

LEETHAM
SIMPSON
INC.

MARKET STUDY
OF TEXTILE MACHINERY
AND ACCESSORIES
FOR THE DEPARTMENT OF
REGIONAL ECONOMIC EXPANSION
QUEBEC REGION

JANUARY 1982

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Montreal, Quebec
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1. INTRODUCTION

A market study of textile machinery and accessories was requested by the Department of Regional Economic Expansion (DREE), Quebec Region. Their invitation was dated July 20, 1981.

Our proposal to undertake this study was submitted in August 1981 and the authorization to proceed with the work was dated September 14, 1981.

.1 Terms of Reference

The following terms of reference form the basis of the study:

- Description of products
- Evaluation of the Canadian market for textile machinery and accessories:
 - Canadian production, by type and by manufacturer
 - Canadian imports, by type and by country
 - Canadian exports, by type and by country
 - consumption
 - distribution channels
 - market trends
 - market forecasts
- Potential export market:
 - emphasis should be placed on the U.S. market
- Description of target markets:
 - Canadian

.1 Terms of Reference (cont'd)

- U.S.
- choice and description of specific types of equipment with highest potential

- Manufacturing potential in Quebec:
 - identify required resources for the manufacture of specific types of equipment
 - availability of the necessary resources in Quebec
 - possibility of foreign manufacturers establishing themselves in Quebec
 - determination of the three best manufacturing opportunities in Quebec for these products:
 - choice of three specific types offering the best manufacturing opportunities in Quebec
 - availability in Quebec of the required elements for efficient production
 - evaluation of manufacturing possibilities in Quebec.

.2 Background Information

The textile industry is a prime factor in the economic well-being of Quebec. Although greatly reduced in size from its heyday, it still provides employment for 45,000 people in Quebec out of approximately 90,000 employed by the textile and knitting industries in Canada. The 1980 value of wage and salary payments in Quebec was approximately \$495.1 million for textile and over \$132 million for knitting out of a total Canadian payroll of over a billion dollars per year.*

In order to protect this important national asset and to ensure its growth in the future, it is widely believed that an intensive program of modernization of equipment and plants

* Statistics Canada, Catalogue 31-203

.2 Background Information (cont'd)

is necessary to keep pace with developments in other textile-producing countries, notably the U.S.A., Japan and the Western European countries. This program is well under way with the major Canadian firms and is gaining momentum with the small and medium sized manufacturers.

In this spirit the Government of Canada has created the Canadian Industrial Renewal Board which is responsible for encouraging the modernization of selected industries, including textiles, clothing and footwear.

It is evident that if maximum advantage is to be achieved from these programs, a significant proportion of the machinery and accessories used in the modernization of plants should be produced in Canada. This provides timeliness to the present market study sponsored by the Department of Regional Economic Expansion, Quebec Region.

In passing it should be noted that the Province of Quebec is also active in this field. It has a program entitled "Programme de modernisation pour les industries du textile, de la bonneterie et du vêtement," which is designed to provide financial and technical support to the textile and apparel industries.

.3 Scope of the Study

It was agreed that before proceeding with the market evaluation, we would meet Mr. Roger Fournier, Senior Industrial Analyst of the Department, Montreal office, to discuss the proposed approach and to review the textile machinery processing list prepared by us. In addition, we would consider the schedule for the study and inform Mr. Fournier of all the planned activities relating to the assignment. This was accomplished.

3 Scope of the Study (cont'd)

The study consisted of the following parts:

- a) A search of available statistical data on the textile industry and related industries to determine the direction in which these industries are travelling.
- b) A search of available statistical data on the market for textile machinery and accessories in Canada and in other leading textile-producing countries.
- c) An opinion survey conducted with thirty knowledgeable representatives of the Canadian textile industry. This survey covered textile manufacturers and machinery manufacturers, distributors and agents.
- d) Interrogation of our own professional staff, including international specialists from the Gherzi Textile Organization, who have had recent relevant experience in the areas under study.
- e) The synthesis of all of the foregoing into a set of conclusions and recommendations as called for by the terms of reference.

Because of the enormous range of machinery used in the textile industry (see Appendix I), the study led to the elimination of marginal equipment or of insignificant types of machinery from consideration and has been largely concentrated on the "short-staple" or cotton textile industry--i.e., machines and accessories involved in the spinning, weaving (or knitting) operations according to the Cotton Spinning Systems used for cotton and man-made fibres. About 82% of all spun yarns world-wide are spun according to this system. In fact, all synthetic fibres can also be spun on these machines either in 100% form or as a blend with cotton.

.3 Scope of the Study (cont'd)

The study takes into account both current market conditions and forecasts and also considers the additional stimulus which will result from the recently announced program of federal support through the Canadian Industrial Renewal Board.

2. SYNOPSIS OF THE REPORT

The main sections of the report and the synopsis are:

Section

- 1 Introduction
- 2 Synopsis
- 3 Textile Industry Trends
- 4 Summary of Interviews
- 5 Canadian Textile Machinery Market
- 6 Export Market Considerations
- 7 Resources Required for Manufacturing in Quebec
- 8 Possibility of Foreign Firms Establishing in Quebec
- 9 Choice of Best Manufacturing Opportunities in Quebec
- 10 Conclusions and Recommendations

By way of background information, it is interesting to note that the textile and knitting industries provide employment for 45,000 people in Quebec out of approximately 90,000 in Canada as a whole. The 1980 value of salary and wage payments in Quebec was approximately \$495.1 million for textile and over \$132 million for knitting out of a total Canadian payroll of over a billion dollars per year.

It is widely believed that an intensive program of modernization of equipment and plants is necessary to keep pace with developments in other textile-producing countries. This program is well under way with the major Canadian firms and is gaining momentum with the small- and medium-sized manufacturers.

The Government of Canada has created the Canadian Industrial Renewal Board which is responsible for encouraging the modernization of selected industries, including the textile industry.

2. SYNOPSIS OF THE REPORT (cont'd)

In passing, it is noted that the Province of Quebec has a program entitled "Programme de modernisation pour les industries du textile, de la bonneterie et du vêtement" which is designed to provide financial and technical support to the textile and apparel industries.

SECTION 3 - TEXTILE INDUSTRY TRENDS

Two significant technical developments in the past decade will continue to exert a major influence on investment decisions relating to spinning and weaving:

- Open-end or rotor spinning has penetrated the field formerly dominated by conventional ring-spinning and will continue to expand over the next decade.
- World sales of shuttleless weaving machines now exceed sales of conventional shuttle looms.

It is possible to upgrade both the older spinning machines and shuttle looms to provide greatly improved performance.

With the continuance of the restraint arrangements with some low-wage supplying countries and the creation of the Canadian Industrial Renewal Board, significantly increased investments are expected. This represents an opportunity for the Canadian textile machinery industry to gain extra sales volume.

SECTION 4 - SUMMARY OF INTERVIEWS

Thirty senior executives of the Canadian textile industry, representing textile manufacturers, textile machinery and accessories manufacturers and textile machinery distributors, were interviewed. The details of the interview program are shown in the main report. The summary of the interviewees' opinions follows:

SECTION 4 - SUMMARY OF INTERVIEWS (cont'd)

- For major machinery purchases, textile manufacturers tend to deal with a selected group of internationally recognized suppliers. A wider range of suppliers is considered for purchasing accessories such as bobbins and heddles.
- A risk factor is associated with any unestablished textile machinery manufacturer.
- Textile manufacturers place great importance on «experience gained prior to purchase» and «supplier reputation,» unlike the machinery distributor or manufacturer who believes service back-up to be of greater significance.
- Weaving and finishing/dyeing are the areas of major future investment.
- Foreign machinery manufacturers will continue to gravitate to the south-eastern U.S.A.
- Canada has the necessary resources for the production of textile machinery. However, an unsophisticated attitude and a lack of trained personnel may deter the success of a textile machinery venture in Canada.

SECTION 5 - CANADIAN TEXTILE MACHINERY MARKET

There is in Canada a fairly comprehensive range of products supplied by local manufacturers. These fall more into the accessories classification than machinery as such. A list of Canadian manufacturers of textile machinery is included in the main report.

Canada is well served by foreign machinery manufacturers, notably in the U.S.A., West Germany and Italy. Total imports

SECTION 5 - CANADIAN TEXTILE MACHINERY MARKET (cont'd)

of textile machinery and parts amounted to \$149 million in 1980.

Canada enjoys a healthy but small export business in textile machinery and parts with the majority of export sales going to the U.S.A., which took \$5 million of exports out of a total of \$18.0 million of exports in 1980.

In 1980, the apparent Canadian market for textile machinery and parts was approximately \$150 million per annum compared with \$1,300 million in the U.S.A.

There is a comprehensive distribution network in existence in Canada composed of agents of foreign firms based both in Canada and the U.S.A., direct sales from foreign (particularly U.S.) manufacturers and U.S.-based subsidiaries of foreign firms. A list of agencies is supplied in the main report.

SECTION 6 - EXPORT MARKET CONSIDERATIONS.

The size and location of the U.S. textile industry make this a primary target for export sales from Canada. Another market worth consideration is the Third World of developing nations, in conjunction with CIDA (Canadian International Development Agency). The majority of Canadian textile machinery manufacturers interviewed in our survey engage in export trade with exports amounting to at least 80% of their sales.

The possibility of developing export sales, particularly to the U.S.A., assisted by the devalued Canadian dollar, is a solid advantage to a manufacturer contemplating the establishment of a textile machinery manufacturing operation in Quebec.

SECTION 7 - RESOURCES REQUIRED FOR MANUFACTURING IN QUEBEC

The following resources are identified as being required for manufacturing in Quebec:

- product knowledge and design skills
- energy and other natural resources
- supporting manufacturing facilities
- labour skills and climate
- financial resources.

It was concluded that all of the resources required for the manufacture of textile machinery are available in Quebec with the possible exception of the first item: product knowledge and design skills.

SECTION 8 - POSSIBILITY OF FOREIGN FIRMS ESTABLISHING IN QUEBEC

The presence of the resources required for a textile machine manufacturing operation in Quebec plus the proximity of the rich U.S. market go a long way towards making the establishment of such an operation an interesting possibility. The final choice would be based on a multitude of factors including climate, language, educational facilities, medical services and the appeal of competing locations. Alternate ways of entering the Quebec industrial scene are identified in the main report.

Because of the conservative nature of the textile industry, it is highly desirable for the new venture to be identified with the name of a well-known partner or his products.

SECTION 9 - CHOICE OF BEST MANUFACTURING OPPORTUNITIES

After examining various alternatives for product selection, we have chosen the following:

- micro-processor controls (production monitoring devices)

SECTION 9 - CHOICE OF BEST MANUFACTURING OPPORTUNITIES (cont'd)

- materials handling equipment including robot transfer devices
- high-volume accessories and parts--for example, spindle conversion kits.

These three products provided the best fit to the attributes considered--namely:

- early in the product life-cycle, ten years remaining
- sufficient market potential to provide full return on capital in two to five years
- product know-how available through joint venture or licencing agreement
- supplementary manufacturing resources available
- access to U.S. market
- applicable to other industries.

Regarding «high-volume accessories and parts,» a study should be made to determine whether spindles and other spinning machine components could be partially or wholly manufactured in Quebec, shipped to the textile belt in the U.S.A. and delivered to the mills at competitive prices.

SECTION 10 - CONCLUSIONS AND RECOMMENDATIONS

We have drawn the following conclusions from the study:

- The purchasing patterns of the textile industry in Canada lean towards obtaining major machinery items from foreign suppliers. Local suppliers operate in the field of accessories and custom-built machines of lower complexity.

SECTION 10 - CONCLUSIONS AND RECOMMENDATIONS (cont'd)

- The lack of an infra-structure supplying parts and sub-assemblies to major machinery makers is a deterrent to the manufacture of major machinery in Canada.
- The size of the potential market for major machinery in Canada could not support the manufacture of such machinery alone. A substantial volume of export sales would be required to make such a venture economically viable.
- The market for machinery and parts in the U.S.A. is many times that in Canada (\$1.3 billion U.S. versus \$150 million Canadian, 1980). The U.S. textile industry is buoyant and is committed to a program for modernization and renewal of equipment. The preliminary 1981 U.S. estimate is \$1.4 billion.
- There are many ways worthy of investigation on how to proceed with expanding the manufacture of textile machinery in Quebec. The most likely to succeed is to identify a foreign manufacturer of high repute and endeavour to negotiate a joint venture or licencing agreement.
- Canada has all the resources required for the manufacture of textile machinery except for know-how and experience. This deficiency would be overcome by an agreement such as described in the above paragraph.

We recommend, in view of the foregoing, that studies be made to:

- Compile a short list of suitable partners in a joint-venture arrangement.
- After willing partners have been identified, select the specific product range to be manufactured in Quebec.

3. TEXTILE INDUSTRY TRENDS

.1 Process Trends

Two significant technical developments in the past decade will continue to exert a major influence on investment decisions relating to spinning and weaving:

- a) In the western world, open-end or rotor spinning has penetrated the field formerly dominated by conventional ring spinning to the following extent:

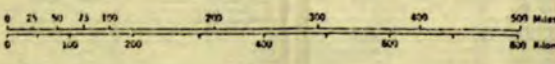
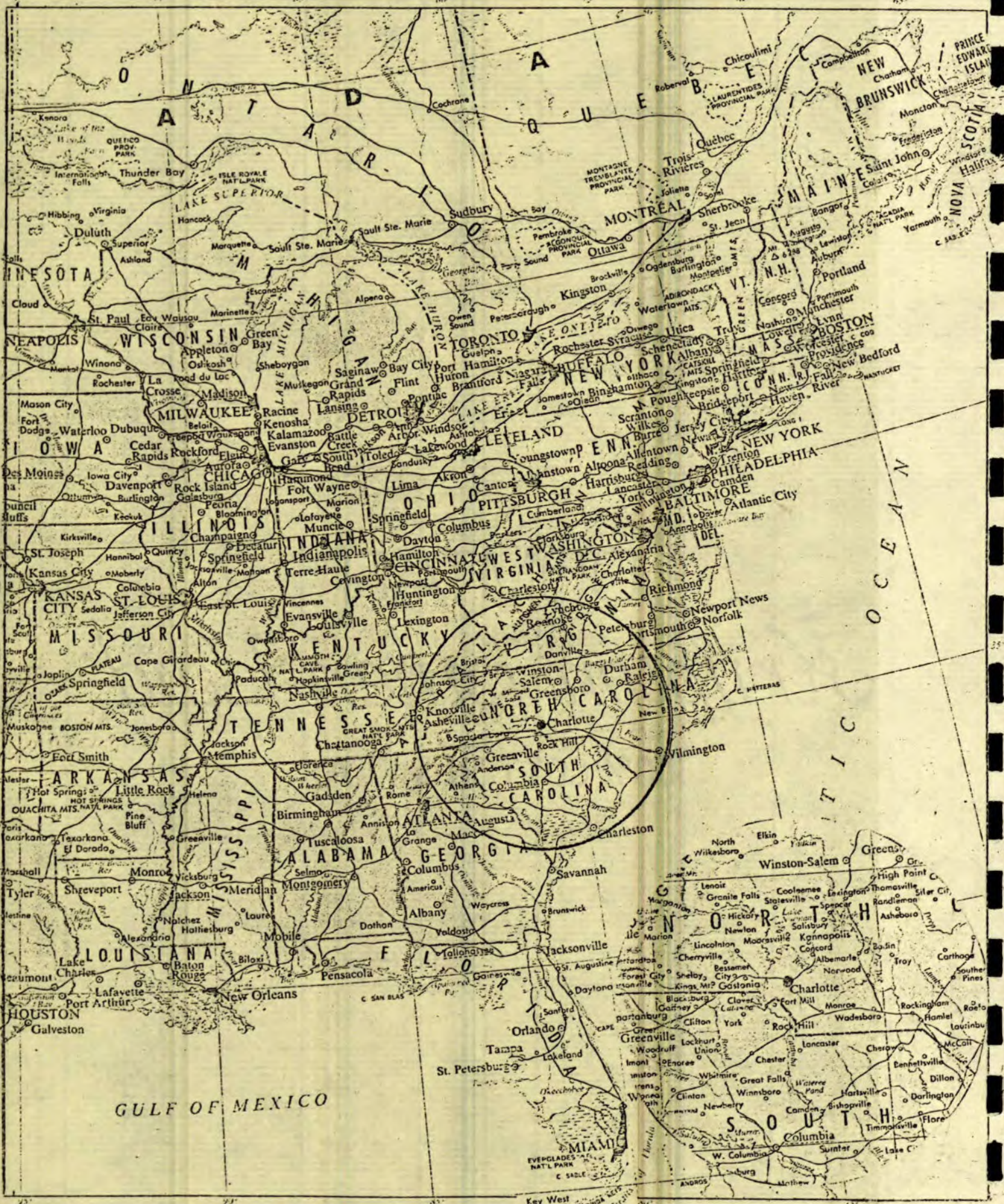
Japan	5.5%
Eastern Asia	3.6%
Africa	3.3%
U.S.A.	2.7%
Latin America	1.7%
Middle Asia	0.4%

In Eastern Europe, the figure for penetration of open-end spinning has been particularly high at 17% due largely to the easy availability of the Czech BD-200 machine.

Global penetration of rotor spinning is expected to exceed 10% by the end of this decade.*

- b) Three years ago the world sales of shuttleless weaving machines exceeded sales of conventional shuttle looms for the first time. Since then the availability of cheaper shuttleless machines has stimulated sales and, except for highly specialized applications, sales of conventional shuttle looms will probably decline. It is possible, however, to convert certain looms so that filling can be inserted by air jet at the rate of 320 picks per minute compared with 198 ppm on conventional looms.

*Source: Dr. H. M. Strolz, International Textile Manufacturers Federation, Switzerland.



.2 U.S. Textile Industry

As any marketing program launched in Canada must take cognizance of the influence of the U.S.A. in the marketplace, we present the following thumbnail sketch of trends in the U.S. textile industry.

A convenient unit of measurement of relative mill sizes is to quote the number of spinning spindles or open-end rotor equivalents installed.

There are approximately 560,000 short-staple spinning spindles installed in Canada, of which 460,000 are in Dominion Textile mills and 77,000 in mills owned by Wabasso. By contrast, there are 16.5 million spindles installed in the U.S.A., of which it is estimated that 85% are concentrated within a two-hundred-mile radius of Charlotte, N.C.* (see map opposite).

A profile of the number of establishments and shipments is presented in Appendix II.

The current leaders in the U.S. textile industry are shown in Table 1 on the following page.

*Source: 1981 Textile Manual, published by the Canadian Textile Journal Publishing Company Ltd.

.2 U.S. Textile Industry (cont'd)

TABLE 1

U.S. TEXTILE MARKET LEADERS - 1981*

Rating	Company	Sales \$MM. 1980
1	Burlington	\$2,901
2	J. P. Stevens	1,916
3	West Point Pepperell	1,246
4	Springs	794
5	Cone	730
6	Cannon	660
7	United Merchants	622
8	Lowenstein	620
9	Dan River	608
10	Collins & Aikman	604
11	Fieldcrest	527
12	Riegel	434
13	Graniteville	341
14	Reeves	322

There is an indication that the U.S. textile industry earnings could increase significantly from \$1.06 billion in 1980 to possibly \$1.3 billion in 1981.* It should be noted that the 1980 textile industry earnings were the second best on record. The outlook for 1982 and beyond is that the industry will derive increasing benefits accruing from current efforts to modernize production facilities.

The U.S. textile industry is continuing its move from being a labour-intensive industry to a capital-intensive one with accompanying improvements in productivity, profits and wages. In addition to the domestic market, which expands in line with population growth, the export market offers good growth potential.

*Source: Standard & Poor's Textile Industry Study (July 1981)

.2 U.S. Textile Industry (cont'd)

to an estimated \$4 billion annually in 1981, a substantial increase from \$1.5 billion in 1975. The table 2, following, presents trends in principal operating statistics for the U.S. textile industry.

TABLE 2

U.S. TEXTILE MILL PRODUCT TRENDS

	1975	1976	1977	E1978	E1979	E1980	% Chg. 1975-80
Value of Shipments (Mil. \$)	31,064	35,389	40,694	43,830	46,850	51,160	+9.2
Value Added (Mil. \$)	12,045	14,495	15,851	17,547	18,220	19,677	+8.0
Value Added Per Production Worker-Hour (\$)	8.29	8.72	10.46	11.12	11.71	12.56	+7.3
Total Employment (Thousands)	931.5	835.1	876.5	866.9	858.2	849.6	-1.0
Production Workers (Thousands)	724.9	765.3	760.0	750.9	742.6	731.5	-1.5
Average Hourly Earnings	3.57	3.85	4.14	4.48	4.87	5.33	+9.4
Yr. to Yr. Percent Change in Average Hourly Earnings	+8.5	+7.8	+7.5	+8.2	+8.7	+9.4	+9.4
Capital Expenditures (Mil. \$)	997.0	1,088.0	1,235.0	1,396.0	1,423.0	1,544.0	+8.5
Yr. to Yr. Percent Change in Producer Price Index (Dec. 1975 = 100)	...	+3.7	+3.9	+3.0	+5.7	+10.0	+10.0
Trade							
Value of Exports (Mil. \$)	1,532.7	1,855.2	1,857.3	2,073.4	3,028.9	3,480.0	+14.9
Value of Imports (Mil. \$)	1,211.9	1,626.3	1,764.8	2,212.0	2,213.8	2,460.0	+11.1

E—Estimated.
Sources: Bureau of Labor Statistics, Bureau of the Census, and International Trade Administration.

Boosting productivity is currently a top priority of the U.S. textile industry. Equipment modernization offers the greatest promise for increasing the efficiency. According to a recent survey by McGraw-Hill's Economic Department, the investment in new plants and equipment in 1981 is expected to reach \$1.92 billion (in 1980 it was \$1.5 billion).

It is expected that during the next five years, about 55% of expenditures will be for new machinery and some 21% for modernization. These forecasts augur well for sales by equipment manufacturers to the U.S. industry in the near future.

TABLE 3

U.S. TEXTILE MACHINERY: TRENDS AND PROJECTIONS 1975-1981

(in millions of current dollars except as noted)

Item	1975	1976	1977	1978	1979	1980	Percent change 1979-80	1981	Percent change 1980-81
Industry (SIC 3552)									
Value of shipments ¹	949	1,006	950	1,001	1,135	1,190	5	1,310	10
Value added	556	580	539	558	641	675	5	740	10
Value added per production worker-hour (\$) ²	14.11	14.18	14.86	17.26	19.67	20.65	5	22.71	10
Total employment (000)	29	29	26	25	25	26	4	27	45
Production workers (000)	20	21	18	17	17	18	6	19	65
Average hourly earnings (Dec.-\$)	4.36	4.70	4.90	5.79	5.68	6.07	-	-	-
Year-to-year percent change in average hourly earnings (Dec.-Dec.)	7.4	7.8	4.3	8.0	7.4	7.4	-	-	-
Year-to-year percent change in industry price index (Dec.-Dec.)	7.4	5.8	7.8	7.8	7.6	13.9	-	-	-
Capital expenditures	27	28	32	55	-	-	-	-	-
Product (SIC 3552) ²									
Value of shipments	861	918	857	870	1,005	1,060	5	1,165	10
Year-to-year percent change in producers price index (Dec.-Dec.)	7.3	3.7	5.4	8.0	6.5	9.4	-	-	-
Trade									
Value of exports	317	269	228	264	354	370	5	400	8
Value of imports	326	393	396	587	552	610	10	660	8
Consumption	870	1,042	1,025	1,193	1,203	1,300	6	1,425	10

Source: Bureau of the Census (industry and trade data). Bureau of Labor Statistics (hourly earnings and price indexes). Estimates and forecasts by the Bureau of Industrial Economics.

1 Value of all products and services sold by the textile machinery industry

2 Value of shipments of textile machinery produced by all industries

TABLE 4

U.S. TEXTILE MACHINERY INDUSTRY (million \$)

	1976	1977	1978	1979	1980	1981E
Shipments ¹	918	857	870	1,005	1,060	1,165
Exports	269	228	264	354	370	400
Shipments less exports	649	629	606	651	690	765
Imports	393	396	587	552	610	660
Apparent American consumption*	1,042	1,025	1,193	1,203	1,300	1,425
Export/Shipments		.27	.30	.35	.35	.34
Import/App. consumption	.38	.39	.49	.46	.47	.46
Shipments/App. consumption	.88	.84	.73	.84	.82	.82

1 Value of shipments of textile machinery produced by all industries

* Shipments - exports + imports - re-exports = Apparent American consumption

E: Estimated figures

Source: U.S. Bureau of the Census

.2 U.S. Textile Industry (cont'd)

a) Characteristics of the U.S. Textile Machinery Industry

The U.S. textile industry represents the largest concentration of primary textile production in the western world.

The industry is located almost exclusively in the states of North and South Carolina, Virginia, Georgia and Alabama and lies within 200 miles of Charlotte, N.C.

Virtually all of the world's leading manufacturers of textile machinery and accessories have established subsidiary companies in the region. Tables 3 and 4 on the facing page show trends and projections for the U.S. textile machinery industry. Examples of international machinery firms establishing in the U.S.A. include the following:

Platt (U.K.): In 1972 they purchased Saco Lowell, an old-established manufacturer of textile machinery who themselves had moved south from New England after the Second World War. The enlarged group, which now has manufacturing facilities in the U.K. and in Spain, as well as in the U.S.A., trades as Platt Saco Lowell.

Sulzer (Switzerland): Their sales of weaving machines in the U.S.A. have just topped 20,000 machines per year. They are now building a 130,000-square-foot plant at Kings Mountain, N.C., to manufacture their latest model, the PS projectile, and in the first phase the company will employ 230 people. Shipments will start in 1982 and most of the components will be manufactured in the new plant. (It is known that Sulzer carried out a study regarding manufacturing in Canada but chose the Carolinas primarily because the U.S. market is many times larger than in Canada.)

a) Characteristics of the U.S. Textile Machinery Industry
(cont'd)

Rieter (Switzerland): Comparable to Platt Saco Lowell in machinery range, they have a small manufacturing and assembly plant in Aiken, S.C.

Zinser (West Germany): Preparation and spinning machinery manufacturers, small plant assembly.

Trutzschler (West Germany): Modernize and manufacture cotton cards.

Textube Inc. (Emil Adolff, West Germany): A manufacturer of cones, tubes and bobbins.

b) Foreign Manufacturers of Textile Machinery and Accessories in the U.S.A.

A more comprehensive list of foreign manufacturers of textile machinery and accessories in the U.S.A. is shown in Appendix III.

c) Imports of Textile Machinery to the U.S.A.

The major foreign suppliers to the U.S.A. of textile machinery are Switzerland and West Germany with Italy, Japan and France making significant progress during the last decade. At the same time, the share of imports from the United Kingdom has decreased from approximately 19% of imports in 1965 to 6% in 1980. Switzerland and West Germany accounted for 60% of imports in 1980, while France had 5% and Japan had 9% of all foreign textile machinery products supplied. In 1979, Italy emerged as a strong newcomer looking towards the U.S.A. market as a major target for its textile machinery, according to the Daily News Record (July 16, 1979 edition). In 1980, Italy accounted for 8% of textile machinery imports.

TABLE 5

U.S. IMPORTS OF TEXTILE MACHINERY BY MAJOR COUNTRY 1980SPINNING AND RELATED MACHINERY

Country	Value \$'000	% of total imports
W. GERMANY	101,380	43.2
SWITZERLAND	52,822	22.5
U.K.	21,019	8.9
ITALY	18,156	7.7
JAPAN	13,136	5.6
Total major imports	206,513	87.9
Other countries	28,358	12.1
Total imports	234,871	100.0

WEAVING AND KNITTING MACHINERY

Country	Value \$'000	% of total imports
SWITZERLAND	102,258	47.3
W. GERMANY	37,536	17.4
JAPAN	28,809	13.3
ITALY	19,452	9.0
U.K.	5,207	2.4
Total major imports	193,262	89.4
Other countries	22,811	10.6
Total imports	216,073	100.0

Source: U.S. Bureau of Census: Subgroup by Country of Origin.

c) Imports of Textile Machinery to the U.S.A. (cont'd)

West Germany and Switzerland dominate the U.S. textile machinery market. This is visible in every major category. In 1980, West Germany accounted for 43% of spinning and related machinery, 35% of finishing machinery, 28% of all machinery parts and 17% for weaving and knitting machinery. In this same year Swiss exports to the U.S.A. accounted for 47% of weaving and knitting machinery, 30% of all machinery parts, 23% of spinning and related machinery and 4% of finishing machinery. Japan and Italy have both registered growth in knitting and weaving machinery with 13% and 9% respectively. The major exporting countries are presented on the facing page in Table 5.

During the last five years, U.S. imports of machinery and parts have increased from \$368 million to \$592 million (see Table 6 on the reverse side of this page). The U.S.A. is a leading world importer of textile machinery. This is shown in Table 7 on the following page.

It is evident that Canadian manufacturers cannot afford to ignore the U.S. market for textile machinery as it represents a very inviting field, close to home and of almost unlimited potential. However, it is the "major league" and calls for marketing skills of the highest order.

TABLE C
IMPORTS OF TEXTILE MACHINERY TO U.S.A.

	1976		1977		1978		1979		1980	
	no.	\$	no.	\$	no.	\$	no.	\$	no.	\$
Textile reeling or winding machines	1,253	11,471,894	1,869	15,697,530	3,052	34,403,813	11,264	37,860,090	9,314	42,142,215
Textile beaming, warping, slashing & machinery for prep'ng yarns - fabrics	893	2,351,550	460	3,401,259	891	6,494,354	771	8,633,873	255	4,965,265
Textile spinning	1,150	29,123,248	1,140	26,439,424	2,186	29,432,234	3,118	32,502,367	4,565	42,942,216
Textile twisting	258	14,071,138	364	20,202,454	583	36,746,777	797	30,358,335	428	23,893,629
Tex. mach. for processing fiber, yarn NSPF		16,232,974		21,414,644	3,583	40,240,166	3,450	33,898,426	1,376	38,854,019
Textile weaving		105,388,833		82,030,436	137,932	127,629,670	219,943	94,651,222	64,978	158,365,922
Knitting Hosiery	1,230	5,064,960	1,256	5,885,425	1,187	10,811,373	2,166	12,597,602	1,606	10,459,126
Double knitting machines	854	19,218,224	950	21,866,593	1,013	18,683,524	303	7,515,483	156	3,684,399
Knitting NSPF	114,009	18,715,042	15,015	21,629,341	12,444	31,010,747	14,519	30,230,787	11,897	28,843,999
Tex. mach. for making lace, braid, fabs, felt making parts		4,013,958		4,266,526		10,918,622		11,968,166		13,394,494
Tex. finish mach. fab folding, etc. mach., cordage mach., other parts		26,210,254		28,852,198		47,573,988		50,076,681		49,140,979
Card clothing	57,107	286,471	64,573	323,329	98,925	630,020	126,806	662,939	78,109	736,677
Parts, NSPF, of tex. mach., NSPF		116,207,609		115,385,899		161,515,606		167,729,517		175,030,244
Total imports		368,356,155		367,398,058		556,092,000		518,686,000		592,453,174

Source: U.S. Bureau of the Census, U.S. General Imports

c) Imports of Textile Machinery to the U.S.A. (cont'd)

TABLE 7

WORLD IMPORTS OF TEXTILE MACHINERY
COMPARATIVE POSITION BY COUNTRY

Country	1973 \$MM	1975 \$MM	1977	
			\$MM	% of Total
U.S.A.	\$ 423	\$ 329	\$ 403	17.5
Italy	272	248	219	9.5
U.K.	215	204	196	8.5
France	206	206	194	8.4
West Germany	172	202	219	9.5
Turkey	120	181	101	4.4
Spain	129	118	141	6.1
Belgium	97	102	111	4.8
Greece	61	121	104	4.5
Total - major countries	1,695	1,711	1,688	73.3
Other countries	569	609	616	26.7
Total imports	\$2,264	\$2,320	\$2,304	100.0

*Source: Organization for Economic Cooperation and Development,
World Imports of Textile Machinery

.3 Canadian Textile Industry

With the continuance of restraint arrangements with some low-wage supplying countries* and the creation of the Canadian Industrial Renewal Board as an agency administering the industry modernization program as it relates to the

*Source: Canadian Textile Journal, March 1981. Hearings in Montreal before the Textile and Clothing Board.

.3 Canadian Textile Industry (cont'd)

textile and clothing industries, significantly increased investments are expected.

The Quebec government also has a program to modernize the province's textile industry. This program is known as the «Programme de modernisation pour les industries du textile, de la bonneterie et du vêtement» and it has objectives similar to those of the Canadian Industrial Renewal Board.

Early in 1981, a detailed presentation was submitted to the Textile and Clothing Board by the Canadian Textile Institute together with the Amalgamated Clothing and Textile Makers Union (Textile Division), the United Textile Workers of America and the Canadian Federation of Textile Workers Inc. (CSD). The presentation demonstrated that the Canadian industry is undertaking major investments to modernize plants in order to improve its competitive position in international trade. In the March 1981 issue of the Canadian Textile Journal, the comments of Mr. Thomas R. Bell, President of Dominion Textile Inc., and of other executives were reported. It was stated that investments in the current decade could reach some \$300 million a year as compared with the average of \$177 million from 1970 to 1978. In fact, from 1979 to 1980, investments in new machinery and equipment had already increased by 35.8%.

The Canadian textile industry has undergone a number of basic structural changes; for example, between 1950 and 1960, it saw many mergers and closures that resulted in some one-hundred textile mills ceasing operations by 1960. During the 1960s, competition from low-cost countries had intensified to the point where the survival of the industry in Canada was in doubt. International recognition of this fact resulted in

TABLE 8
NUMBER OF ESTABLISHMENTS IN THE CANADIAN TEXTILE INDUSTRY 1979

SIZE OF EMPLOYMENT

\$'000

TEXTILE INDUSTRY SECTOR	1- 19	20- 49	50- 99	100-499	500-999	1,000†	Total	Shipments
Cotton yarn and cloth mills	NS	NS	NS	NS	NS	NS	NS	589,129
Wool yarn and cloth mills	15	6	5	16	-	-	42	221,986
Fibre and filament yarn manf.	2	1	1	5	3	1	13	2,023,911
Throwsters, spun yarn and cloth mills	8	17	11	40	3	-	79	
Felt and fibre processing mills	16	13	3	3	-	-	35	32,875
Thread mills	6	3	2	2	-	-	13	31,096
Narrow fabric mills	12	13	7	5	-	-	37	
Embroidery, pleating & hem stitching manf.	53	15	3	3	-	-	74	
Textile dyeing and finishing plants	49	25	5	10	-	-	89	
Misc. textile industries*	206	45	24	23	1	1	300	48,995
Cotton and jute bag manf.	10	7	5	1	-	-	23	
Canvas good manf.	136	15	9	3	-	-	163	
Cordage and twine	16	5	1	1	-	-	23	30,445
Carpet, mat and rug	6	4	6	12	4	-	32	541,448
Automobile fabrics	12	2	1	4	2	3	24	424,588
Hosiery mills	15	18	13	17	-	-	63	156,848
Knitted fabrics manf.	21	23	12	12	-	-	68	
Other knitting mills	49	38	23	39	1	-	150	
Total	632	250	131	196	14	5	1,228	4,101,321

* Includes establishments engaged in manufacturing house furnishings, surgical dressings, gauze, etc.

Source: Statistics Canada, Catalogues 34-202, 203, 205, 208, 209, 210, 215, 219, 221, 222

NS : Not Specified

.3 Canadian Textile Industry (cont'd)

an arrangement regarding international trade in textiles negotiated under the auspices of GATT.

While the situation improved somewhat at the beginning of the 1970s, it deteriorated again by the middle of the decade, so that in 1976 the federal government decided to make use of Article XIX of the GATT agreement and imposed quotas on the import of many apparel items.

As a result of these quotas, subsequently replaced by several three-year bilateral agreements restraining importation, and as a result of increased interest of the government in the fate of the textile industry and due to the downward adjustment of the value of the Canadian dollar, the situation has improved to the point where the industry has started to implement plans to assure its international competitiveness in the 1980s.*

Table 8 on the facing page presents a profile of the textile industry with regard to the number of establishments and shipments. For this period, the industry provided employment for some 90,000 people in these establishments, the majority of which are located in Quebec and Ontario. The 1979 value of shipments (including knitting mills) totalled \$4.1 billion. The wage and salary payments by the industry exceed \$1 billion annually. Total industry assets have increased from \$3.1 billion in 1969 to \$6 billion in 1978. Annual productivity increases in the textile industry have averaged 4.7% compared with 3.4% for all manufacturing industries.**

*Source: Canadian Textile Journal, March 1981

**Source: «The Textile and Clothing Industries,» Textile Manual (1981), Canadian Textile Journal Publishing Company Ltd.

.3 Canadian Textile Industry (cont'd)

In 1980, the demand for textile products had declined as a result of general economic conditions and consumer reluctance to spend money on non-essential goods including clothing. However, the «appreciable recovery» in textiles in the first months of 1981, referred to in the Annual Report on Textiles and Clothing, 1981,* appears to have been sustained well into the second half of the year.

Table 9 shows the major Canadian Textile manufacturers and their rating (in sales volume) in North America.

TABLE 9

MAJOR CANADIAN TEXTILE MANUFACTURERS

Rating U.S. and Canada	Company	1980 Sales (\$000)
4	Dominion Textile	\$864,800
18	Celanese	262,387
35	Wabasso	117,111
38	Consoltex	103,488
39	Peerless Rug	97,953
41	Harding Carpets	87,832
64	Bay Mills	28,207
67	Westmills	22,260
73	Riverside Yarns	13,379

Source: 1981 Textile Manual, published by the Canadian Textile Journal Publishing Company Ltd.

The spending intentions of the textile industry for 1981 indicate further growth with purchases of new equipment expected

*Source: «The Textile and Clothing Industries,» Textile Manual (1981), Canadian Textile Journal Publishing Company Ltd.

TABLE 10

CANADIAN CAPITAL EXPENDITURES - MACHINERY AND EQUIPMENT

(\$' 000,000)

Textile Industry Sector	1977	1978	1979	1980*	1981**
Cotton yarn and cloth mills	9.2	4.8	5.6	15.5	29.1
Wool yarn and cloth mills	4.2	4.5	6.7	10.2	13.9
Man-made fibre, yarn and cloth mills	20.8	23.5	39.5	51.1	68.6
Carpet, mat, rug	10.0	12.7	10.4	21.4	7.9
Canvas products, cotton and jute bags	1.3	.9	.9	.7	.7
Automobile fabric accessories	-	-	7.7	5.3	9.0
Miscellaneous textiles	8.5	17.1	23.1	30.0	18.2
Hosiery mills	2.0	2.3	3.4	5.9	4.2
Knitting mills	6.8	7.8	9.7	10.8	10.4
TOTAL	62.8	73.6	107.0	150.9	162.0

* Preliminary actual

** Intentions 1981

Source: Statistics Canada, Catalogue 61-214

.3 Canadian Textile Industry (cont'd)

to increase 7.4% over the previous year. It is too early to tell whether this objective has been achieved.

Industry attitudes obtained throughout the study towards new machinery development are appropriately summarized as follows:

«Technological progress in this industry is a very gradual process with no radical breaks with the past and aimed at several objectives simultaneously. A first objective is to increase speed. There are numerous textile machines which have had their speed increased by factors of three, ten or more.

«The second objective is that of accuracy in machine operation for each process, including those of dyeing and finishing, to ensure optimum uniformity, the basis for good quality.

«A third objective is to introduce a greater degree of automation with the aim of reducing labour costs per unit of output. A fourth objective is to add to the versatility of equipment; that is, to increase its capability to change over to new production with a minimum of downtime.»

*Source: Annual Report on Textile and Clothing, 1981

.4 Actual Capital Expenditure - Machinery and Equipment

The actual and estimated expenditures on Canadian machinery and equipment in the five years (1977 to 1981) are shown in Table 10 on the facing page. This reveals an estimated expenditure of \$162 million in 1981, trending upward at approximately 27% per annum.

TABLE 11

U.S. CAPITAL EXPENDITURES FOR MACHINERY AND EQUIPMENT - 1977

TEXTILE INDUSTRY SECTOR	\$000,000
<u>Yarn and Thread Mills:</u>	
Yarn mills, except wool	101.0
Throwing and winding mills	42.9
Wool yarn mills	2.5
Thread mills	9.8
Total	<u>156.2</u>
<u>Weaving Mills:</u>	
Weaving mills, cotton	154.4
Weaving mills, man-made fibre and silk	236.9
Weaving and finishing mills, wool	11.0
Narrow fabric mills	12.1
Total	<u>414.4</u>
<u>Knitting Mills:</u>	
Women's hosiery except socks	12.6
Other	172.4
Total	<u>185.0</u>
<u>Floor Covering Mills:</u>	
Woven carpets and rugs	.8
Other	69.6
Total	<u>70.4</u>
<u>Misc. Fabricated Textile Products:</u>	
Textile bags and canvas	10.8
Automotive and apparel trimmings	29.6
Other	51.8
Total	<u>92.2</u>
<u>Misc. Textile Goods</u>	82.6
<u>Dyeing and Finishing Textiles, except wool</u>	108.7
TOTAL	1,109.5

Source: Census of Manufactures, U.S. Department of Commerce,
Bureau of the Census

.4 Actual Capital Expenditure - Machinery and Equipment (cont'd)

U.S. capital expenditures appear in Table 11 on the facing page. A breakdown of U.S. and Canadian capital expenditures by machinery type is shown in Appendix IV.

4. SUMMARY OF INTERVIEWS

.1 Sample Profile

- a) Interviews were conducted with approximately thirty senior executives from the Canadian textile and textile machinery supply sectors. The sample profile is presented in the following table.

PROFILE OF INTERVIEW SAMPLE

<u>Class</u>	<u>No. of Establ.</u>	<u>Sample</u>	
		<u>Number</u>	<u>%</u>
Textile machinery and accessory manufacturers	7	7	100.0
Textile machinery distributors	36	13	36.0
Textile manufacturers	944	11	1.2

The Canadian textile industry is dominated by a small number of large establishments. Sales of ten major Canadian textile manufacturers exceeded \$1.5 billion in 1980. The number of textile manufacturers with more than 500 employees represents approximately 2% of total establishments, while 71% have fewer than fifty employees. Our sample profile covers the majority of the largest manufacturers and also includes representation from several smaller establishments.

- b) In terms of size and geographic location, the sample of machinery and accessories manufacturers breaks down as follows (see next page).

b) (cont'd)

TEXTILE MACHINERY/ACCESSORIES MANUFACTURERS

	<u>Small*</u>	<u>Medium*</u>	<u>Large*</u>	<u>Total</u>
No. of cos. interviewed	4	1	2	7
Location: Ontario	1	1	1	3
Quebec	3	-	1	4
Total No. of employees	119	125	800	1,044

*Small: 1 to 49 employees
 Medium: 50 to 99 employees
 Large: 100+ employees

c) Most of these firms are exporting their products in addition to supplying the local market. The following table illustrates this fact:

TEXTILE MACHINERY/ACCESSORIES MANUFACTURERS

	<u>Small</u>	<u>Medium</u>	<u>Large</u>	<u>Total</u>
No. of cos. exporting	2	1	2	5
Not exporting	<u>2</u>	<u>-</u>	<u>-</u>	<u>2</u>
Total	<u>4</u>	<u>1</u>	<u>2</u>	<u>7</u>

d) In terms of products being manufactured, the seven firms interviewed are primarily involved in supplying custom-made machinery followed by dyeing and finishing machinery and parts.

TEXTILE MACHINERY/ACCESSORIES MANUFACTURERS

	<u>Small</u>	<u>Medium</u>	<u>Large</u>	<u>Total</u>
% of cos. producing:				
Dye./finish. machinery	28.6	-	-	28.6
Custom-made machinery	42.9	-	-	42.9
Parts and accessories	14.3	14.3	28.6	57.2

- e) Thirteen textile machinery distributors were interviewed. In terms of market presence and the type of machinery being distributed, the sample breaks down as follows:

TEXTILE MACHINERY DISTRIBUTORS

	<u>Minor*</u>	<u>Major*</u>	<u>Total</u>
No. of companies interviewed:	7	6	13
% of companies producing:			
Yarn processing and spinning machinery	30.8	23.1	53.9
Weaving machinery	23.1	30.8	53.9
Knitting machinery	23.1	15.4	38.5
Dye. and finish. machinery	30.8	38.5	69.3

- f) Eleven textile manufacturers were also interviewed. The sample profile in terms of both location and products being produced is as follows:

TEXTILE MACHINERY MANUFACTURERS

	<u>Medium**</u>	<u>Large**</u>	<u>Total</u>
No. of companies interviewed	2	9	11
Location: Quebec	-	8	8
Ontario	2	1	3
% of companies producing:			
Yarns and threads	-	36.4	36.4
Staple fibres	9.1	18.2	27.3
Fabrics: knit, pile, woven, interlining and lining	9.1	63.6	72.7
Automotive fabrics	-	18.2	18.2
Domestic textile products	9.1	36.4	45.5
Floor coverings	-	27.3	27.3
Furnishing fabrics	-	18.2	18.2
Industrial products	9.1	18.2	27.3
Labels	9.1	-	9.1
Lace	9.1	-	9.1
Narrow fabrics	18.2	-	18.2
Non-wovens	9.1	9.1	18.2

* Determined by reputation in the textile industry

**Medium: 50 to 200 employees

Large: 200+ employees

.2 Summary Observations

A summary of observations from the interviews is outlined in this section.

a) "IN WHAT AREAS OF TEXTILE MACHINERY DO YOU PLAN TO INVEST OVER THE NEXT THREE YEARS?" (This question was asked of textile manufacturers only.)

- Weaving and finishing-dyeing were stated to be primary areas of machinery investment for the next three years.
- Almost 70% of the textile manufacturers expressed the intention of purchasing a variety of textile process machinery including weaving, yarn preparation, spinning, dyeing, finishing and special computer monitoring equipment.
- According to this group, the practice will continue of the textile manufacturers purchasing Western European, Japanese and, to a lesser extent, U.S. machinery. A small but significant portion of machinery is supplied from Eastern Europe, such as the Czech BD-200 open-end spinning machine.
- Among these suppliers there is a strong domination of major market segments by a handful of large companies including Platt, Rieter, Schubert and Sulzer and Toyota.

b) "WHICH AREAS OF TEXTILE MACHINERY REPRESENT THE GREATEST GROWTH POTENTIAL?"

i) Textile Manufacturers

The textile manufacturers' responses to this question appear in the following table:

MACHINERY WITH GREATEST GROWTH POTENTIAL

<u>Textile Manufacturers</u>	<u>% of Total Responses</u>
Weaving	44.4
Across-the-board	33.4
Spinning	11.1
Heat-setting	<u>11.1</u>
Total	<u>100.0</u>

- Weaving was felt to be the greatest area of growth potential by 44% of this group.
- The opinion expressed by 33% was that an equal growth potential exists with all textile process machinery.
- The remaining 23% regarded spinning and heat-setting as areas of future growth.

ii) Machinery Distributors and Canadian Manufacturers

- The area of greatest sales volume for the distributors of textile machinery is within the weaving segment, followed closely by dyeing and finishing equipment.
- Also, consistent with the responses of the textile manufacturers, the majority of the distributors and machinery manufacturers claimed that weaving is the area of highest growth potential, especially with regard to shuttleless looms and air-jet weaving.

ii) Machinery Distributors and Canadian Manufacturers (cont'd)

- Other important areas are thought to be open-end spinning and non-woven technology.
- Material-handling and pollution-control equipment is an area of recent concern in view of environmental regulations.
- Microprocessing and computer technology are also felt to be upcoming trends in the areas of preparation, weaving and finishing.

c) "WHAT ARE THE FACTORS INVOLVED IN THE FINAL PURCHASE DECISION?"

i) Textile Manufacturers

The purchasing procedures of the individual textile manufacturer appear to vary according to specific needs. There does exist, however, a general pattern of selection criteria among these textile manufacturers. The results appear in the following table:

<u>Textile Manufacturers</u>	<u>% of Total Responses*</u>	
	<u>Primary Factor</u>	<u>Secondary Factor</u>
Experience to be gained prior to purchase (mill visits, trial runs, trade shows)	100.0	-
Innovation/quality	55.5	11.1
Supplier reputation	33.3	11.1
Service back-up	11.1	22.2
Price/Economic evaluation	11.1	11.1

*Results may exceed 100% due to multiple mentions.

i) Textile Manufacturers (cont'd)

- A unanimous opinion emerged that a primary motive in selecting a machine is the degree of knowledge to be obtained prior to the purchase decision. This information is sought most commonly through mill visits and trial installations. In some cases, a prospective customer's yarn may be processed by the supplier. Trade shows and the opinions of technical experts are also contributory factors.
- Innovation was also considered to be an important criterion with regard to the degree of research and development activity and the pace of technological development. Higher speeds and productivity levels are on-going considerations of a textile manufacturer. However, there is an increasing concern for reduced noise and dust levels.
- The reputation of the supplier was indicated to be a primary factor. These textile manufacturers do not engage in a comprehensive search and tend to depend on the brand-name of recognized world leaders.
- Price was felt to be more of a secondary factor with the attitude that money saved from the initial investment is lost with respect to operating costs in the long run. There is only a slight price differential among the leading suppliers.
- Several textile manufacturers mentioned their fear of imposed duties on imported machinery resulting from the Canadian manufacture of similar equipment. This suggests that price is a more serious consideration than indicated by the interviews.

i) Textile Manufacturers (cont'd)

- Service was viewed as a secondary factor. It may be assumed that the trend of European suppliers establishing themselves in the southern part of the U.S.A. has substantially improved the accessibility of service back-up and spare parts. With the increased modernization of machinery, fewer spare parts are required and service becomes less of a concern. A major textile manufacturer suggested that Sulzer reflects this pattern. They refer to their loom as a «weaving machine,» indicating how their machine has moved away from the concept of being a composite of multiple parts.

ii) Machinery Distributors and Canadian Machinery Manufacturers

- Forty-five percent of the distributors and machinery manufacturers reported that the bulk of their business is conducted with «large» textile manufacturers (number of employees greater than 200), 36% with medium (50 to 200 employees) and 18% with companies from all size ranges.
- A majority of the machinery manufacturers claimed there was a barrier when dealing with the larger textile manufacturers in terms of acceptance of Canadian innovations.
- However, this predisposition to foreign machinery, as explained by the textile manufacturers interviewed, is associated with a perceived high risk factor.

ii) Machinery Distributors and Canadian Machinery Manufacturers
(cont'd)

<u>Machinery Dist./</u> <u>Canadian Manuf.</u>	<u>% of Total Responses*</u>	
	<u>Primary Factor</u>	<u>Secondary Factor</u>
Innovation/quality	81.3	-
Service back-up	31.3	12.5
Supplier reputation	12.5	18.8
Price	18.8	37.5

*Results may exceed 100% due to multiple mentions.

- Departing from the trend exhibited by the textile manufacturers, «experience to be gained prior to purchase» was not considered to be a factor with the distributors and machinery manufacturers. This may be explained by the large extent to which the distributors represent recognized suppliers.
- Reliance was placed more on innovation than on reputation.
- Service back-up was felt to be of greater importance in the purchasing decision by this group than by the textile manufacturers. This may reflect the machinery manufacturer's or distributor's obligation to «service» an account.

d) "WHAT IS YOUR EXPERIENCE WITH CANADIAN MANUFACTURERS OF MACHINERY AND ACCESSORIES?" (This question was asked of textile manufacturers only.)

- Almost 70% of the textile manufacturers claimed to have never dealt with a Canadian manufacturer of textile machinery or accessories.

d) (cont'd)

- Although the majority of this group was not familiar with MTC in Granby, the remaining interviewees are closely monitoring their operations.
- It was agreed among these textile manufacturers that there is no advantage in purchasing Canadian machinery which could be more expensive than duty-free imported machinery.
- As well, it was suggested that the risk associated with purchasing an untested Canadian machine may decrease in time.
- The remaining group of textile manufacturers are purchasing from the companies listed in Table 12.

e) "DO YOU FEEL IT IS LIKELY THAT FOREIGN MACHINERY MANUFACTURERS WOULD ESTABLISH THEMSELVES IN CANADA?"

i) Textile Manufacturers

- A consensus exists among all the textile manufacturers interviewed that the disadvantages far outweigh the advantages in terms of a foreign machinery manufacturer establishing himself in Canada.
- Lower labour and warehousing costs, less union militancy, tax concessions and, most importantly, the central location to the U.S. market are factors which will continue to attract foreign manufacturers to the Carolinas.

i) Textile Manufacturers (cont'd)

- If Canada were to be used as a base for manufacturing machinery with the U.S.A. as a primary export market, 1981 U.S. duties of 3.8% to 7.3% for machinery and up to 17.1% for accessories may inhibit Canadian sales. Appendix V lists the declining rates of duty for textile machinery over a seven year period. However, there are Canadian manufacturers in sufficient numbers successfully exporting to the U.S.A. in product categories with substantially higher duty rates.

ii) Machinery Distributors and Canadian Manufacturers

- The prevailing sentiment among the machinery distributors and manufacturers was consistent with that of the textile manufacturers in terms of foreign manufacturers gravitating to the U.S.A.
- It was suggested, however, that it would not be more difficult for a relatively unknown machinery manufacturer to sell from a distance--i.e., from Canada to the U.S.A.
- All interviewees emphasized the importance of an export program to support any machinery venture in Canada.
- Of the textile machinery/accessories manufacturers interviewed, the majority engage in an export program of at least 80% of total sales. The manufacturers who did not have a substantial export program were either supplying machines on specifications or were subsidiaries of a U.S. parent company.

- f) "WOULD THE REQUIRED RESOURCES AND SKILLS FOR THE PRODUCTION OF TEXTILE MACHINERY BE AVAILABLE IN CANADA? DESCRIBE THE MACHINERY TYPES YIELDING THE BEST MANUFACTURING OPPORTUNITIES."

The majority of all interviewees felt that Canada has the required resources: «the space, energy, material and willingness» to manufacture textile machinery.

Of the remaining interview responses, Canada was thought to be supporting unsophisticated attitudes and lacking in the proper training of qualified personnel for the textile machinery industry. To amend this situation, it was suggested that a successful venture would require European assistance in terms of technical support for conception and design.

i) Textile Manufacturers

- Seventy percent of the textile manufacturers felt that certain pieces of machinery could be manufactured in Canada; however, such potential equipment would have to be of a simple technology with low research and development requirements. Realistic potential equipment was thought to include accessories (such as bobbins, heddles, containers), examination and dyeing and finishing machinery.
- Computer electronic controls for the textile industry were also suggested in view of the degree of Canadian sophistication in this discipline. Underlying all of these suggestions, it was understood that an export program would be necessary.
- Thirty percent of this group felt that European competition in terms of experience, price and technology renders the situation impossible.

i) Textile Manufacturers (cont'd)

Based on our experience with similar surveys, this proportion is not unusual.

ii) Machinery Distributors and Canadian Manufacturers

- Of the distributors interviewed, 60% were of the opinion that it would be possible to manufacture machinery or accessories in Canada. Several distributors described Canada as a «spare parts» market in view of the European machinery purchases by most textile manufacturers and that such a market would be well served by a Canadian supplier of accessories. Again, finishing was considered to be a realistic possibility.

.3 Conclusions and Recommendations

a) Conclusions

- For major machinery purchases, textile manufacturers tend to deal with a select group of internationally recognized suppliers. A wider range of suppliers is considered for the purchasing of machinery accessories, such as bobbins and heddles.
- A risk factor is associated with any unestablished textile machinery manufacturer.
- Textile manufacturers place great importance on «experience to be gained prior to the purchase» and «supplier reputation,» unlike the machinery distributor or manufacturer who believes service back-up to be of great significance.

a) Conclusions (cont'd)

- Weaving and finishing-dyeing are the areas of major future investment.
- It is felt that foreign manufacturers will continue to gravitate to the south-eastern U.S.A.
- Canada has the necessary resources for the production of textile machinery. However, an unsophisticated attitude and a lack of trained technical personnel may deter the success of a textile machinery venture in Canada.

b) Recommendations

- It is important that the machinery manufacturer work closely with the textile manufacturer to determine specific needs. The discrepancy of response between the textile manufacturers and the machinery distributors with regard to purchasing criteria reflects a lack of close communication. The machinery manufacturer should actively define the textile manufacturer's needs and provide an abundance of information to the potential customer in the form of mill visits, trial installations, the processing of sample yarns and trade shows.
- A newly established machinery manufacturer should strive to obtain a certain degree of recognition within the textile industry. This "recognition" will decrease the high risk associated with newly established machinery manufacturers.

b) Recommendations (cont'd)

- The predisposition to purchase foreign machinery might be weakened through an increased awareness of available Canadian resources, as well as the proved ability to manufacture and export highly complex technical products in Canada.
- The areas of greatest equipment potential, as defined by the interviewees, include accessories, examination equipment and dyeing and finishing machinery. Machinery with relatively low research and development requirements and of simple technology represent the most viable alternatives.
- Upon initial introduction to the Canadian market, the textile machinery would be best allied to an existing product line of high repute.

5. CANADIAN TEXTILE MACHINERY MARKET

.1 Canadian Production

There is in Canada a fairly comprehensive range of products supplied by local manufacturers. These products fall more into the «accessory» classification than «machinery» as such. Some of the significant manufacturers of textile-related machinery are shown in Table 12 below:

TABLE 12

CANADIAN MANUFACTURERS OF TEXTILE MACHINERY

<u>Manufacturer</u>	<u>Products</u>	<u>Comments</u>
Machinerie textile canadienne Ltée Granby, Que.	Jumbo jigs Continuous dye ranges Inspection tables Winding systems Custom-made machines	Joint venture with Asisa, Spain; export 85% of production to Mexico,
<u>No. of Employees: 34</u>		
Exceltor Inc. Bedford, Que.	Knitting machine needles	Formerly Torrington; manufacture and import for re-export; 85% of production is exported
<u>No. of Employees: 500</u>		
Technova Inc. Drummondville, Que.	Carpet finishing machines, custom- made machines	Manufacture according to customer's specifi- cations
<u>No. of Employees: 40</u>		
Steel Heddle Mfg. Co. Granby, Que.	Loom reeds	Stock heddles and shuttles supplied by U.S. parent company
<u>No. of Employees: 35</u>		

TABLE 13

CANADIAN IMPORTS OF TEXTILE MACHINERY BY MAJOR COUNTRY

SPINNING AND RELATED MACHINERY

	1976		1977		1978		1979		1980	
	\$'000	%	\$'000	%	\$'000	%	\$'000	%	\$'000	%
U.S.A.	6,516	67.5	7,136	63.6	8,556	50.3	10,322	52.8	13,029	50.6
W. GERMANY	587	6.1	1,372	12.2	3,935	23.2	5,164	26.4	4,411	17.1
U.K.	1,058	11.0	1,074	9.6	1,043	6.1	1,155	5.9	1,726	6.8
ITALY	379	3.9	66	.6	877	5.2	833	4.3	2,556	10.0
FRANCE	29	.3	526	4.7	1,037	6.1	1,046	5.4	1,371	5.3
Total major imports	8,569	88.8	10,174	90.7	15,448	90.9	18,520	94.8	23,093	89.8
Other countries	1,082	11.2	1,049	9.3	1,545	9.1	1,016	5.2	2,632	10.2
Total imports	9,651	100.0	11,223	100.0	16,993	100.0	19,536	100.0	25,725	100.0

WEAVING MACHINERY AND PARTS

	1976		1977		1978		1979		1980	
	\$'000	%	\$'000	%	\$'000	%	\$'000	%	\$'000	%
U.S.A.	4,395	52.1	6,147	51.6	7,941	52.5	10,809	55.8	14,027	46.3
SWITZERLAND	1,728	20.5	1,352	11.3	2,450	16.2	2,185	11.3	7,457	24.6
BELG.-LUX.	583	6.9	1,601	13.4	919	6.1	609	3.1	2,691	8.9
W. GERMANY	216	2.6	688	5.8	1,154	7.6	1,427	7.4	1,553	5.1
SWEDEN	437	5.2	592	5.0	265	1.8	1,420	7.3	793	2.7
Total major imports	7,359	87.3	10,380	87.1	12,729	84.2	16,450	84.9	26,521	87.6
Other countries	1,094	13.0	1,535	12.9	2,397	15.8	2,915	15.1	3,752	12.4
Total imports	8,433	100.0	11,915	100.0	15,126	100.0	19,365	100.0	30,273	100.0

Source: Statistics Canada, Catalogue 65-203

.1 Canadian Production (cont'd)

TABLE 12
(cont'd)

<u>Manufacturer</u>	<u>Products</u>	<u>Comments</u>
Canada Spool and Bobbin Co. Ltd. Walkerton, Ont. <u>No. of Employees: 125</u>	Wooden spools, bobbins	Ten percent of Canadian market; balance imported
Sonoco Ltd. Brantford, Ont. <u>No. of Employees: 300</u>	Spools, reels, bobbins, shuttles, paper cones, tubes	Subsidiary of Sonoco Products Co., Hartsville, S.C.
GWD Controls Ltd. Burlington, Ont. <u>No. of Employees: 10</u>	Web guiding systems for textile, rubber	Limited application in textile industry

.2 Canadian Imports

The Canadian textile machinery market is well served by foreign manufacturers, notably the U.S.A., West Germany and Italy (see Table 13 on the facing page).

A five-year trend of Canadian imports and a breakdown by machinery type appear in Appendix VI.

.3 Canadian Exports and Re-exports

Canada enjoys a healthy export business in textile machinery and the figures for 1976 to 1980 are shown in Table 14 on the reverse side of this page. The reader should refer to the explanatory notes in Appendix XVII concerning the interpretation of Canadian export statistics.

TABLE 14

CANADIAN EXPORTS OF TEXTILE MACHINERY BY MAJOR COUNTRY

Country ¹	1976		1977		1978		1979		1980	
	\$'000	%	\$'000	%	\$'000	%	\$'000	%	\$'000	%
U.S.A. ²	4,192	33.7	3,594	26.8	5,334	35.1	5,269	33.7	4,782	26.6
BELG.-LUX.	1,912	15.4	1,967	14.7	1,554	10.2	1,554	9.9	204	1.1
U.K.	1,187	9.5	1,042	7.8	1,759	11.6	2,104	13.5	1,483	8.3
U.S.S.R.	875	7.0	1,012	7.5	179	1.1	145	.9	1,263	7.0
POLAND	700	5.6	898	6.7	441	2.9	732	4.7	725	4.0
Total major exports	8,866	71.2	8,513	63.5	9,267	60.9	9,804	62.7	8,457	47.0
Other countries	3,581	28.8	4,893	36.5	5,941	39.1	5,832	37.3	9,535	53.0
Total exports	12,447	100.0	13,406	100.0	15,208	100.0	15,636	100.0	17,992	100.0

CANADIAN RE-EXPORTS TO MAJOR IMPORTING COUNTRIES

TEXTILE MACHINERY AND PARTS

Country	1977		1978		1979		1980	
	\$'000	%	\$'000	%	\$'000	%	\$'000	%
U.S.A.	1,539	50.0	1,418	49.1	2,258	53.4	2,149	39.4
W. GERMANY	326	10.6	242	8.4	215	5.1	480	8.8
JAPAN	138	4.5	238	8.2	377	8.9	194	3.6
ITALY	29	1.0	139	4.8	137	3.2	430	7.9
MEXICO	40	1.3	88	3.0	210	5.0	220	4.0
Total major re-exp.	2,072	67.4	2,125	73.5	3,197	75.7	3,473	63.7
Other countries	1,004	32.6	765	26.5	1,029	24.3	1,986	36.3
Total re-exports	3,076	100.0	2,890	100.0	4,226	100.0	5,450	100.0

Source: ¹Statistics Canada, Catalogue 65-202²U.S. Dept. of Commerce, U.S. General Imports

.4 Apparent Market Size

Taking the previous figures, we can conclude that the apparent Canadian market for textile, machinery and parts is of the order of \$150 million per annum (see Table 15 on the reverse side of this page).

.5 Distribution Channels

There is a very comprehensive distribution network in existence in Canada for textile machinery and parts. The network includes:

- Resident Canadian agents
- U.S.-based agents of foreign firms
- U.S.-based subsidiaries of foreign firms
- Direct sales from U.S. manufacturers

The role of each of these types is as follows:

a) Resident Canadian Agents

Sales of textile machinery and accessories to Canadian users are made through local agents who specialize in the industry. The principal agencies are as follows:

Quebec

- Adasco Inc.
- AEP Inc.
- John Aitken
- Alltex Products Reg'd
- Carlton Textile Machinery
- Crowther Machinery Ltd.
- Delbec Enterprises Ltd.
- Erskine Mill Supplies Reg'd
- Intex Machinery Ltd.
- International Textile
- Machines Canada Ltd.
- C. A. Kennedy Co. Ltd.

Ontario

- Ian M. Haldane & Co. Ltd.
- Heppelshore Ltd.
- M. P. Representatives Ltd.
- Williams Asselin Inc.

TABLE 15
CANADIAN TEXTILE MACHINERY AND PARTS INDUSTRY (\$'000)

	1976	1977	1978	1979	1980
Shipments ⁽¹⁾	22,965	19,188	19,148	17,547	NA
Domestic Exports ⁽²⁾	12,447	13,406	15,208	15,636	17,992
Shipments less exports	10,518	5,782	3,940	1,911	-
Imports (incl. re-exports)	70,543	74,334	98,122	135,794	154,529
Re-exports ⁽²⁾	3,358	3,076	2,890	4,226	5,459
Imports less re-exports	67,185	71,258	95,232	131,568	149,070
Apparent Canadian consumption*	77,703	77,040	99,172	133,479	150,000 ⁽³⁾
Export/Shipments	.54	.70	.79	.89	-
Re-export/Import	.05	.04	.03	.03	.03
Import/App. consumption	.91	.96	.99	1.00	-
Shipments/App. consumption	.30	.25	.19	.13	-

* Shipments - exports + imports - re-exports = Apparent Canadian consumption

Source: Statistics Canada Catalogues:

- (1) 42-214, Misc. Machinery and Equipment Manufacture
- (2) 65-202, Exports by commodity and country; U.S. Department of Commerce: Schedule A, U.S. General Imports
- (3) Leetham Simpson estimate.

b) U.S.-Based Agents of Foreign Firms (incl. U.S.A.)

Some foreign manufacturers employ agents with sales responsibilities for both the U.S.A. and Canada.

c) U.S.-Based Subsidiaries of Foreign Companies

Virtually all the leading machinery makers (both domestic and foreign) have their own subsidiary companies located in the Carolinas with sales responsibility for the whole of North America.

d) Direct Sales from U.S. Manufacturers

Several of the larger U.S. machinery manufacturers sell into Canada from their corporate headquarters in the U.S.A. Typical companies in this category include:

Leesona Corp. of Warwick, R.I.
Platt Saco Lowell of Greenville, S.C.

Appendix VII lists the U.S. Textile machinery manufacturers.

e) The Canadian Used Machinery Market

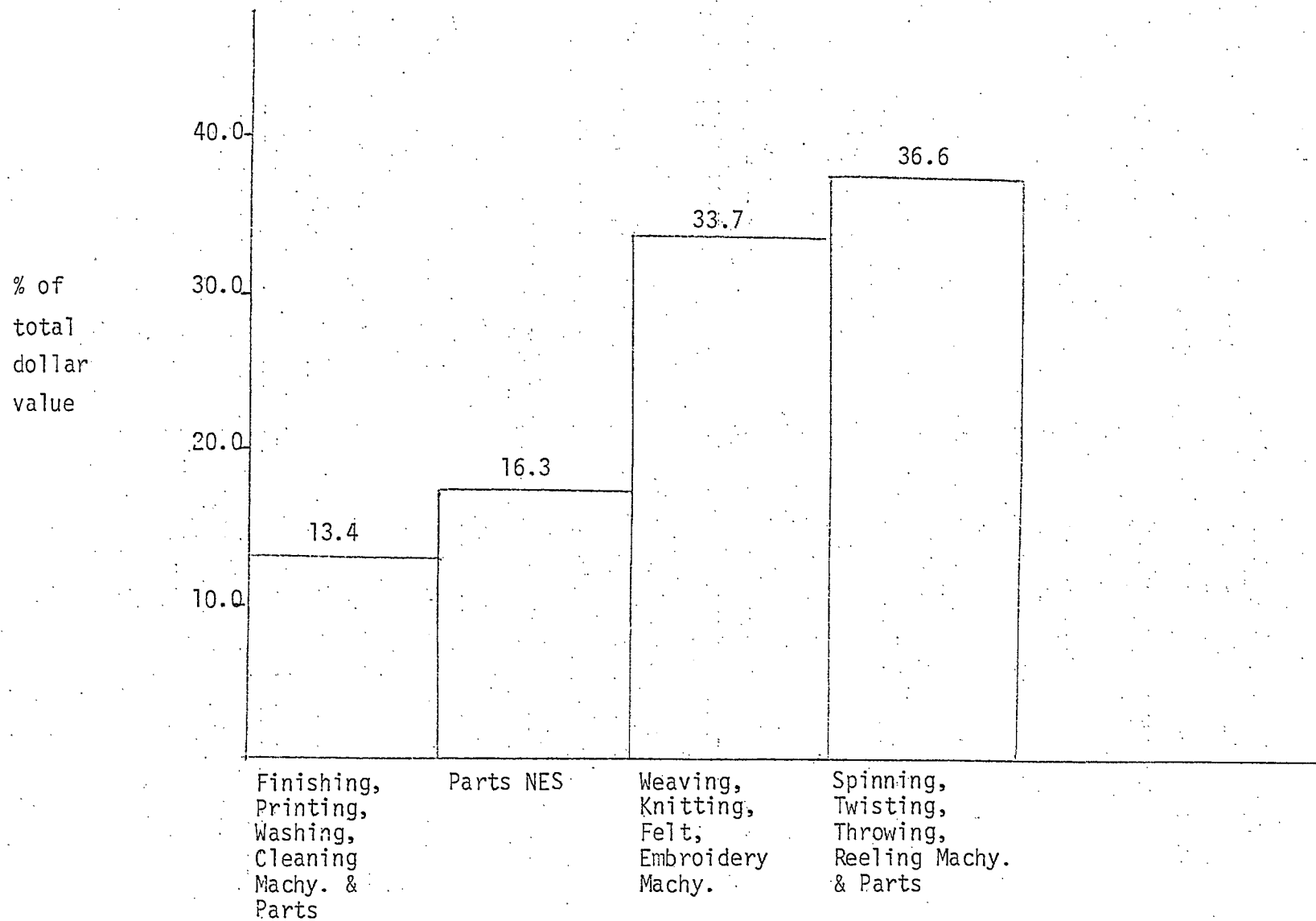
It was the opinion of several interviewees that among a depressed sector, plant closings and company bankruptcies lead to the availability of low-priced second hand, but modern machinery. The market for used modern knitting machinery is very active. Generally, this equipment is purchased by small to medium textile manufacturers. A situation was described by one machinery distributor, whereby a small carpet manufacturer considering a \$250,000 shearing machine chose to purchase a similar used piece of equipment at 25% of the price.

e) The Canadian Used Machinery Market (cont'd)

The larger textile manufacturers purchase the most up-to-date machinery and tend to use the equipment until it is eventually scrapped. However, in general, Canadian textile manufacturers do not purchase "antiquated" machinery and those who do not participate in a modernization effort will not survive. A dealer of used machinery who buys, reconditions and sells, foresees a decrease in sales owing to the modernization program.

The U.S. market for used machinery was suggested to represent a far greater potential resulting from a greater tendency of textile manufacturers to sell, rather than to scrap, the used machinery.. Both American and Canadian used machinery may serve to supply the spare parts market.

1980 U.S. IMPORTS OF TEXTILE MACHINERY AND PARTS



Source: U.S. Bureau of the Census: U.S. General Imports

6. EXPORT MARKET CONSIDERATIONS

It has been shown in the previous section that the Canadian textile machinery industry enjoys an export market for its products amounting to almost \$18 million in 1980. The U.S.A. leads the list of countries receiving these goods by a wide margin.

The export figures for the past five years are as follows:

<u>Year</u>	<u>U.S. Imports from Canada</u> ((\$000)	<u>Other Cdn. Exports</u> ((\$000)	<u>Total Exports</u> ((\$000)
1976	\$4,192	\$ 8,255	\$12,447
1977	3,594	9,812	13,406
1978	5,334	9,874	15,208
1979	5,269	10,367	15,636
1980	4,782	13,210	17,992

The figures shown above indicate that the U.S. market for Canadian products is a steady one and not a «flash in the pan.» This qualifies it for prime consideration in exploring ways in which Canadian exports of textile machinery and parts could be increased to provide extra justification for expansion of Canadian manufacturing capacity. A breakdown of 1980 U.S. imports of textile machinery and parts is illustrated on the facing page.

The size of the U.S. market for textile machinery and parts (\$1.3 billion per year) and the large number of firms concentrated in the Carolinas suggest that this is where the action is and, although the competition is tough, the rewards for a successful marketing program are potentially great. A manufacturer setting up in Quebec would be well advised to investigate this market thoroughly.

Another market which offers an opportunity for expansion of export sales is the Third World group of countries. Sales can be negotiated in conjunction with the Canadian International Development Agency (CIDA) program of financial assistance to developing countries.

6. EXPORT MARKET CONSIDERATIONS (cont'd)

The potential size of this market is not known with any degree of accuracy but it is evident that Third World countries must place a high priority on textile manufacturing as one step towards self-sufficiency. Textile consumption varies directly with population and rapid population increase is one factor which is common to most Third World countries.

In our field interview program, the question was put to the textile manufacturers: «Do you engage in export sales and, if so, what proportion of your sales are exports?» The response indicated that the majority of Canadian manufacturers of textile machinery engage in exporting and exports account for at least 80% of their total sales. The manufacturers who did not export were supplying custom-built machines to local customers or were subsidiaries of foreign companies whose policy it is to supply only the local market.

In order to elevate export sales from the present plateau of approximately \$18 million per annum, a major input of marketing expertise would be required. Such an input would be available in a joint-venture arrangement between a Quebec manufacturer and a «big name» from overseas.

At this point it is worth considering a theoretical model in the accessories category:

A West European company manufactures drafting systems and spindles for conventional ring frames. These are sold to original equipment makers and also as conversion kits to the mills that are upgrading their machinery.

For some time the company has been considering setting up a parts manufacturing and assembly plant in North America. At first sight the logical location would appear to be in

6. EXPORT MARKET CONSIDERATIONS (cont'd)

the heart of the textile industry in North and South Carolina.

Factors which could persuade the manufacturer to locate in Quebec would include:

- Substantial encouragement from federal and provincial government departments, particularly in the form of grants, low-interest long-term loans, training subsidies, tax concessions, etc.
- The existence of a small but stable domestic textile market being supported and encouraged by a stable government.
- The availability of the necessary resources and skills required to manufacture components to fine tolerances.
- Abundant energy and natural resources.
- Open access to the U.S. market into which the manufactured product can be shipped and delivered at profitable and competitive prices.
- The belief that the range of products would be the subject of gradual and profitable expansion in line with the general expansion of the Canadian economy.

While this theoretical model envisages a West European entrepreneur making the decision whether to set up shop in Canada or the U.S.A., the same analysis would be required of a domestic manufacturer or any other group facing this problem.

7. RESOURCES REQUIRED FOR MANUFACTURING IN QUEBEC

As stated in the previous section of this report, an entrepreneur contemplating an investment of capital, time and marketing skills in a Quebec manufacture of textile machinery and/or equipment would need to satisfy himself on several counts, including the availability of suitable resources. The main resources which would be required for this purpose are as follows:

.1 Product Knowledge and Design Skills

Processing machinery in the textile industry has been developed over many years and the current levels of technology are the results of massive investments in research and development together with manufacturing skills and resources of a very high order. To ignore this and attempt to enter the market with Canadian-made complex mainline machinery such as looms or spinning machines would be an act of pure folly. However, there is a textile accessories manufacturing base in Canada supported by design and knowledge skills and this should provide a good but modest starting point for an expansion program.

.2 Energy and Other Natural Resources

Canada is favoured among industrial nations with abundant supplies of energy and other natural resources. This applies even more so to the Province of Quebec.

.3 Supporting Manufacturing Facilities

In all of the main textile machine manufacturing locations overseas, the principal machinery manufacturers are supported by peripheral suppliers of specialized components. In many

.3 Supporting Manufacturing Facilities (cont'd)

cases, these firms supply more than 50% of the number of parts in the company's products. There is no such infrastructure in Quebec or even in Canada and this would impose limits on the complexity of products which could be made in Quebec in the early days of an expansion program. However, there is an excellent choice of engineering firms capable of working to very fine tolerances and a top-rate electronics industry capable of developing micro-electronic devices for the textile industry.

.4 Labour Skills and Climate

Canada and Quebec are well supplied with both skilled and unskilled labour although the skilled component of the labour force is ageing and probably not being replaced at a satisfactory rate.

Wage rates prevailing in Canada are high by world standards due to high-pressure bargaining tactics by the major labour unions. This is particularly true in the Province of Quebec, where wage rates are as high as anywhere in North America. From the viewpoint of a manufacturer setting up in Quebec, the existence of high wage rates represents a challenge to obtain higher productivity levels, in which case his labour cost per unit of production can be fully competitive with costs elsewhere.

.5 Financial Resources

Adequate financial resources are available for worthwhile projects from both government and private sources.

a) Federal and Provincial Governments

Among several sources of financial assistance available from government agencies are:

- Department of Regional Economic Expansion (DREE)

DREE assistance programs are intended to relieve under-employment situations in designated geographical areas, of which Quebec has a number.

- Canadian Industrial Renewal Board (CIRB)

This recently created agency of the federal government has as its objective the modernization of key Canadian industries, including the textile and apparel industries. It has a budget of \$250 million for this purpose. Some of these funds could conceivably be made available to encourage the machinery-producing sector of the industry.

- Export Development Corporation

The Corporation's credit insurance provides insurance against losses caused by non-payment of foreign buyers, thereby promoting the sale of such exports as capital equipment.

- Canadian International Development Agency

The Canadian International Development Agency (CIDA) administers Canada's international development assistance program. Canadian exports are promoted through bilateral aid, involving grants and loans tied to the purchase of Canadian goods and services.

a) Federal and Provincial Governments (cont'd)

- Société de Développement Industriel du Québec (SDI)

The mandate of the SDI is to stimulate Quebec economic development and to obtain greater participation of Quebecois by means of financial assistance. This assistance can be provided through direct loans at prevailing interest rates, loan insurance or participation in the firm's shares. Percentage rebates of interest costs are also available.

- Canadian Commercial Corporation

Each year the CCC helps firms obtain government contracts in 90 different countries. Many contracts are linked to Canadian aid projects and are financed by CIDA.

- Special Grants and Low-Interest Loans

These are occasionally made to encourage the siting in Canada of specially attractive industrial enterprises offering substantial job opportunities for Canadian labour or other major economic advantages.

b) Local Government

Special tax concessions are available from some municipalities to encourage the location of job-producing enterprises within their boundaries. Such concessions may take the form of "tax holidays" for a number of years; the actual amount of relief is subject to negotiation.

c) Private Sources

There is no shortage of private investment capital available in Canada for soundly based business ventures.

c) Private Sources (cont'd)

All of the resources required for the manufacture of textile machinery are available in Quebec, with the exception of specific experience in the design and engineering of complex mainline equipment. However, there is a viable base industry functioning in accessories and parts and this could provide a launching pad for a major step forward.

8. POSSIBILITY OF FOREIGN FIRMS ESTABLISHING IN QUEBEC

Some of the more obvious reasons for a foreign company to establish machinery manufacturing operations in Quebec are described in the previous section--namely:

- There is a well-seasoned textile industry of substantial size functioning in Canada (principally Ontario and Quebec) and importing the major portion of its requirements of machinery and accessories from overseas.
- Quebec is within easy distance of the largest assemblage of textile and textile machinery firms in the world, in North and South Carolina.
- Quebec can offer most of the resources required in the manufacture of textile machinery and equipment except for specific design experience outside its own limited range of products currently serving the textile industry.
- Substantial assistance programs, both technical and financial, are available to selected industries as a result of government objectives to create employment and improved economic conditions. Textile and apparel industries are included in this category.

These reasons go part of the way towards creating a favourable attitude on the part of the potential investor. However, there are many subjective considerations which may arise: climate, language, educational facilities, medical services and, above all, the appeal of other competing locations. Fortunately, the Province of Quebec can offer many examples of other international companies which have entered the Quebec industrial scene with successful results. This includes a good representation of «Fortune 500» companies from the U.S.A.

.1 Ways of Entering the Quebec Industrial Scene

A foreign manufacturer could enter the Quebec scene in one of several ways--namely:

- Form a wholly owned Quebec company.
- Acquire an interest in an existing Quebec corporation, either a controlling or a minority shareholder interest.
- Enter into a licencing agreement with a suitable Canadian manufacturer whereby the local manufacturer would acquire access to foreign manufacturers' designs and technical know-how in exchange for licencing fees or royalties.
- Appoint a local textile machinery distributing firm as a representative agent . . . in effect a commission sales arrangement.

.2 Advantages of the Proposed Organization

Regardless of the type of organization which is set up to enable the foreign manufacturer to enter the Quebec scene, the advantages should be:

a) To the Foreign Manufacturer

A foothold in the North American marketplace with knowledgeable local representation involving the broadest use of the original (foreign) manufacturer's name.

b) To the Quebec Firm

The input of necessary expertise at all levels: existing designs, research and development, manufacturing, marketing and after-sales service.

.2 Advantages of the Proposed Organization (cont'd)

Neither the local Canadian textile company nor the potential customer in the U.S.A. will buy from an unknown, untried supplier. It follows that any joint manufacturing venture must lean heavily on the prestige, reputation and know-how of the original machinery or accessories manufacturer. There are numerous examples in the textile machinery industry where customers insisted that their equipment should come from the parent company's plant even when a subsidiary company was capable of supplying the same product. This stresses the need for a local manufacturer to fly under the flag of a well-established partner.

In summary, it is highly possible for a foreign manufacturer to enter the Quebec scene. Care must be taken, however, in weighing all the pros and cons and the advice of local authorities, both government and private, should be sought.

9. CHOICE OF BEST MANUFACTURING OPPORTUNITIES

The terms of reference under which this study was conducted call for the determination of the three best manufacturing opportunities in Quebec for textile machinery products. In order to do this, it was necessary to identify the potential strengths and weaknesses of the Quebec manufacturing sector vis-à-vis the textile industry. This has been done and the results are presented in the previous section of the report.

It was also necessary to review the whole range of products consumed by the textile industry so that a sound selection could be made.

Appendix I to this report presents a «smörgåsbord» of mainline equipment and accessories which are used by the textile industry. The list covers several pages. In selecting the requisite three groups of products for possible manufacture in Quebec, we have been guided by the following criteria:

- Product Life-Cycle

The product should be in the early phase of its life-cycle. This means that products which are in danger of becoming obsolete within, say, the next ten years should be avoided or at least should not play a major part in the proposed product line.

- Product Know-How

The requisite product knowledge to ensure success should be available in Quebec from either existing sources in Quebec or from a business agreement with a successful foreign partner.

- Market Potential

There should be enough market potential to provide an adequate return on investment within, say, two to five years.

- Manufacturing Resources

Manufacturing resources such as foundries and machine shops capable of working to the required standards of quality and costs should be readily available in Quebec.

- Access to the U.S. Market

The product(s) proposed should have free access to the U.S. textile market--that is, they should not be barred by other existing agencies or licencing agreements or blocked by higher tariffs at the U.S. border (Canadian-made machinery may attract U.S. duties of 3.8% to 7.3% and up to 17% for accessories).

- Applicable to Other Industries

If the product(s) is/are applicable to other manufacturing industries, so much the better.

With these criteria in view, we have selected the following three groups as representing the best opportunities for manufacture in Quebec:

.1) Micro-processing Controls

Canada is off to a good start in the use of micro-processing devices, including those for the control of factory operations. These can be used simply to record production, downtime, etc., or can be integrated to provide fully automated production and inventory control, quality control and cost control.

According to a recent study by SRI International,* «The annual market value of all factory automation equipment and systems

*«Suppliers Tool-up for Change in the Factory Automation Market»
SRI International, Menlo Park, California, September 1981

.1 Micro-Processing Controls (cont'd)

in the U.S.A. is currently measured in billions of dollars and some market segments are expected to grow at rates exceeding 30% per year." The report presents strong evidence that factory automation will be one of the major market opportunities in the 1980s.

Later in the same report, the writers say: "The most important trend that can be observed is the cross-linking and inter-connection of different manufacturing functions by means of automated equipment and specially developed software that will link different functions as, for example, product design, engineering specifications, material requirements planning, scheduling, management information with such factory operations as, for example, assembly, production and finishing."

According to the Science Council of Canada in their November 1981 Statement by the Science Council Industrial Policies Committee, "These (advances in microelectronics) technologies are becoming key factors affecting manufacturing productivity and competitiveness. They lower design and manufacturing costs, and they increase production flexibility."

Further comments on this new high-technology are shown in Appendix VIII to this report.

In the case of micro-processors, Canadian general expertise in the field, combined with the specific knowledge of an overseas textile machinery manufacturer who is working also in that field, would provide a very powerful team. Another benefit of such a liaison is that the devices produced would not be limited in application to the textile industry but would be marketable across a wide spectrum of industry.

.1 Micro-Processing Controls (cont'd)

To estimate the potential market in the textile industry in Canada for production monitoring devices, we have accumulated data from several sources. One U.K. source, Dextralog, estimates that for full monitoring of all aspects of production for 100 looms, the total systems cost would amount to approximately \$110,000. (£ 45,000). For a knitting plant with 50 knitting machines, the approximate cost would be \$35,000, (£ 15,000). Quoting from Textile World, January, 1982, an article by McAllister Isaacs III, "monitoring and controlling the operation of a 400 loom weaving department costs U.S. \$115,000 - \$150,000 depending on the amount of electronics built into your weaving machines."

If one takes the average of the above figures and uses \$700 per major process machine to be monitored, the market size in Canada alone is substantial. With approximately 1,000 major pieces of equipment being purchased each year, assuming that each machine will require \$700 of production monitoring devices, yields an annual market of \$700,000. In addition, there is the upgrading of existing equipment and the potential for export sales.

.2 Materials Handling Equipment

Among steps being taken to raise the productivity of textile plants, the handling and transfer of in-process materials represent an area of major opportunity. Some leading European and U.S. textile firms have already taken steps to introduce automated or robot machinery for this purpose; however, such machines are not yet in use in Canada to any significant extent.

.2 Materials Handling Equipment (cont'd)

The technology involved in robot machines or devices--namely, micro-processor controls, pneumatic or hydraulic servo and activator mechanisms and high-precision machine work, is well understood in Canada. For instance, the transfer arm developed by SPAR Industries for use in the Columbia space shuttle program of NASA provided Canada with millions of dollars worth of publicity in this branch of industry.

This product choice for one of the three best opportunities for development in Quebec meets the requirements identified at the beginning of this section--namely:

Product Life-Cycle:	Early phase
Product Know-How:	Available
Market Potential:	Very large
Manufacturing Resources:	Available
Access to U.S. Market:	Available
Applicable to Other Industries:	Yes

One possible way of entering this field would be to act as an assembler of major parts supplied by an advanced European partner, gradually expanding the Canadian content as experience and competence were acquired locally.

Materials handling and, above all, the provision of robot devices are two of the most attractive fields for productivity improvement in all branches of industry and are not limited to textiles. Thus, the market potential is very great.

According to the Canadian Institute of Metalworking, McMaster University, in a paper entitled "A Robotics Application Study for the National Research Council," there were approximately 125 robots installed in Canadian manufacturing plants in 1980, with an estimated value of \$10 million. This brought the Canadian robot population to approximately 200.

.2 Materials Handling Equipment (cont'd)

Based on an average unit cost of \$80,000 and the fact that there are approximately 200 mills in Canada of a size likely to benefit from robotics applications, the potential in this market is at least \$16 million. Even if this were to be spread over ten years, 20 robots per year represents an annual consumption of \$1.6 million in the Canadian textile industry.

.3 Accessories and Parts

Our third choice of products to be manufactured in Quebec is high-volume accessories and parts.

The existing textile machinery industry in Canada is primarily engaged in the manufacture and assembly of accessories and parts (see list of Canadian manufacturers in Section 5). We have noted that this industry has a viable position in the economy, with export sales reaching \$18 million annually in 1980.

It has been well established in our field interview program that it is not considered feasible to plunge into the manufacture of mainline machinery at this stage because of a lack of design and engineering skills and an infra-structure producing complex components. This does not apply to those accessories and parts being produced at the present time.

Such a deficiency has already been overcome in the range of products already being produced or could readily be overcome through licencing agreements with foreign (probably West European) manufacturers.

As an example of the kind of accessories and parts which could be manufactured in volume, consider the case of drafting systems and spindles for spinning frames.

.3 Accessories and Parts (cont'd)

In spite of the increasing penetration of open-end spinning, many medium and finer counts of yarn need to be spun on ring-spinning frames. These in turn are capable of being modernized and brought close to the performance levels of new ring-frames, particularly by the replacement of drafting systems and spindles.

Many of the best-known manufacturers of these items have their own excellent sales and service companies located in the Carolinas. A strong case could probably be made for the establishment of manufacturing facilities in North America where textile market prospects remain more buoyant than in any other part of the free world.

A study should be made to determine whether spindles and other spinning-machine components could be partially or wholly manufactured in Quebec, shipped to the textile belt in the U.S.A. and delivered to the mills at competitive prices.

With 16.5 million spindles installed in U.S. mills and 560,000 short-staple spindles installed in Canada, there should be a substantial volume of replacement work available in this field alone. At a unit cost of approximately \$40 per spindle, and assuming that there are at least 250,000 spindles in Canada requiring this modification, the total market would be \$10 million. Based on a five year program, this would yield annual sales of \$2 million in Canada alone.

10. CONCLUSIONS AND RECOMMENDATIONS

As a result of the foregoing study, we have drawn conclusions and have made recommendations as follows:

.1 Conclusions

- Purchasing patterns in the Canadian textile industry involve the selection of machinery and accessories from internationally known and reputable foreign suppliers. Only a small percentage of Canadian consumption is supplied by Canadian manufacturers and is confined to simpler non-critical machinery and accessories which are often built according to the specific requirements of a customer.
- Processing machinery in the primary textile industry has been developed over many years and the current levels of advanced technology are the results of massive investments in research and development together with manufacturing skills and resources of a very high order. In all the main manufacturing locations, the principal machinery makers are supported by peripheral suppliers of specialized components who in many cases supply more than 50% of the total number of parts. It is not possible to identify any comparable manufacturing infra-structure in Canada and this in turn would prejudice any of the leading machinery makers against setting up facilities here.
- The size of the Canadian market for textile machinery and supplies could not support the manufacture of any of the "mainline" processing machinery or accessories in this country. It might be possible to interest a domestic or foreign company in establishing a manufacturing base in Canada if the products could command a profitable share of the vast U.S. market in the south-eastern states. Statistics indicate that the U.S.

.1 Conclusions (cont'd)

market for machinery and parts is many times that in Canada. Furthermore, the U.S. textile industry is buoyant and is committed to an upgrading and modernization of its textile plants.

- Canada has all of the basic resources required for a successful textile machinery operation, with the exception of specific design experience and know-how.
- Manufacturing opportunities exist for specialized products with sales potential within and outside Canada. The identification of specific products and the preparation of detailed specifications require further market and cost study. However, consideration should be given to technologically advanced products which would command a market in the textile industries but which would be applicable to the manufacturing industry generally. Canada has already established a foothold in the technologies involved.

.2 Recommendations

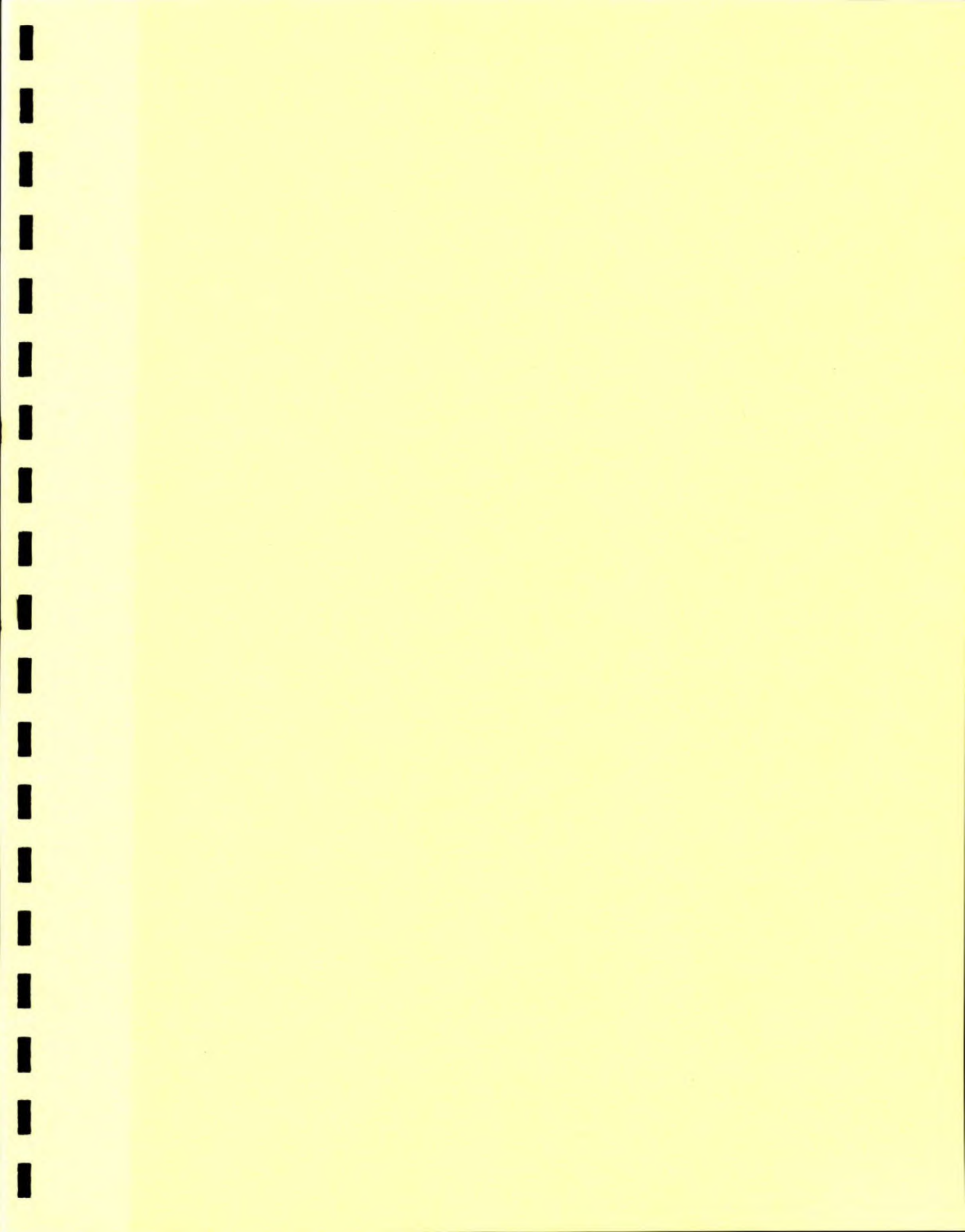
In response to the terms of reference, in which we were instructed to name three products for most favourable consideration for possible manufacture, we recommend:

- micro-processor production monitoring devices
- materials handling and robot transfer equipment
- high-volume accessories and parts such as spinning spindles conversion kits.

These three product groups offer a favourable present and future market potential and Canada has already established a foothold in the respective fields of competence.

.2 Recommendations (cont'd)

In each case, we have concluded that the best way to proceed to develop a volume operation in Quebec is through a joint-venture or licencing arrangement with a technologically advanced foreign manufacturer whose reputation is well-established in the U.S. and Canadian textile industries. We therefore recommend that a market study be made to identify specific leading manufacturers in Europe who would be interested in a joint venture with a Quebec-based manufacturer for the purpose of establishing a soundly based manufacturing activity to produce the items recommended above. As a step in that direction, we have listed in Appendices XV and XVI the principal textile machinery and accessories manufacturers in France and Italy where suitable partners might be found. Such a study would produce a short list of firms that would be interested in a business arrangement and should identify the actual product range which would be manufactured in the start-up phase of the venture.



APPENDIX I

MAJOR TEXTILE PROCESSING MACHINERY

COTTON SYSTEM (short staple)

- Preparation and spinning
- Weaving
- Processing department

SPINNING

- Blow room
 - automatic bale pluckers and blenders (including weigh pan blenders)
 - opening and cleaning
 - flock feeding
 - chute
 - lap
- Carding department
 - distribution system via chutes to cards or preparation and supply of laps to cards
 - carding machines
 - single
 - tandem
 - auto-leveller(s) on cards

DRAWING DEPARTMENT

- draw frames - with large cans for ring-spun yarns; auto-leveller
- draw frames - with small cans for rotor spun yarn

COMBING DEPARTMENT

- combing machines
- sliver lap machines or
- ribbon lap machines

(Note: The combing operation applies to fine yarns generally and particularly for knitting yarns and sewing thread.)

SPEED FRAMES for preparing roving bobbins

RING FRAMES

- may be equipped with variable speed drives, automatic doffing, noise suppression kit

ROTOR SPINNING

- may be equipped with automatic piecing and doffing; stop-start device; coning attachment; package conveyors

DOUBLING AND TWISTING

- assembly winding
- ring-twisting
- 2-for-1 twisting

WEAVING

- cone winders
- creel
- warper
- filling winder (or Unifil attached to loom)

(Note: Filling winding is not required for shuttleless weaving machines.)

SIZING

- size mixing and preparation
- sizing (slashing) machines

DRAWING-IN

- automatic warp drawing in machine
- automatic knotting machine

WEAVING DEPARTMENT

- shuttle looms with automatic bobbin change or Unifil
- weaving machines, shuttleless
 - flexible rapier - projectile - water jet
 - rigid rapier - air jet

GREY CLOTH PROCESSING

- desizing machine
- shearing and cropping machines
- singeing machines

MERCERISING AND BLEACHING

- mercerising
- washing machines
- rope bleaching ranges
- open-width bleaching ranges
- drying ranges (drying cans or hot air chambers)

YARN DYEING

- soft package winders (yarn is wound at low, even tension on to perforated or expanded metal dye tubes)
- yarn package dyeing machines
 - working at high temperature and high pressure
- high-speed yarn drying units

CLOTH DYEING

- jiggers for cloth dyed in open width at atmosphere pressure
- jiggers for batches of cloth in rope form
- continuous pad steam ranges
- continuous paddler, hot-flue and polymerizing ranges for synthetics and blends
- steamers
- drying ranges

PRINTING DEPARTMENT

- cloth-brushing machines with vacuum removal of fluff
- flat-bed screen-printing machines
- rotary screen printing machine
- print cloth dryers (an integral part of the printing machine)
- agers and steamers for substantive dyes
- polymerizer for pigment prints
- soaping ranges

FINISHING DEPARTMENT

- stenters, with chemical padder
- calenders, types for various surface finishes
- compressive shrinkage ranges (e.g., «Sanforize»)

LONG STAPLE SYSTEMS

- spinning
 - woollen system
 - worsted system
 - semi-worsted system
- weaving
- processing

WOOLLEN SYSTEM

- rag-tearing machines (recover fibre from cloth cuttings)
- garnetting machines (rework recovered fibres and open-thread waste)
- opening and blending
- hopper feeds
- storage bins
- woollen cards, with roving condenser in the headstock
- ring frames
- ring twisting and fancy yarn twistors
- package winders

PROCESSING OF WOOLLENS

- scouring machines
- crabbing machines
- milling machines (for «felting» a «fulling»)
- stenters
- decatizing machines
- hydro extractors
- brushing machines
- raising machines
- shearing machines
- rotary press

WORSTED SYSTEM

- washing ranges
- loose stock dryers

WORSTED SYSTEM (cont'd)

- worsted cards
- back washing machines
- gilling machines
- combing machines
- reducers with rubber aprons
- fly frames
- ring frames
- ring twisters
- fancy yarn twisters
- assembly winders
- package winders

SEMI-WORSTED SPINNING

A cotton-type weigh-pan hopper blender precedes a single cylinder card. After carding there are two/three passages of gilling followed by apron-draft spinning. Semi-worsted spinning is particularly relevant to carpet and other relatively thick yarns, including those used for tufted carpets.

KNITTING MACHINERY

- single cylinder circular knitting machines
- double cylinder circular knitting machines
- circular loopwheel and circular knitting machines
- fully fashioned hosiery machines for underwear and outerwear
- flat warp knitting machines
- Raschel knitting machines

ACCESSORIES (Principal)Spinning

- empty tubes of paper or plastic
- paper or plastic, spinning, twisting, winding and wooden roving bobbins
- cans with or without spring bottoms
- transport equipment (boxes, trolleys, etc.)
- metal travellers
- spinning rings
- spindle tape
- rubber aprons for drafting systems
- metallic card clothing

ACCESSORIES (Principal) - (cont'd)

Weaving

- shuttles (wood, plastic)
- pickers (leather, plastic)
- picking sticks (wood)
- leather strips and check straps
- beams
- heddles
- heddle frames
- temples
- warp stop motions
- weft stop motions
- reeds
- drop wires
- bobbins, tubes, pirns
- punched cards
- transport equipment (bobbin boxes, containers, trolleys, etc.)
- pick counters

NUMBER OF ESTABLISHMENTS IN THE U.S. TEXTILE INDUSTRY 1977

SIZE OF EMPLOYMENT

	1- 19	20- 49	50- 99	100-499	500-999	1,000 †	Total	Shipments \$ Mil.
<u>Weaving Mills:</u>								
Weaving mills cotton	122	19	9	80	55	29	314	4,431.2
Weaving & finishing mills wool	81	30	11	37	6	-	165	583.3
Weaving mills, manmade fibre & silk	98	48	39	159	78	27	449	6,325.9
Narrow fabric mills	153	57	58	64	3	-	335	682.9
<u>Yarn and Thread Mills:</u>								
Yarn mills except wool	86	28	46	257	31	8	456	3,864.9
Throwing of winding mills	48	32	40	61	14	1	196	1,510.1
Wool yarn mills	33	14	15	14	-	-	76	194.9
Thread mills	23	8	6	27	4	2	70	544.4
Felt goods except woven felts	19	6	7	13	1	-	46	197.7
Lace goods	47	15	3	8	1	-	74	45.9
Padding and upholstery filling	64	33	11	11	1	-	120	251.8
Processed textile waste	60	17	13	9	-	-	99	178.4
Coated fabrics	82	56	20	26	7	-	191	1,059.0
Tire cord and fabrics	2	-	-	11	5	2	20	1,013.2
Non-woven fabrics	26	17	14	38	5	-	100	864.4
Cordage of twine	87	37	21	24	2	-	171	332.2
Textile goods, NEC	346	60	19	11	-	-	436	231.1
<u>Knitting Mills:</u>								
Women's hosiery, except socks	81	36	19	49	12	3	200	871.2
Hosiery, NEC	158	94	62	96	4	1	415	921.3
Knit outerwear mills	402	263	126	142	10	10	953	2,335.9
Knit underwear mills	18	14	15	31	7	7	92	648.9

NUMBER OF ESTABLISHMENTS IN THE U.S. TEXTILE INDUSTRY 1977 (CONT'D)

SIZE OF EMPLOYMENT

	1- 19	20- 49	50- 99	100-499	500-999	1,000 ^A	Total	Shipments \$ Mil.*
Circular knit fabric mills	220	98	68	127	14	3	530	3,169.4
Warp knit fabric mills	82	52	34	59	7	1	235	1,407.2
Other knitting fabric mills	145	32	9	6	-	-	192	95.7
Finishing plants cotton	116	36	20	25	11	2	210	759.5
Finishing plants, synthetics	96	51	39	85	9	5	285	2,404.3
Finishing plants, NEC	71	38	37	33	4	-	183	830.6
Woven carpets and rugs	55	4	6	5	1	-	71	138.7
Tufted carpets and rugs	198	71	60	95	18	7	449	4,520.7
Carpets and rugs, NEC	54	16	3	4	-	1	78	115.2
Curtains and draperies	1,388	191	69	60	4	-	1,712	1,013.1
House furnishings	648	185	88	121	7	2	1,051	2,294.0
Textile bags	138	38	31	21	-	-	228	321.8
Canvas and related products	855	95	28	25	-	-	1,003	486.8
Pleating and stitching	573	125	52	23	7	-	780	635.0
Automotive and apparel trimmings	526	124	33	19	5	7	714	2,165.7
Schiffli machine embroideries	305	35	14	7	2	-	363	158.0
Fabricated textile products NEC	606	139	65	59	5	3	877	1,145.4

* Value of shipments including resale

Source: U.S. Department of Commerce - Census of Manufacturer

APPENDIX III

FOREIGN MANUFACTURERS
OF TEXTILE MACHINERY AND ACCESSORIES
IN THE U.S.A.

AMERICAN COMPANY

American Artos Corp.
P.O. Box 26306 3201 N 1-85
Charlotte, N.C. 28213

American Barmag Corp.
P.O. Box 7046
Charlotte, N.C. 28217
(1980 sales volume: \$33 MM)*

American Suessen Corp.
P.O. Box 7147
Charlotte, N.C. 28217

American Zinser Cor.
P.O. Box 7444
Charlotte, N.C. 28217

ARCT Inc.
P.O. Box 11381
Greensboro, N.C. 27409

Bonas Bros. Looms
300 Charles Street
Providence, R.I. 02904

Crosrol Inc.
Tower Dr., P.O. Box 1328
Greenville, S.C. 20602
(1980 sales volume: \$9 MM)

FOREIGN PARENT

Artos Dr Ing. Meier-
Windhorst KC
2105 Seevetal
3/Maschen, West Germany

Barmag
(Barmer Maschinenfabrik AG)
Leverkuserstrasse 65
P.O. 110240
5630 Armscheid 11 (D)
Lennep, West Germany

Spindelfabrik Suessen
Postfach 60
7334 Suessen/Wuertt.
West Germany

Zinser Textilmasch. GmbH
D-7333 Ebersback/Fils
West Germany

ARCT
Roanne, France

Bonas Machine Company Ltd.
Roper St. Paillion
Industrial Estates
Sunderland SR4 6SX
England

Crosrol Ltd.
Pellon Lane Works
Halifax, Yorkshire HX1 50G
England

* Source for sales statistics: "50,000 Leading U.S. Corporations",
Business Trends.

AMERICAN COMPANY

Duesberg-Bosson of America Inc.
Main Street, Box 25
Jefferson, MA 01522
(1980 sales volume: \$3 MM)

Hacoba Corp. of America
P.O. Box 240563
Charlotte, N.C. 28224

Hergeth Inc.
P.O. Box 5971
Spartanburg, S.C. 29301

Krantz America Inc.
11024 Nations Ford Road
Charlotte, N.C. 28210

Mayer American Textile Machine Co.
7102 Sherwin Road
Greensboro, N.C. 27409

Mayer Textile Machine Corp.
310 Brighton Road
Clifton, N.J. 07012

Peter Zimmer American Inc.
P.O. Box 1905
Spartanburg, S.C. 29304

Platt Saco Lowell Corp.
P.O. Box 2327
Greenville, S.C. 29602
(1980 sales volume: \$66 MM)

SACM Inc.
P.O. Box 547
Lyman, S.C. 29365

FOREIGN PARENT

Duesberg-Bosson SA
Brussels, Belgium

Hacoba Textilmasch. GmbH
& Company KG
P.O. Box 200817
56 Wuppertal - 2
West Germany

Hergeth KG
Halternerstrasse 70
D-4408 Düelm
West Germany

H. Krantz GmbH & Company
Maschinenbau
P.O. Box 830, Krantzstrasse
5100 Aachen, West Germany

Karl Mayer Textil
Maschinenfabrik GmbH
Postfach 1120, D-6053
Obertshausen, West Germany

Karl Mayer Textil
Maschinenfabrik GmbH
Postfach 1120, D-6053
Obertshausen, West Germany

Maschinenfabrik Peter Zimmer
Postfach 38, A-6330
Kufstein, Austria

Platt Saco Lowell Ltd.
P.O. Box 55
Accrington, Lancs. BB5 0RN
England

SACM de Mulhouse
P.O. Box 1210
68054 Mulhouse/Cedex
France

AMERICAN COMPANY

Scharer Textile Machine Works
450 East Edsall Blvd.
Palisades Park, N.J. 07650

Schweiter Corp.
P.O. Box 6010
Spartanburg, S.C. 20304

Stork Inter America Corp.
3001 North 1-85
Charlotte, N.C. 28213

Sulzer Bros. Inc.
Textile Machinery Division
P.O. Box 5332
Spartanburg, S.C. 29304

Textube Corp.
New Pellum Road
Box 547
Greer, S.C. 29651

FOREIGN PARENT

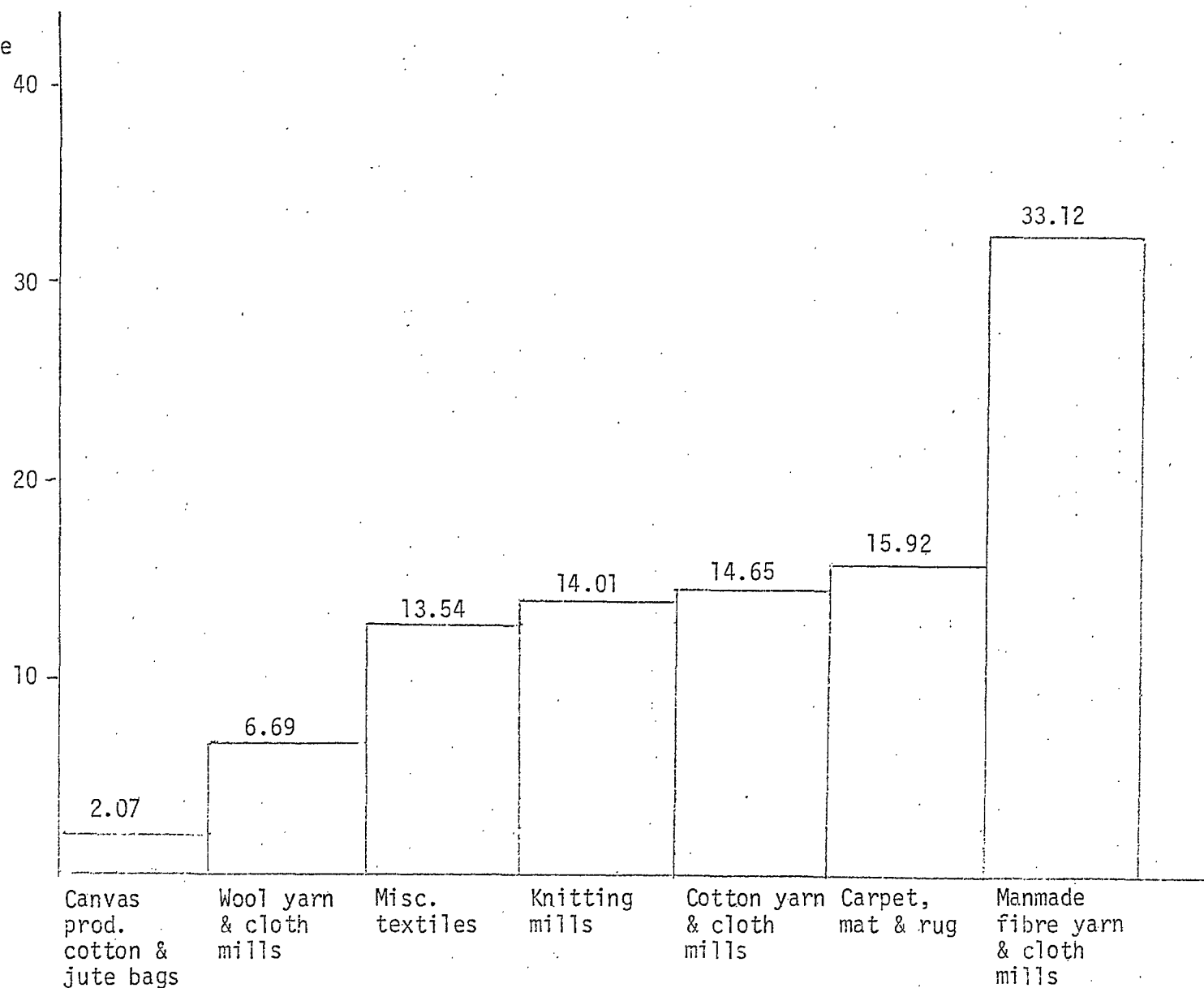
Scharer Textile Machine Works
CH-8703 Erlenlack
Zurich, Switzerland

Schweiter AG
CH-8810 Horgen 2
Zurich, Switzerland

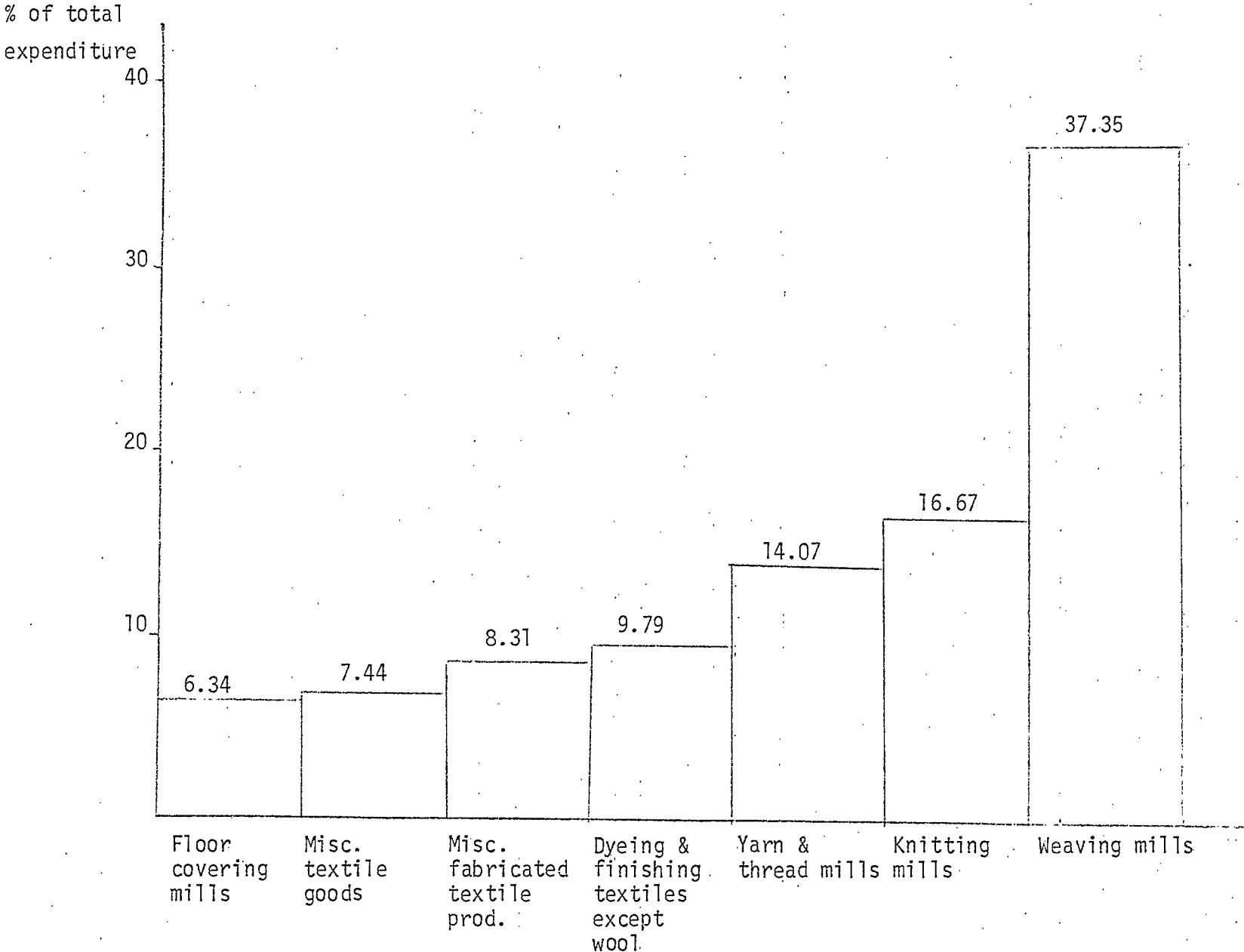
Stork AG
Baarenstrasse 112
CH-6300 Zug, Switzerland

Sulzer Bros. Ltd.
CH-8401 Winterthur
Switzerland

Emil Adolff
P.O. Box 70
Emil Adolffstrasse 14
7410 Reutlingen 1 (D)
West Germany

CAPITAL EXPENDITURES FOR NEW MACHINERY AND EQUIPMENT CANADA 1977% of total
expenditure

CAPITAL EXPENDITURES FOR NEW MACHINERY AND EQUIPMENT U.S.A. 1977



APPENDIX V
RATES OF U.S. DUTIES ON TEXTILE MACHINERY

1981-1987

Page 1 of 4

Machinery Description	Classification	Rates of Duty - Percent						
		1981	1982	1983	1984	1985	1986	1987
I Textile printing machinery	668.15	7.3	6.9	6.6	6.2	5.8	5.5	5.1
II Machinery suitable for extruding or drawing of man-made textile filament	670.00	6.4	6.1	5.9	5.6	5.3	5.0	4.7
III Machinery used to prepare natural or man-made fibres or combinations thereof for spinning, stuffing or for processing of non-woven fabric or wadding; includes spinning, twisting, doubling and other yarn processing machinery:								
a) Specially designed for vegetable fibres (except cotton)	670.02	3.8	3.7	3.6	3.4	3.3	3.2	3.1
b) Specially designed for wool	670.04	6.4	6.1	5.9	5.6	5.3	5.0	4.7
c) Other	670.06	5.6	5.3	5.1	4.9	4.7	4.4	4.2
IV Textile reeling, winding machinery, beaming, warping or slashing machinery. Other machinery to prepare yarns to be woven, knit, braided or otherwise.	670.12	6.4	6.1	5.9	5.6	5.3	5.0	4.7
V Weaving machinery, knitting machinery and other textile machinery for making lace, net, braid, embroidery, trimming or other textile articles:								
a) Weaving machinery	670.14	6.4	6.1	5.9	5.6	5.3	5.0	4.7
b) Circular knitting, hosiery	670.16	6.0	5.7	5.5	5.2	4.9	4.7	4.4
c) Circular knitting, other	670.17	5.6	5.3	5.1	4.9	4.7	4.4	4.2

Source: Department of External Affairs, U.S. Relations

APPENDIX V
RATES OF U.S. DUTIES ON TEXTILE MACHINERY

1981-1987

Page 2 of 4

Machinery Description	Classification	Rates of Duty - Percent						
		1981	1982	1983	1984	1985	1986	1987
V cont'd.								
d) Knitting machines, other than circular, full fashioned hosiery	670.18	7.3	6.9	6.6	6.2	5.8	5.5	5.1
e) Knitting machines, other than circular, flat bed knitting *	670.19	7.3	6.9	6.6	6.2	5.8	5.5	5.1
f) Knitting machines, other than circular, other **	670.20	6.4	6.1	5.9	5.6	5.3	5.0	4.7
g) Lace and net making machinery, except lace braiding; leavers (including go-through) machinery	670.22	5.6	5.3	5.1	4.9	4.7	4.4	4.2
h) Lace and net making machinery, except lace braiding; other	670.23	4.7	4.5	4.4	4.2	4.0	3.9	3.7
i) Braiding and lace machinery	670.25	6.4	6.1	5.9	5.6	5.3	5.0	4.7
j) Embroidery machinery	670.27	5.6	5.3	5.1	4.9	4.7	4.4	4.2
k) All other weaving, knitting machinery	670.29	6.0	5.9	5.5	5.2	4.9	4.7	4.4
VI Machines for making or finishing felt, non-wovens, including bonded felt, felt-hat making machinery and hat making blocks and parts thereof.								
a) Finishing machinery and parts	670.33	7.3	6.9	6.6	6.2	5.8	5.8	5.7
b) Other	670.35	6.0	5.7	5.5	5.2	4.9	4.7	4.7

Source: Department of External Affairs, U.S. Relations

* By virtue of 912.13, duties on power driven flat bed knitting machines over 20 inches in width are temporarily suspended on or before June 30, 1983

** By virtue of 912.14, duties on warp knitting machines are temporarily suspended on or before June 30, 1983

APPENDIX V

RATES OF U.S. DUTIES ON TEXTILE MACHINERY

1981-1987

Page 3 of 4

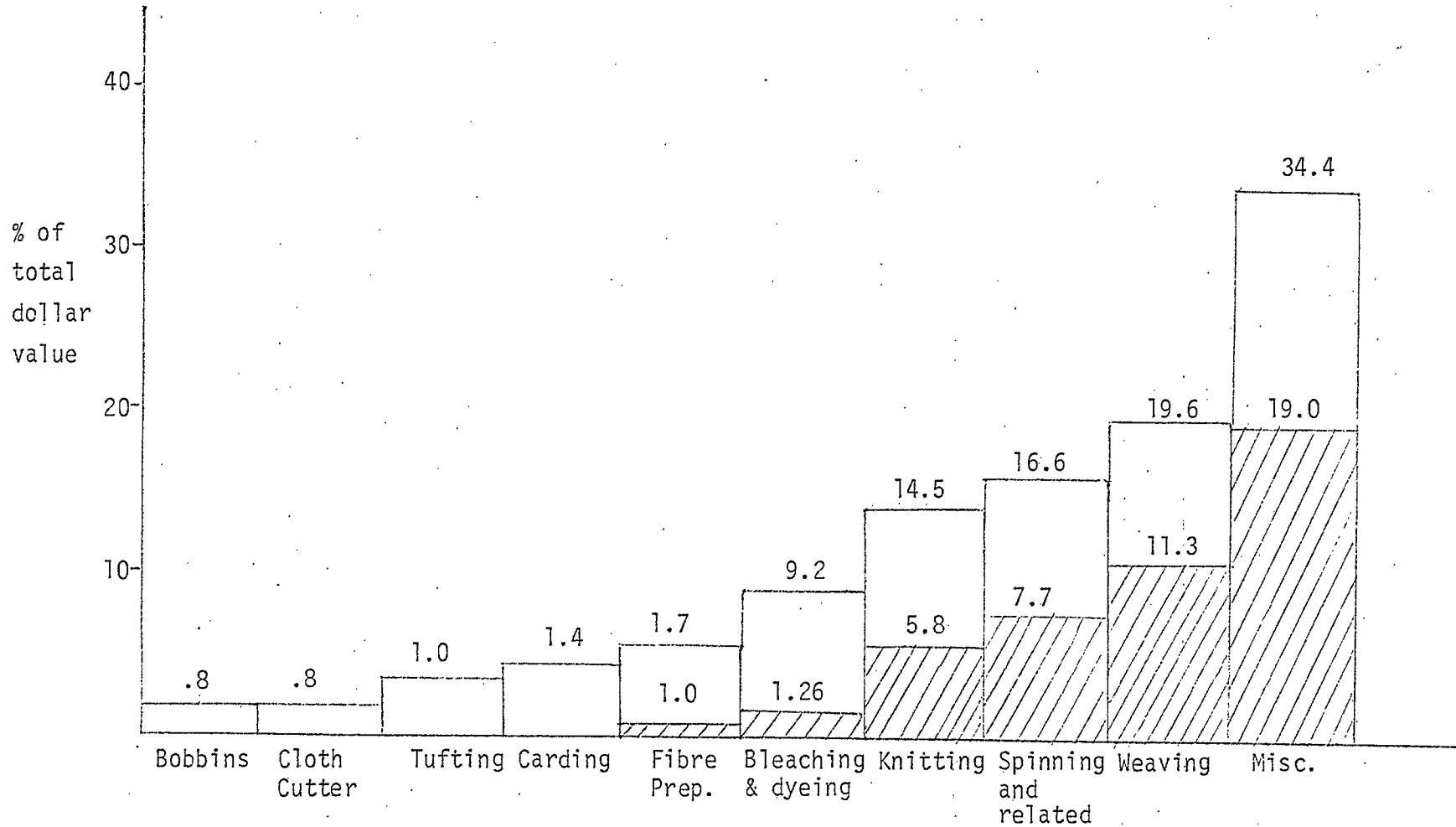
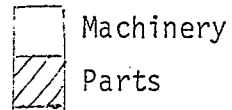
Machinery Description	Classification	Rates of Duty - Percent						
		1981	1982	1983	1984	1985	1986	1987
VII Machinery for washing, cleaning, drying, bleaching, dyeing, finishing or coating textile filaments and fabrics and parts:								
a) Washing machines, other than types used in finishing	670.40	6.0	5.4	4.9	4.4	3.9	3.3	2.8
b) Dry cleaning machinery	670.41	5.1	4.9	4.7	4.5	4.3	4.1	3.9
c) Other	670.43	7.3	6.9	6.6	6.2	5.8	5.5	5.1
VIII Fabric folding, reeling, cutting.	670.50	6.0	5.7	5.5	5.2	4.9	4.7	4.4
IX Parts of textile machinery:								
a) Card clothing not fitted or attached to carding machinery, made with round iron or untempered round steel wire	670.52	4.7	4.5	4.4	4.3	4.0	3.9	3.7
b) Card clothing, not fitted or attached, made with tempered round steel wire or plated wire or with a felt, wool or rubber face cloth containing wool	670.54	11.0	10.3	9.6	8.8	8.1	7.3	6.6
c) Jacquard cards.	670.56	12.3	11.4	10.5	9.6	8.8	7.9	7.0
d) Knitting machine needles, latch needles	670.58	15.0	14.2	13.3	12.5	11.7	10.8	10.0
		+	+	+	+	+	+	+
		\$.50/M	.41/M	.33/M	.25/M	.16/M	.08/M	.00/M
e) Knitting machine needles, spring beard	670.60	11.0	10.2	9.5	8.7	7.9	7.2	6.4
		+	+	+	+	+	+	+
		\$.32/M	.30/M	.28/M	.25/M	.23/M	.21/M	.19/M

Source: Department of External Affairs, U.S. Relations

APPENDIX V
RATES OF U.S. DUTIES ON TEXTILE MACHINERY
1981-1987

Machinery Description	Classification	Rates of duty - Percent						
		1981	1982	1983	1984	1985	1986	1987
IX cont'd.								
f) Knitting machine needles, other	670.62	17.1	15.6	14.4	12.6	11.2	9.7	8.2
		+	+	+	+	+	+	+
	\$	.48/M	.44/M	.40/M	.35/M	.31/M	.27/M	.23/M
g) Needles for embroidery machines	670.64	8.9	8.4	7.8	7.3	6.7	6.2	5.6
		+	+	+	+	+	+	+
	\$	.33/M	.31/M	.29/M	.27/M	.25/M	.23/M	.21/M
h) Shuttles for embroidery machines	670.66	10.2	9.3	8.4	7.5	6.6	5.7	4.8
i) Spinning and twisting ring travellers	670.68	15.1	13.9	12.7	11.4	10.2	9.0	7.8
j) Textile pins	670.70	9.0	8.4	7.9	7.4	6.9	6.3	5.8
k) Wire helds and heddles	670.72	10.6	9.7	8.8	7.8	6.9	5.9	5.0
		+	+	+	+	+	+	+
	\$	.08/M	.07/M	.07/M	.06/M	.05/M	.04/M	.04/M
l) Parts not specially provided for (Same rate for machines for which they are parts)	670.74							
X Cordage machinery and parts	670.90	5.6	5.3	5.1	4.9	4.7	4.4	4.2

Source: Department of External Affairs, U.S. Relations

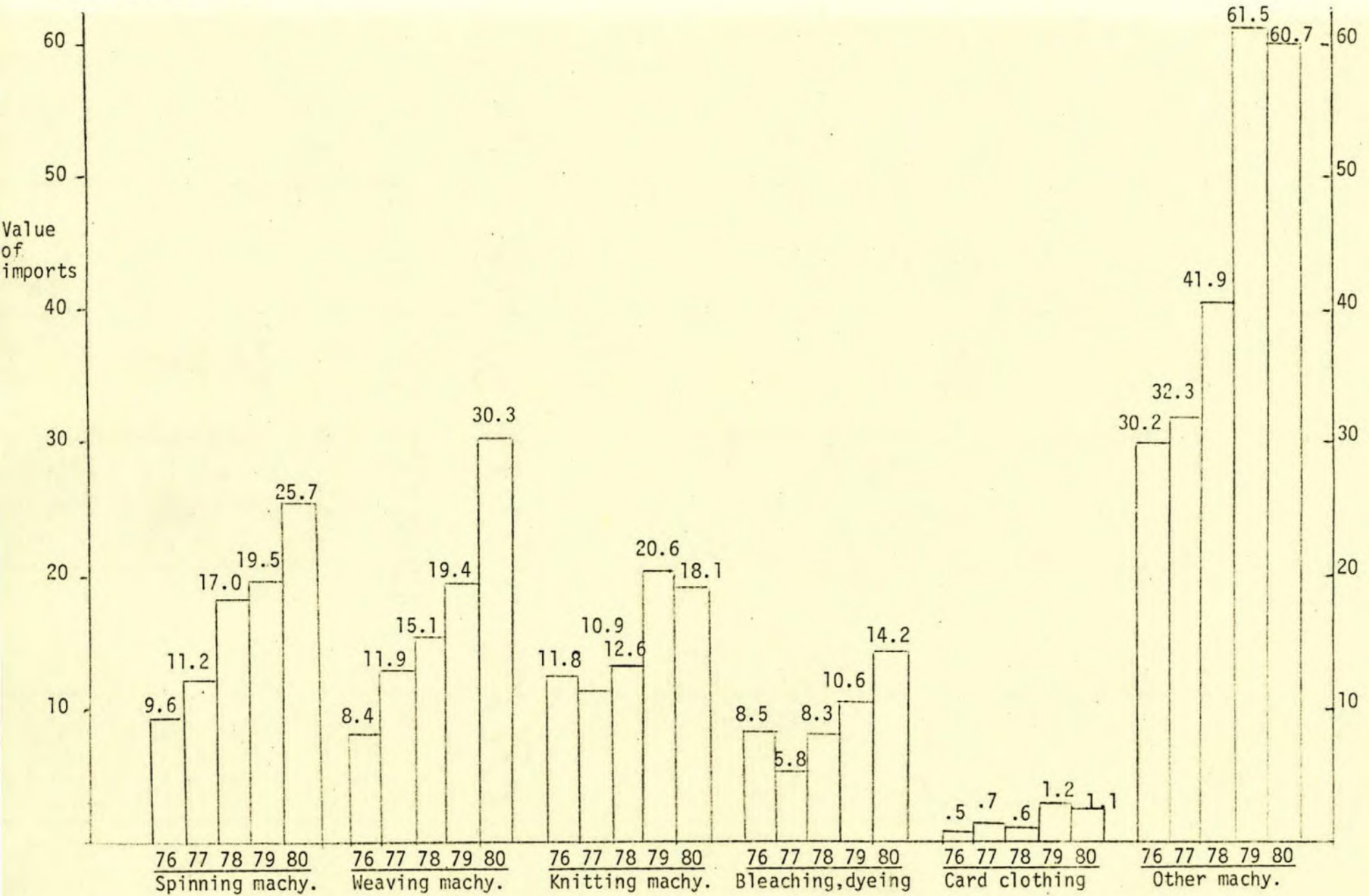


Source: Statistics Canada Catalogue 65-207

CANADIAN IMPORTS OF TEXTILE MACHINERY AND PARTS

1976 - 1980

\$ millions



U.S. TEXTILE MACHINERY MANUFACTURERS

APPENDIX VII

<u>Company</u>	<u>1980 Sales (\$ MM)</u>	<u>Manufacturing Activity</u>
A.B. Carter	NA	Spinning travellers, accessories
* Abington Inc.	3	Mill waste vacuum systems
Adams Inc.	NA	Production monitoring system for yarn
* Aldrich Machine Works	5	cotton system pickers
American Monorail	NA	Overhead cleaning, material transport
* Armstrong World Industries Ltd.	4	Drafting rollers, accessories
* Ashworth Bros. Inc.	13	Card clothing
* Automatic Materials Handling	NA	Materials handling systems, blending machinery
B.F. Perkins	NA	Water extraction system
* Barber - Colman Co.	131	Spooling and warp preparation
Belmont Textile Machinery Co. Inc.	NA	Carpet yarn equipment: Skein winders and large package winders, twisters
Birch Bros., Southern Export Inc.	NA	Web winding equipment
* Crompton & Knowles Corp.	194	Looms, fibre preparatory systems, card chute feeds, finishing ranges
* Collins Bros. Machine Co.	NA	Heavy-duty twisters for carpet yarns to paper and tire cord
Curtis & Marble Corp.	4	Shearing machinery for carpets
* David Gessner Co.	NA	Specialists in surface-effects technology: shearing, napping, sanding machinery
* Davis & Furber Machine Co.	NA	Spinning spindles and parts. Preparatory equipment for woolen, worsted, modified worsted, high-pile knitting and non- wovens. Fibre blending lines and multi-purpose cards
* Dayco Corp.	577	Drafting rollers, accessories
* Fiber Controls Corp.	NA	Blending and blow room machinery
Foster Needle Co. Inc.	NA	Felting needles for non-wovens

* Major suppliers of textile machinery

Source for sales statistics: "50,000 Leading U.S. Corporations", Business Trends

NA: Not available

<u>Company</u>	<u>1980 Sales (\$ MM)</u>	<u>Manufacturing Activity</u>
* Gaston County Dyeing Machine Co.	22	Dyeing and finishing machinery
Gilbos of America Inc.	NA	Winders
* Greenville Machinery Corp.	NA	Opening equipment
Greentex	NA	Twist-setting and yarn-bulking machinery
* The Guider Specialty Co.	NA	Cloth guiders
Gunter & Code Inc.	NA	Cards
H.H. Arnold	NA	Beam and ball warpers, thread-covering machines
* Hayes-Albion	200	Beams and knitting machinery accessories
Heany Industries Inc.	NA	Industrial ceramics
* John D. Hollingsworth	NA	Card clothing
Intech Corp.	3	Hosiery boarding machines
Ira L. Griffin & Sons	NA	Slashing, size-cooking and preparation equipment
Jenkins Metal Corp.	6	Air filtration and dust-removal equipment
* Leesona Corp.	103	Loom winders
Marshall and Williams Co.	6	Accessories
* Morrison Textile Machinery Co.	6	Dyeing and finishing machinery
Morton Machine Works	NA	Beam dyeing and drying equipment
* Mount Hope Machinery Co.	11	Fabric monitoring equipment
Patton Products	6	Assembly winders (doublers) and non- automatic winders
Joel F. Perkins Inc.	NA	Finishing machinery, accessories
Plastic Injectors Inc.	NA	Disposable plastic dye springs
* Platt Saco Lowell**	66	Spinning spindles and parts
Penumafil Corp.	NA	Dust-removal and air filtration equipment
Qualitex	NA	Tensioning devices for carpet equipment
* Rando Machine Corp.	NA	Non-woven equipment: fibre web processing
* Rockwell-Draper	NA	Looms
* B.S. Roy	NA	Grinders for cards

** John D. Hollingsworth has recently placed a bid to buy Platt Saco Lowell which is currently of British ownership

<u>Company</u>	<u>1980 Sales (\$ MM)</u>	<u>Manufacturing Activity</u>
Servtex Corp.	NA	Accessories
* Silk City	NA	Inspection equipment
* Sonoco Ltd.	270	Paper tubes for spinning
Speizman Industries Inc.	NA	Hosiery knitting machines for men's and children's hosiery
* Steel Heddle Mfg. Co.	43	Shuttles, heddles
Tandematic	NA	Guiding decurling, wrinkle-removing equipment
* Terrell Machine Co.	5	Loom bobbin cleaning equipment, winders
Veeder-Root	NA	Counting equipment
* The Warner & Swasey Co.	264	Fibre processing machinery for long staple and middle staple fibres
* West Point Foundry and Machine Co.	NA	Slashers and finishing machinery
* Whitin Roberts Co.	NA	Drawing frame
* Whitinsville Spinning Ring Co.	NA	Spinning rings
* Wildman Jacquard	NA	Knitting machinery

APPENDIX VIII

THE EXPANDING MARKET FOR MICRO-PROCESSORS

In the opinion of some textile manufacturers, European textile machinery and accessories manufacturers are far more advanced than their U.S. counterparts, particularly in the use of micro-electronic equipment for monitoring production.

Some textile equipment manufacturers are already making use of micro-electronics--for example:

- Sulzer, whose looms are built so that they can be electronically monitored;
- Rockwell-Draper is using micro-electronic devices in their looms as sensing devices which can switch off the machines if there are problems;
- Marv Loom, produced in France, utilizes micro-electronic devices to register all stoppages of the machines, which are then analysed to reduce downtime;
- Applied Colour Systems manufactures colour control systems, dispenser controls and batch ticket inventory control systems;
- Gaston County Dye Machines, produced in South Carolina, has developed a computerized dye-processing machine;
- Electro-Knit is manufacturing a knitting machine which is run by magnetic tape;
- IBM has designed a computer colour-match system which stores dye formulas and controls dye quantities used;
- Reliance Electric produces a computer to control the colour-matching dyeing process;

- Keiltronix manufactures micro-processor controls for dyeing equipment.

Some Swiss-made knitting machines use micro-processors to control patterns during the knitting process.

Computer controls are being used for production and inventory control in the production of fibreglass and also in the manufacture of non-wovens.

There are plans at one of the leading felt manufacturers to use micro-processors to control non-woven fibres by monitoring equipment to speed or slow down the motors and through the use of automatic weighing systems to achieve better quality control.

The major reasons for the introduction of micro-processors by this company are:

- to have a technically superior product
- to achieve labour savings
- to increase efficiency and to obtain higher levels of production
- to achieve uniformity of quality.

In this case, no jobs will be lost as a result of the introduction of micro-electronics.

In more advanced textile plants in North America, micro-electronic equipment is being introduced with varied applications to spinning, weaving, dyeing and finishing. The application of this technology to the dyehouse has resulted in very significant labour savings and in a general speed-up of the dyeing process.

In the production of carpets, computers are used to control the printing process (for example, the PDP-II computer by Digital is used for pattern designing).

In weaving, Computral, Dextralog and other monitoring systems are used on looms to register stoppages of the machines and to accumulate machine data, including the pick-count:

- in spinning, electronic devices are used to control the uniformity of yarn produced;
- in knitting, micro-electronic equipment is used more and more, mostly to control patterns;
- in fabric finishing and inspection, micro-processors are used to grade fabrics accurately and Acu Ray systems control shrinkage of the fabric;
- in dyehouses, computers are used for consistent colour control, uniformity of style and colour, elimination of defects and increased production efficiency (they control the temperature, timing, water levels, etc., and will also signal any mechanical problems);
- finishing frames have monitors to control speed and stretching;
- robots are already used in materials handling.

It is the opinion of leading textile manufacturers that the industry will, in the next few years, increase its use of micro-electronic equipment and that the continued use of micro-electronics will provide promising opportunities for market expansion for Canadian textile machinery manufacturers.

In our opinion, there are opportunities for a leading manufacturer of production monitoring devices (probably from Europe) to establish his operation in Canada with the possibility of serving not only the textile industry in this country, but also the textile industry in the U.S.A. In addition, since most of these production monitoring devices have applications to other industries, such a manufacturer will have the opportunity to serve other industrial sectors in both Canada and the U.S.A.

APPENDIX IX

LEADING MANUFACTURERS OF RING SPINNING FRAMES

Platt Saco Lowell	U.K., U.S.A., Spain
Rieter	Switzerland
Ingolstadt	West Germany
Zinser	West Germany
Sacm	France
Heberlein/Hispano	Switzerland
Cognetex	Italy
Carniti	Italy
Comelor	France
Nuova San Giorgio	Italy
Marzoli	Italy
Edera	Italy
Howa	Japan
Totoda	Japan
OMM	Japan
OKK	Japan
Ishikawa	Japan
Lakshmi	India
Texmaco	India
NMM	India
Whitin	U.S.A.
Howa do Brazil	Brazil
Fasa-Zinser	Brazil
Investa	Czechoslovakia
Schubert-Salzer	West Germany
James Mackie	Northern Ireland
Schlumberger	France

APPENDIX X

LEADING MANUFACTURERS OF LOOMS

Picanol	Czechoslovakia
Ruti	Switzerland
Sulzer	Switzerland
Saurer	Switzerland
Saurer-Diedrichs	France
Sacm	France
Dornier	West Germany
Güsken	West Germany
Howa	Japan
Nissan	Japan
Toyoda	Japan
Tsudakoma	Japan
Investa (Kovo)	Czechoslovakia
Somet	Italy
Crompton & Knowles	U.S.A.
Rockwell-Draper	U.S.A.
Wilson & Longbottom	U.K.

APPENDIX XI

LEADING MANUFACTURERS OF KNITTING MACHINES

Bentley	U.K.
Camber	U.K.
Dubied	Switzerland
Elitex-Investa	Czechoslovakia
Monarch	U.K.
Monk	U.K.
Fouquet	West Germany
Sulzer Morat	Switzerland
Terrot	West Germany
Wildman Jacquard	U.S.A.
Jumberca	Spain
Lebocey	France
Mayer	West Germany
Orizio	Italy
Liba	West Germany
Scholl	Switzerland

APPENDIX XII

LEADING MANUFACTURERS OF ACCESSORIES FOR TEXTILE MACHINES

1. Spinning Spindles and Parts

Barmag	West Germany
Davis and Furber	U.S.A.
Eadie	U.K.
FAG	West Germany
Edera	Italy
Heberlein	Switzerland
Maier-Flügel	West Germany
Novibra	West Germany
Platt Saco Lowell	U.K., U.S.A., Spain
Rieter	Switzerland
Sacotex	Spain
Sant'Andrea Novara	Italy
Scragg	U.K.
SKF	West Germany
SMM	Switzerland
Spintex	West Germany
Star Group	India
Suessen	West Germany
Zinser	West Germany

2. Tubes for Spinning, Doubling

Adolff	West Germany, U.S.A.
Italtubetto	Italy
Scaglia	Italy
Sonoco	U.S.A.
T.P.T.	The Netherlands
Wolters	West Germany
Zimmermann	West Germany

3. Drafting Rollers

Armstrong	U.S.A.
Dayco	U.S.A.
Dienes Honeywell	West Germany
Edera	Italy
Rieter	Switzerland
SKF	West Germany
SMT	Italy
Star Group	India
Suessen	West Germany
Zinser	West Germany

4. Sliver Cans

Alvi	Italy
Gmöhling	West Germany
Nagler	West Germany
WCB	U.K.

5. Loom Accessories

Alvacolor	West Germany
Bräcker	Switzerland
Dratex	West Germany
Eltex	Denmark
Egelhaaf	West Germany
Frohlich	Switzerland
Grob	Switzerland
Honegger	West Germany
Hardaeve	U.K.
Italtex	Italy
Leuze - Electronic	West Germany
Luptor	U.K.

5. Loom Accessories (cont'd)

Meiners	U.K.
Permal	France
Roj	Italy
Schmeing	West Germany
Schwede	West Germany
Siek	West Germany
Steel Heddle	U.S.A.

6. Counters

Baer	Switzerland
Barco	Belgium
Hengstler	West Germany
Ivo-Zähler	West Germany
Schmidt	West Germany
TDS Dextra-log	U.K.
Trumeter	U.K.
Zivy	Switzerland
Veeder Root	U.K.

APPENDIX XIII

LEADING MANUFACTURERS OF DYEING MACHINES

Durand	France
Barriquand	France
Industrie-Amdes-Ameliorair	France
ASISA	Spain
BIT	Spain
Bellini	Italy
Brazzoli	Italy
ILMA	Italy
Mezzera	Italy
Benz	Switzerland
Brückner-Apparatebau	West Germany
Dreher	West Germany
Krantz	West Germany
Obermaier	West Germany
Pegg	U.K.
Morrison	U.S.A.
Henriksen	Denmark
ATYC	Spain

APPENDIX XIV

LEADING MANUFACTURERS OF SHORT STAPLE
BLENDING AND BLOW ROOM MACHINERY

*Automatic Material Handling Inc.	U.S.A.
Fiber Controls	U.S.A.
Hergeth	West Germany
Marzoli	Italy
Platt Saco Lowell	U.K., U.S.A.
Rieter	Switzerland
SACM	France
Schubert and Salzer	West Germany
Temafa	West Germany
Trutzschler	West Germany

*Wholly owned subsidiary of Steel Heddle Inc. of Greenville, S.C., which also owns Steel Heddle Manufacturing Company of Granby, Que.

APPENDIX XV

MANUFACTURERS - FRANCE

<u>Name</u>	<u>Products</u>
ARCT - Ateliers Roannais de constructions Rue Cuvier 42300 Roanne	Synthetic filament and staple processing machinery
BARRIQUAND FRERES 9a, rue Saint-Claude 42300 Roanne	Drying, dyeing and finishing machinery; dust control equipment; air conditioning and humidifying
BRACKER-FRANCE SA 132, rue Clémenceau Wintzenheim 68000 Colmar	Spinning rings and travellers
DOMISSE MACHINES TEXTILES Boîte postale 6 80800 Corbie	Stenters; heat-setting machines; steamers; decatizers, calenders; presses; knit-goods finishing machines; compressive shrinkers; polymerisers; coating machines, cloth inspection and rolling machines
LEMAIRE ET CIE 40, rue Boucher de Perthes 59100 Roubaix	Heat-setting machines; steamers; presses; roller printing machine; knit goods finishing machines
LAROCHE-COURS Constructions mécaniques Laroche SA B.P. 21 69470 Cours la Ville	Machinery for woollen and worsted prepa- ration; cotton bale breakers; blowroom; blending hoppers; needlelooms; non-woven machinery; dust extraction and filtration equipment
BENE MADINOX Chemin de la Pierre Blanche 69800 Saint-Priest MiPlaine	Suction extractors; skein and full-width washers; desizing and dyeing machines
MAB MANUFACTURE ALSACIENNE: DE BROCHES 20, rue de la Marne 68360 Soultz	Worsted flyer frames; ring spinning frames; cotton cards and ring frames; bast fibre ring frames; spindles, parts, drafting rollers; spinning rings
ROUSSELET SA Rue Montalivet, B.P. 129 07104 Annonay	Suction and hydro extractors, carbonising machines

SACM DE MULHOUSE
1, rue de la Fonderie
68054 Mulhouse/Cedex

Woollen cards, draw frames and combers; worsted flyer frames; cotton cards, draw frames; filament draw twisters; worsted and cotton ring frames, doublers and twisters; cone, cheese and balling winders; agers; steamers, bleaching machines and continuous bleaching ranges; screen and roller printers; presses; spindles and parts; drafting rollers

N. SCHLUMBERGER ET CIE
170, rue de la République
68500 Guebwiller

Woollen draw frames and combers; worsted flyer frames and ring spinning frames; bast fibre spinning machinery

SUPERBA SA
13, rue de Pfastatt
68060 Mulhouse/Cedex

Cone, cheese and balling winders; heat setting machines; dryers; agers and steaming machines; continuous dyeing machinery

VERDOL SA
2-12, av. Barthélémy
Thimonnier, Postfach 159
69643 Caluire & Cuire

Twisting machines; jacquards, card punching machines

AIR INDUSTRIE-AMDES-AMELIORAIR
Faubourg des Vosages
B.P. 8
68800 Thann, Haut Rhin

Non-woven machinery; sizing machines; suction extractors; stenters; heat-setting machines; dryers, damping machines; full-width washing machines, bleaching machines; padding machines, continuous dyeing machinery; boarding machines; polymerisers; padders, coating machines; printing and mercerising machines; cloth expanders; dust extraction and air conditioning machinery

J. NANTERME ET FILS
7, rue Janin
69004 Lyons

Ribbon looms (shuttle); shuttle looms (silk, rayon, elastic fabrics); shearing machines; inspecting and making-up machinery; selvedge printing machines; shuttle embroidery machines

ETABLISSEMENTS PERMALI
8, rue A. Fruchard
54320 Maxeville

Weaving and warping accessories

APPENDIX XVI

MANUFACTURERS - ITALY

<u>Name</u>	<u>Products</u>
AIGLE S.R.L. Via Canova N.I. 10071 Borgaro Torinese	Staple cutting machines, dryers, conveyors, printing machines; cloth brushing machines; polymerisers, coating and flock printing machines; chenille machines
ARIOLI & CIE, S.R.L. Via Clerici 2 21040 Gerenzano (VA)	Suction extractors, stenters, heat-setting machines; felt calenders, suction drum dryers, agers, full-width washing machine polymerisers, padders
NAT S.A.S. DI A. BERTOLDI & CIE Via E. Fermi 1 25025 Manerbio (BS)	Wool and skein washing machines; full width washing machines; fulling machines
BOBBIO BENEDETTO Via Giotto 8 22069 Rovellesca Como (I)	Jacquards; jacquard punching machines; selvedge name machines
OFFICINE MECCANICHE DI BORGOS- ESIA DI FROSINNA & CIE Via Vittorio Veneto 17 13011 Borgosesia	Spinning rings
COGNETEX S.P.A. Via Selice 94 40026 Imola (BO)	Gill boxes for wool; false twist machines; worsted ring spinning frames; ring doubling and twisting frames
COLLI OFF. MECC. Via Campana 65 27024 Cilavegna/Pavia	Knitting machines; trimming machinery; crochet machinery; lace machinery
DONINI INTERNATIONAL S.P.A. Via Castel Bolognese 1 40128 Bologna	Hydro extractors; presses; finishing machinery for knit goods
OFFICINE GAUDINO S.A.S. DI P. GAUDINO Via Marconi 18 13041 Cossalo	Woollen and worsted ring frames
DAVIDE GIUDICI & FIGLI SNC Piazza Chiesa 22040 Sala al Barro	False twist and filament texturising machinery

GUALCHIERANI & CIE, S.P.A.
Via F. Illi Cervi
50010 Capalle (Firenze)

Cotton baling presses; packing machines

LEZZENI MARIO S.P.A.
Via Alciato 17
22100 Como (I)

Ring doubling machines; flyer doubling machines

ROJ ELECTROTEX S.P.A.
Via Vercellone 11
13051 Biella (VC)

Loom automatisa-tion parts, textile testing equipment

ROLANDO MACCHINE TESSILE
C.P. 392
13051 Biella (I)

Preparatory machinery for worsted and woollen spinning systems; wadding, felting and hat-making machinery; non-woven machinery, staple fibre cutting machines; carbonising machines

OFFICINE SAVIO S.P.A.
Via Udine 105
33170 Pordenone

Automatic winding machinery; twisting machinery; doubler winders; yarn singeing machines

M. SCAGLIA S.P.A.
C 50 San Gottardo 42
20136 Milano

Spinning tubes, bobbins, cones, pirns; dye tubes and cones

SOLIS S.R.L.
Via Cassia 65
50029 Tavarhuzze
Firenze

Sinkers and other accessories for knitting machines

SOMET
Somet Società Meccanica
Tessile S.P.A.
Provinciale Valseriana Km 23
24029 Colzate (Bergamo)

Shuttleless looms with gripper

SPA ANGELO E MARIO F. LLI
BETTINI
Corsa Carlo Alberto 120
22053 Lecco (I)

Spindles and parts; miscellaneous parts for spinning and weaving machines; thread guides

COMERSIO ERCOLE S.P.A.
Via S. Pellico 3
21052 Buseo Arsizio

Hosiery machines; roller squeezer, stentering machines, heat-setting machines; drying machines, felt calenders, agers and steamers, cloth singeing machines, skein washers, crabbing and desizing machines; bleachers, roller printers; presses, polymerisers; padding and coating machines; mercerisers, bobbin-net machines

MEZZERA S.P.A.
Via Frigia 19
20126 Milano

Hat-making machines; yarn and skein-washing machines; desizing machines; bleachers; dyeing machinery, padding mangles; dye jiggers

TECNOECCAVICA LOMBARDA S.P.A.
Via Bruno Buozzi 4
22067 Missaglia
Como

Cone and cheese winders; sewing thread winders; doubling winders

FRATELLI MARZOLI & C.S.P.A.
Corso Matteotti 11
20121 Milano

Blow room and blending machinery; sliver lap machines; cotton cards, draw frames combing machines; ring spinning, doubling and twisting machines; filament draw twisters and take-up machines

FRATELLI BOLELLI DI ALSO BOLELLI
& C.S.N.C.
Via Melozzo da Forlì 46/a
Bologna

Preparation and ring spinning frames for bast fibres; flyer spinning, doubling and twisting frames; cordage and rope-making machinery; winding machinery, waxing machines; braiding machines, spindles and parts, spinning rings; drafting rollers

OFFICINE MINNETTI DI ORNELLA
RAVEGGI & CIE SA
51018 Pieve A. Nievole
Via Colonna 2
51018 Pieve A
Nievole (PT)

Roller squeezers; suction and hydro extractors; stenters; heat-setting and cylinder drying machines; tunnel, package and drum dryers; centrifugal dyeing machines; air conditioning and humidifying machinery

OMLI S.A.S.
Officina Meccanica Lavorazioni
Inossidabili
Via Rovella
13068 Vallemosso Vercelli

Agers, steamers, bleaching machines; crabbing machines; dyeing machinery

OFFICINE MECCANICHE MENEGATTO
S.P.A.
Via Ercolano 2
20052 Monza (MI)

Warping machines and creels; shuttleless ribbon looms; folding, rolling and measuring machines

OCTIR S.P.A.
Strada Campagné 16
C.P. 361
13051 Biella (I)

Woollen carding machines; back washing machines; wadding and felting machinery; non-woven fabric machinery; woollen ring spinning frames; card mounting and grinding machines; cylinder and section drum drying machines

MICHELE RATTI S.P.A.
Via Fornara 5
21016 Luino, Varese

Texturing machines; doubling and twisting machines; cone and cheese winders; doubler winders; reeling machines; covering machines

NUOVO SAN GIORGIO S.P.A.
Via Luciano Manara 2
16154 Genova-Sestri (I)

Flyer frames for worsted yarn; cotton draw frames; cotton cards; ring and rotor spinning frames

OMEZ S.P.A.
Via Carnovali 88
24100 Bergamo

Roller squeezers; suction extractors; agers; steamers; skein and full-width washing machines; desizing machines; bleaching and dyeing machines; polymeriser and padder

POZZI LEOPOLDI S.P.A.
Costruzione Meccaniche
20040 Agliate
Milano

Squeezers; extractors; dryers; agers, steamers; carbonising machines; bleaching and dyeing machines; padding and coating machines; mercerisers; dyeing spindles and beams

SANATA LUCIA SAS
OFFICINE MECCANICHE DI
ARONNI & PIATELLI
Via S. Allucioe Molinaccio
51010 Uzzano, Pistoia

Extractors, stentering machines; heat-setting and drying machines; agers, steamers; polymerisers; coating machines, inspection and making-up machinery

SANT ANDREA NOVARA
Officine Meccaniche E.
Fonderie S.P.A.
Via Leonardi da Vinci 18
28100 Novara

Draw frames for wool, combers for wool; flyer frames for worsted yarn; synthetic take-up machines; draw twisters; ring spinning frames for cotton system; spindles and parts; drafting rollers

APPENDIX XVII

Explanatory Notes on Canadian Export Statistics

During the course of this study, it was revealed that there were certain inconsistencies in the Statistics Canada data for shipments and exports of textile machinery and parts. Shipments data, obtained from Statistics Canada Catalogue No. 42-214, are as follows:

<u>Year</u>	<u>Value of Shipments</u>
1976	\$22,965,000
1977	19,188,000
1978	19,148,000
1979	17,547,000

During these same years, the value of domestic exports of textile machinery and parts, obtained from Statistics Canada Catalogue No. 65-007, is as follows:

<u>Year</u>	<u>Domestic Exports</u>
1976	\$17,213,000
1977	21,415,000
1978	27,827,000
1979	24,552,000

Since the export value consistently exceeds Canadian shipments, the value of U.S. imports of textile machinery and parts from Canada was analysed. Substantial differences appear between the Canadian export figures and the U.S. import results. As a result of this analysis, we have chosen to adjust the Canadian export value using U.S. import statistics. The following table demonstrates the methodology and the revised export results.

APPENDIX XVII (cont'd)

	<u>Statistics Canada</u>		<u>U.S.</u>	
	<u>Total</u>	<u>Exports</u>	<u>Imports</u>	<u>Adjusted</u>
		<u>To U.S.</u>	<u>from Can.</u>	<u>Exports</u>
1976	17.213	8.958	4.192	12.447
1977	21.415	11.603	3.594	13.406
1978	27.827	17.953	5.334	15.208
1979	24.552	14.185	5.269	15.636
1980	25.989	12.779	4.782	17.992

