton</b>	<b>Combed wool semi combed</b>
<b>Ø of ring (mm)</b>		51 → 102 75%	
<b>Annual Production</b>	<b>Spindles</b>	210 000	
	<b>Machines</b>	500	
<b>DELIVERY TIME <sup>1/</sup></b>		27	
<b>Address</b>		Mallén (Barcelona) Spain	
<b>Licences</b>	<b>Company</b>	No	
	<b>Country</b>		
<b>Turnover</b>	<b>Home Country (%)</b>	40%	
<b>MADE</b>	<b>Export (%)</b>	60%	
<b>IMPOR- TANCE OF EXPORT MARKETS</b>	1°	Portugal	
	2°	Latin America (Brazil, Colombia)	
	3°	Western Europe	
<b>EXPORT MARKETS</b>	1°	Turkey	
	5°		

<sup>1/</sup> Third Quarter of 1974.

Exhibit 9: World market data of main Ringspinning machine producers

COMPANY: **VEB MASCH. KARL-MARX-STADT E. GERMANY**

TYPE OF MACHINES		Type 2110 B Cotton	Type 2110 K Wool
Ø of ring (mm)		45-48-50-56-60-63-65	50-63-65
Annual Production	Spindles	275 000	115 000
	Machines	600	300
DELIVERY TIME <sup>1/</sup>		2 years	
Address		Karl-Marx-Stadt, East Germany	
Licences	Company	No	
	Country		
Turnover MADE	Home Country (%)	20%	
	Export (%)	80%	
IMPOR- TANCE OF EXPORT MARKETS	1°	U. R. S. S.	
	2°	Poland	
	3°	Other socialistic countries	
	4°	Egypt	
	5°	Ceylon, Syria	

<sup>1/</sup> Third Quarter of 1974.



Exhibit 9: World market data of main Ringspinner machine producers

COMPANY:            ZINSER            EBERSBACH FILS            WEST GERMANY

<b>TYPE OF MACHINES</b>		317 et 318 Cotton •	317K et 418 Carded Wool
<b>Ø of ring (mm)</b>		75 → 45 a 50 82,5 → 50 a 56 90 → 56 a 68 105 → 65 a 70	identical to collo.
<b>Annual Production</b>	Spindles	325 000	
	Machines	750	
<b>DELIVERY TIME <sup>1/</sup></b>		24	
<b>Address</b>		Ebersbach, West Germany	
<b>Licences</b>	Company	Metalurgica Textil	
	Country	Spain	
<b>Turnover MADE</b>	Home Country (%)	28	35
	Export (%)	72	65
<b>IMPORTANCE OF EXPORT MARKETS</b>	1°	Turkey	
	2°	Far East	
	3°	Formosa	
	4°	Taiwan	
	5°		

<sup>1/</sup> Third Quarter of 1974.

Exhibit 19: Mexico's Bi- and Multilateral Conventions with other ALALC Countries with regard to Textile Machines.

Latest information available would indicate that some progress is being made within the interested ALALC - Countries to diminish trade barriers. But Mexico's only signed to the following agreements:

Cotton cleaning machines (used in field).

- Argentina, Brazil, Colombia and Ecuador also signed this agreement.
- Each case must be examined prior to importation
- In case of "free importation to Mexico", 7% on the cif-value has to be paid as import fee.

Other cotton preparation machines (used in field).

- Argentina, Bolivia, Colombia, Chile, Ecuador and Peru also signed this agreement.
- Each case must be examined prior to importation
- In case of "free importation to Mexico", 7% on the cif-value has to be paid as import fee.

Circular Knitting machines (automatic).

- Brazil and Ecuador also signed this agreement.
- Each case must be examined prior to importation
- In case of "free importation to Mexico", 4% on the cif-value has to be paid as import fee.

Circular Knitting Machines (non automatic),

- Argentina, Ecuador, Peru and Uruguay also signed this agreement.
- Each case must be examined prior to importation
- In case of "free importation to Mexico", 20% on the cif-value has to be paid as import fee.

Spare parts for cotton - fiber - preparation machines,

- Argentina, Bolivia, Columbia, Chile, Ecuador, Perú, Uruguay and Venezuela also signed this agreement.
- Each case must be examined prior to importation.
- In case of "free importation to Mexico", 14% on the cif-value has to be paid as import fee.

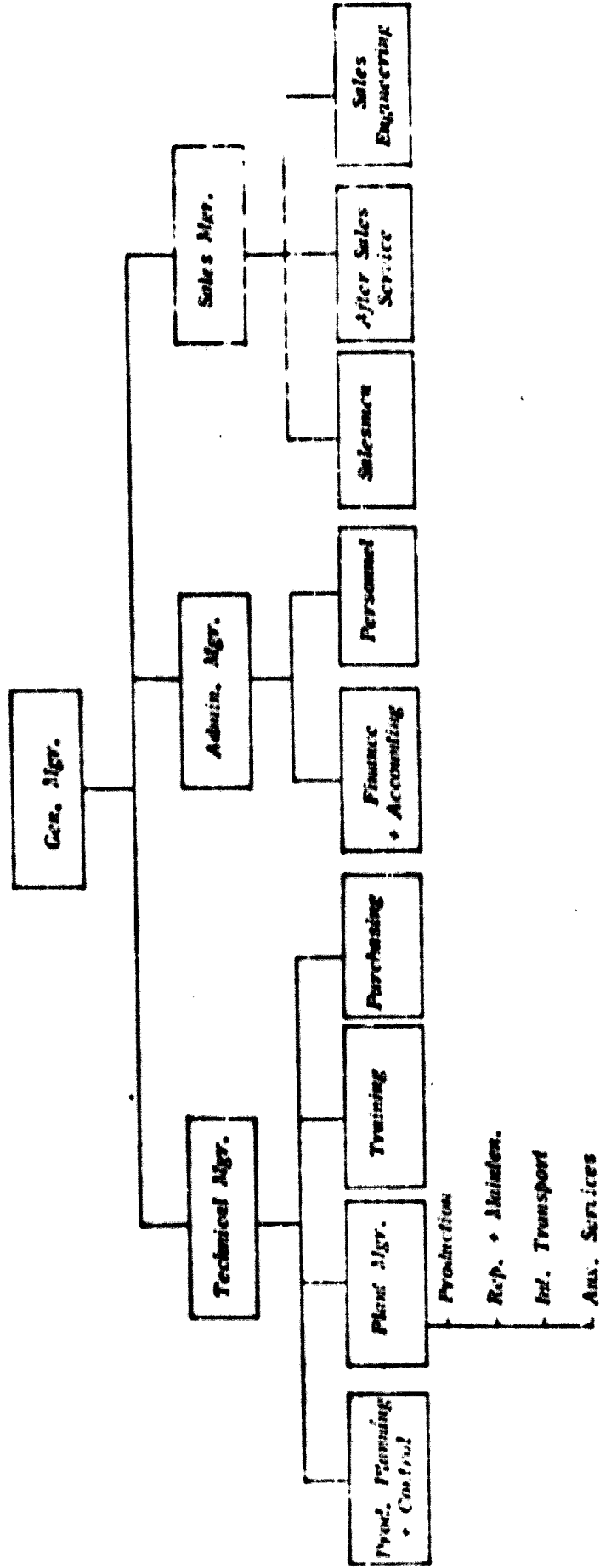
Exhibit 11: Continental America's total fibre consumption.

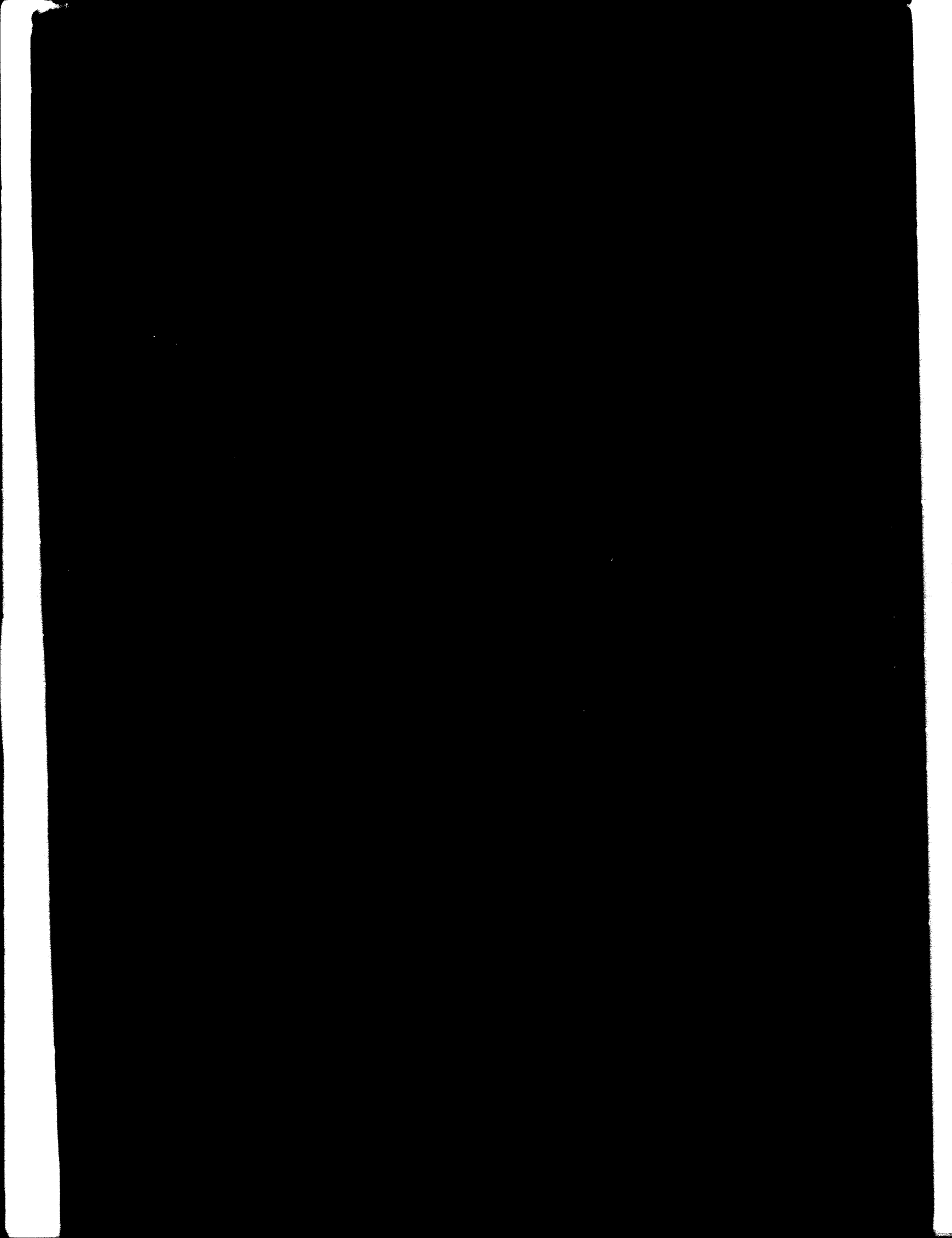
Region	Domestic Fibre Consumption ( 1 000 Tons)					Av. Incr. '72-'80 (C) Fibre cons. Population	1973 Pop (Mill)	1973 Fib. Cons. per capita (Kgr)
	1972	1973	1974	1975	1980			
MEXICO	254	262	273	285	350	4.1	53.7	4.877
U.S.A.	4 819	5 151	4 957	5 150	6 120	2.7	211.0	24.402
Central Am. (without Mex.)	199	207	216	225	285	4.1	44.0	4.530
South Amer.	966	1 095	1 115	1 152	1 415	4.9	198.0	5.460
Total	6 268	6 718	6 561	6 812	8 170	---	609.0	----

Source: Population: World Bank Atlas, Washington D. C., 1973  
 Fibre consumption: ICME/CONDOR investigations.

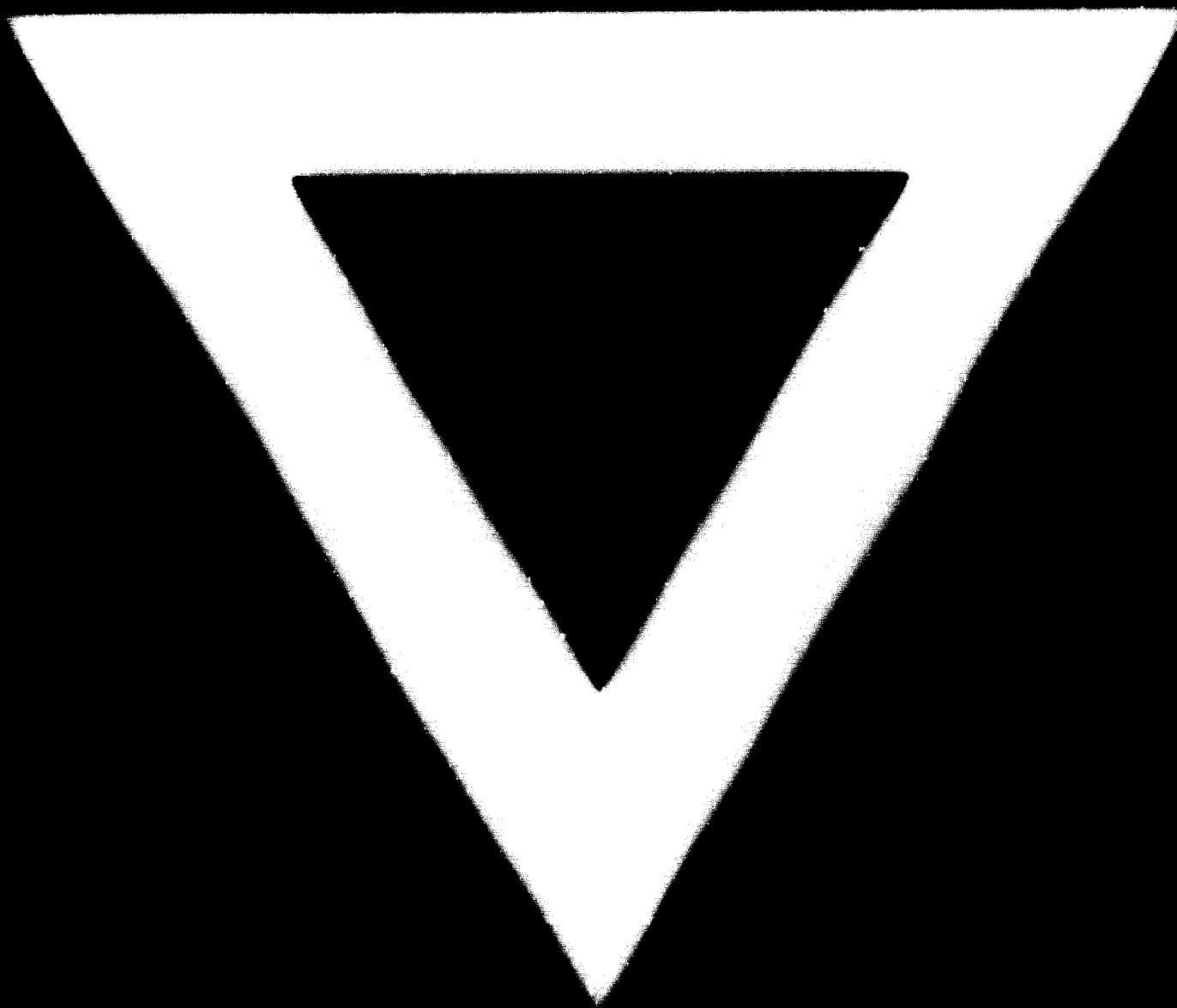


Exhibit 12: Tentative Organization Chart for Ringspinning Machine Manufacturing





**G - 562**



**81.08.27**

*Under such conditions, the following manpower requirements for direct labour have been established:*

**Production Phase 1**

- **Skilled labour: 23 men.**
- **Semi-skilled labour: 65 men.**
- **Unskilled labour: 23 men.**

**Total            111 men.**  
=====

**Production Phase 2**

- **Skilled labour: 41 men.**
- **Semi-skilled labour: 123 men.**
- **Unskilled labour: 41 men.**

**Total            205 men.**  
=====

*Every one of the machine making factories in Mexico has its own different wage rates. Therefor, in order to form a basis for the calculation of labour costs in the present instance, the rates of the following companies were analysed and compared:*

- **Empac-O-Matic**
- **Schindler**
- **Draper**
- **ILSA**
- **TOSA**
- **DREIS**
- **FAMA**