Industry Snapshot

Metal Finishing in Canada

Prepared for
Industry Canada
by
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Highlights

- The metal finishing industry plays an important role in the knowledge-based economy through its ability to transform basic metal parts and components to make them more suitable for advanced applications.
- Custom painting was the largest source of revenue in 1995, followed by electro-plating, galvanizing, polishing, anodizing and enameling.
- The industry's activities can be viewed as an additional stage of adding value before semi-fabricated products are exported. They can also be characterized as a key processing stage of various manufacturing clusters that produce and often export finished goods.
- The industry is subdivided into "job shops," which provide metal finishing services to other manufacturing firms, and "captive shops," which are the metal finishing operations of firms that produce metal products. Some captive shops engage in contract metal finishing for other manufacturing firms.
- Based on growth rates of shipments and productivity over the last decade and a half, it is clear that the metal finishing industry has been outperforming the aggregate economy for some time.
- Nevertheless, the level of productivity in the metal finishing industry, in spite of a favourable growth record, remains well below the average level of productivity found in the manufacturing sector.
- As larger establishments exhibit much higher productivity than small and medium-sized establishments, the shift in activity to larger, more productive establishments over the 1989-96 period provided a significant boost to the productivity of the metal finishing industry as a whole.
- The industry requires significant financing to adopt more environmentally friendly production processes, improve quality standards to levels demanded by, for example, the automotive and aerospace industries, and expand production capabilities in line with market opportunities. The higher financial surplus per employee of larger firms suggests that they are more capable of meeting these financing needs.
- Favourable factors influencing the industry's future include demand growth and competitiveness trends. Areas of concern, on the other hand, include environmental challenges, access to financing, reliance on foreign suppliers and skills shortages.

1. Introduction

The purpose of this *Industry Snapshot* is to provide an economic overview of the metal finishing industry. The strategic importance of this industry is established in Section 2. A profile of the industry is developed in Section 3 and a review of its historical performance follows in Section 4. Section 5 discusses key success factors that must be considered to ensure long-term prosperity of the industry and Section 6 reviews prospects facing the industry. An Annex containing industry data completes the report.

2. Strategic Importance

The knowledge-based economy is characterized by high-knowledge workers using science-based processes and technologies to produce new or existing goods and services in new ways to better meet the evolving needs of society.

The metal finishing industry plays an important role in the knowledge-based economy through its ability to transform basic metal parts and components to make them more suitable for advanced applications. Metal finishing is an essential service in the value-added manufacturing chain and is a critical stage in the manufacturing of automotive, aerospace and marine components, electronics, equipment, construction products and consumer goods.

The metal finishing industry contributes to productivity enhancement by providing metal coatings that improve the performance of consumer and investment goods. Productivity gains in custom coating can be passed along to client industries in the form of reduced costs or higher quality for the same cost.

The industry can also be characterized as an integral part of various manufacturing clusters that export finished goods. Porter has written that “Clusters are geographic concentrations of interconnected companies and institutions in a particular field....Because members of the cluster are mutually dependent, good performance by one can boost the success of others.”[1]

[1] Michael Porter, *Clusters and the New Economics of Competition*, Harvard Business Review, 1998.

3. Sector Profile

3.1 Nature of Work

The metal finishing industry falls under 1980 Statistics Canada's Standard Industrial Classification (SIC) 3041, "custom coating of metal products," which defines the industry as follows:

> Establishments primarily engaged in spray or dip coating metal and metal products and galvanizing and electroplating, except plating with precious metals. While these establishments typically coat metal they may also metal-coat other materials such as plastics or coat metal products with protective material such as Teflon (T.N.). Establishments primarily engaged in plating with precious metals are classified in SIC 3921 - Jewellery and Silverware Industry.

The metal finishing industry performs the following value-added activities to enhance metal products: anodizing, coating, electroplating, hot dipping (including galvanising), protective film forming, spraying and vitreous enamelling.

Revenues earned by the industry in 1995 are presented in Table 1. Custom painting was the largest source of revenue, followed by custom electroplating. Custom painting also accounted for the largest revenue per establishment among the revenue-producing activities of the industry.

Virtually all of the industry's revenue is earned domestically as imports and exports[2] of custom coating services are small. Nevertheless, international trade exerts an important indirect influence on the industry as many client industries serve foreign markets that demand products with performance characteristics, such as corrosion resistance, imparted by the coating process.

[2] Exporting would involve shipping metal parts into Canada from other countries for coating and then re-exporting the coated product back to the owner.

Table 1: Revenue by main activities, 1995			
Activity	**Revenue ($ millions)**	**Establish-ments**	**Revenue per establishment ($ millions)**
Custom painting	354.7	34	10.4
Custom electroplating	201.3	48	4.2
Custom galvanizing	59.7	13	4.6
Custom polishing	24.1	10	2.4
Custom anodizing	12.1	7	1.7
Custom enamelling	6.4	4	3.2
Other custom work	18.3	14	1.3
Small establishment not reporting detail	119.2	118	1
Source: Statistics Canada, Catalogue 41-251			

3.2 Organization of Production

There were 296 establishments involved in metal finishing in 1996. Most establishments were located in Ontario (56.7% in 1996), with Quebec accounting for the next highest share (19.3% of the total). British Columbia and Alberta accounted for 11.1% and 7.1%, respectively, and the other provinces had 5.7% of the establishments among them. In 1994, the four largest firms accounted for less than 50% of all revenues. In that sense, the metal coating industry in Canada is not very concentrated.

Within the metal finishing industry, establishments that specialize tend to be located close to their clients. For example, those that coat aerospace parts tend to be located close to aerospace manufacturing companies in the Montreal and Toronto areas. Similarly, establishments that specialize in auto parts tend to be located in the Windsor and Toronto areas.

The industry is subdivided into “job shops,” which provide metal finishing services to other manufacturing firms, and “captive shops,” which are the metal finishing operations of firms that produce metal products. Some captive shops engage in contract metal finishing for other manufacturing firms.

As a general rule, job shops serve a number of different industries. Apogee Research suggested that the average was three industries and the upper limit seven or more. Nevertheless, job shops serving industries that demand high quality standards, such as

ISO 9000 (e.g., auto parts, aerospace), tend to specialize. Captive shops, on the other hand, are integrated into the operations of their firm and are found in industries such as steel strip, plumbing fixtures and electrical appliances.

In 1994, Apogee estimated that roughly 75% of the industry was made up of job shops, up from about 40% in the early 1980s. The percentage of job shops has been rising as they increase quality standards to levels demanded by the automotive and aerospace industries and reduce costs through economies of scale. In addition, new costs associated with meeting environmental standards have caused a number of captive shops to close in favour of contracting out to job shops that have upgraded their processes to become more environmentally acceptable.

Foreign ownership has been more prevalent in captive shops than in job shops. However, in line with the decreasing share of captive shops within the industry, the degree of foreign ownership has declined over time.

3.3 Indicators of Size

In 1997, the metal finishing industry recorded shipments of $1.6 billion, $800 million of which was accounted for by value added (wages and salaries and gross profits) and the remainder by the value of metal products prior to coating (often still owned by the client industry) and other inputs such as chemicals and metals used for coatings (e.g., nickel). The industry accounted for roughly one third of a percent (0.38%) of total manufacturing shipments in 1997.

Employment within the metal finishing industry was 11 135 in 1997, with production workers accounting for 90% of the total and administrative, office and other non-manufacturing employees for the balance. The industry accounted for about one half of a percent (0.51%) of total manufacturing employment in 1997.

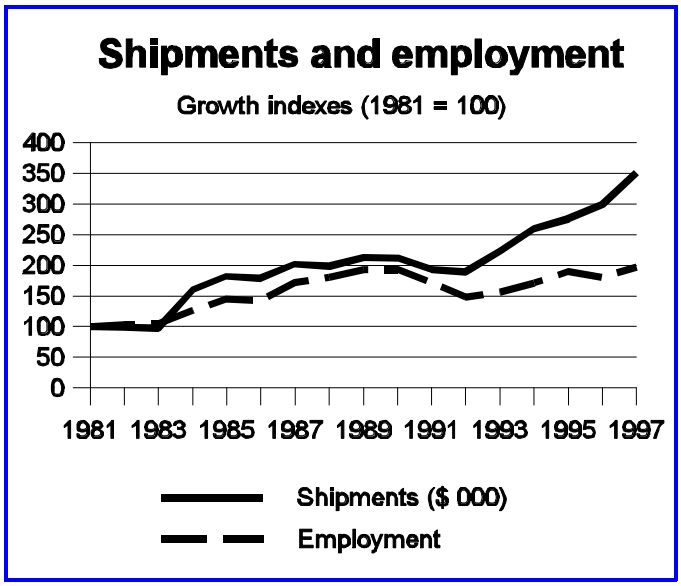
4. Historical Performance

4.1 Shipments and Employment Growth

Over the period 1981-97, real shipments[3] grew at a fast pace, posting an 8.2% per annum growth rate. Employment growth, at 4.3% over the same period, was also impressive. Based on these growth rates, it is clear that the metal finishing industry has been outperforming the aggregate economy for some time.

[3] The price deflator for the stamped, pressed and coated products industry is used to deflate shipments for the metal finishing industry because a separate deflator is not available.

Figure 1



A gap between real shipments and employment opened up during the recession years of 1991 and 1992 as employment fell substantially more than real shipments (see Figure 1). Subsequently, real shipments quickly recovered the ground lost and continued to grow rapidly. In contrast, employment was slow to recover and only in 1997 did it surpass its pre-recession peak. Thus, over the latest business cycle, on a peak-to-peak basis (1989-97), real shipments grew at 6.4% per annum, whereas employment growth virtually stagnated with only a 0.3% per annum gain. Such trends signal significant changes within the industry as the former growth rate is high compared with the aggregate economy whereas the latter is low.

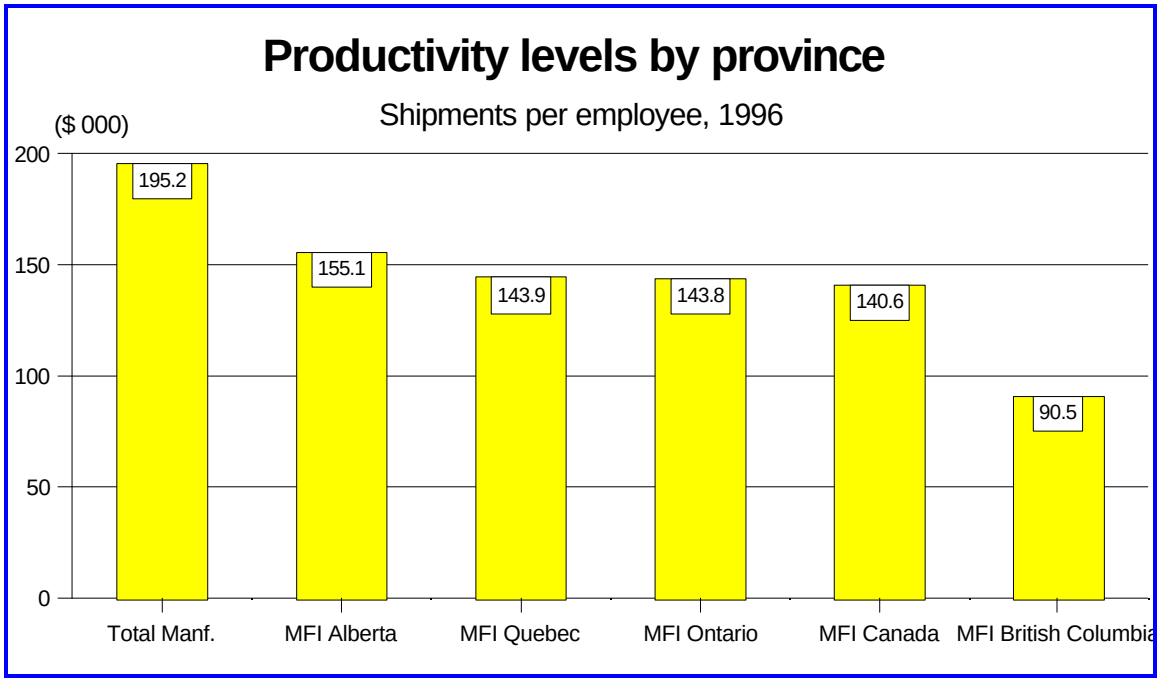
4.2 Labour Productivity

Labour productivity has grown more quickly in the metal finishing industry over the last decade and a half than in manufacturing. Measured in constant dollar shipments per employee, the average annual growth in productivity within the industry was 3.6% between 1981 and 1997. Productivity in manufacturing, on the other hand, grew by a more modest 2.5% per annum over the same period. As productivity in the metal finishing industry varies significantly with the economic cycle (see Figure 2), an additional comparison of productivity growth rates was undertaken on a peak-to-peak basis (1984-97 for the metal finishing industry and 1985-97 for manufacturing). Once again, productivity growth in the metal coating industry (2.7%) exceeded that in manufacturing (2.0%). These data suggest that custom metal coating is making a positive contribution to productivity growth and cost competitiveness of Canada's manufacturing sector.

Figure 2

At the same time, productivity in the metal finishing industry, in spite of its favourable growth record, remains well below the average productivity within the manufacturing sector (see Figure 3). Regionally, Alberta exhibits the highest productivity levels, followed by Quebec and Ontario. Productivity levels in British Columbia are significantly lower. Statistics show that in 1997, the average wage for production workers in the industry was about $30 000. This relatively low wage level reflects the fact that many workers within the industry are unskilled.

Figure 3



An important determinant of productivity levels in the metal finishing industry is size of establishment. The largest establishments have productivity levels that are more than twice those of the smallest establishments (see Table 2). Likely reasons for this difference include the economies of scale available to larger establishments (e.g., purchasing inputs in bulk at a lower cost) and the use of more advanced technologies (e.g., computer-controlled mixing and coating processes).

Table 2: Productivity levels by size of establishment, 1996

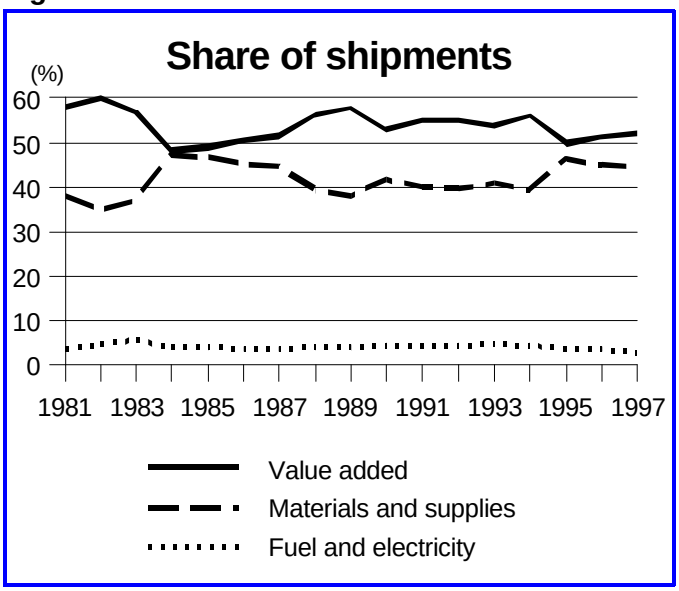
Size range (employees)	Shipments ($ 000)	Employment	Productivity (shipments per employee) ($ 000)
0-49	296 337.00	3 761	78.79
50-99	417 056.00	3 519	118.52
100-199	340 269.00	2 202	154.53
200+	373 247.00	2 093	178.33
Total	1 426 909.00	11 575	123.28

Source: Special tabulation, Manufacturing, Construction and Energy Division, Statistics Canada

4.3 Material and Energy Inputs

The input structure of the industry shows no significant trends over time (see Figure 4). Materials and supplies account for 42% of the value of shipments, on average, but fluctuate between 35 and 48% depending on the stage of the economic cycle. Fuel and electricity costs vary between 3 and 7%, averaging just over 4%. Value added averages 54% of the value of shipments, but may account for as much as 60% and as little as 48%.

Figure 4



The main input suppliers in 1996 were U.S. companies, including Atotec, MacDiarmid, OMI, Diversey and Mengel. In 1996, Canadian firms imported 61.2% of their products from the United States. The other main suppliers were France (21.5%) and China (8.1%).

4.4 Structural Adjustment

The decline in the number of establishments and subsequent rise corresponds closely to the economic cycle, suggesting that adjustments to excess capacity within the industry are met by smaller firms going out of business rather than contraction through layoffs at larger firms. The decrease in employment during the recession and slow recovery to the previous peak employment level suggest that restructuring played a major role in the metal finishing industry's productivity performance. Table 3 illustrates that the size distribution of establishments changed significantly over the period 1989 to 1996 (the latest year for which data are available).

Table 3: Number of establishments by size of establishment			
Size range (employees)	**1989**	**1996**	**Change**
0-49	248	218	-30
50-99	50	56	6
100-199	13	15	2
200+	4	6	2
Total	315	295	-20
Source: Special tabulation, Manufacturing, Construction and Energy Division, Statistics Canada			

The number of establishments in the smaller size category decreased by 30, whereas the number of establishments in the larger categories increased. Because each larger establishment has greater employment, the shift in employment to the upper end of the establishment size range was even more impressive. As larger establishments exhibit much higher productivity than small and medium-sized establishments, the shift in activity to larger, more productive establishments has provided a significant boost to the productivity of the custom coating of metal products industry as a whole.

5. Key Success Factors

The most important factors that determine the degree of success of metal finishing firms are achieving environmental goals, introducing innovations, accessing financing and meeting international competition.

5.1 Achieving Environmental Goals [4]

The metal finishing industry releases cadmium, nickel, chromium, lead and other substances into the environment. Increasingly stringent environmental regulations designed to limit the impact of these releases have had an impact on the structure and performance of the industry.

Much of the interaction between government and the industry revolves around environmental concerns. The government has funded a number of technology demonstrations/transfer projects and pollution-prevention studies. Environmental concerns

[4] This section is based on the 1994 report by Apogee Research entitled “Socio-Economic Study to Assess the Canadian Metal Finishing Industry.”

have been at least partly responsible for a reduction in cyanide and cadmium use in the United States.

Cost of Compliance

Apogee Research noted that "environmental regulations in general were considered to be a 'most important' factor influencing competitiveness and financial stability of 33% of firms responding to our questionnaire."

In Apogee's survey, two-thirds of metal finishers cited cost as the most important barrier to increasing recycling/recovery efforts (recycling systems commonly used include evaporation, ion exchange and electrolytic recovery). Other barriers cited included a lack of markets for recovered materials, space constraints within plants, a lack of technical knowledge and government regulations (e.g., pooled wastes from smaller firms must be collected by a registered hazardous waste receiver).

Apogee noted that the cost of complying with environmental regulations was a factor in discontinuing the operation of some captive shops and was a deterrent to establishing new captive shops. Part of the cost is related to the time involved in obtaining certificates of approval from environmental authorities. This process requires developing waste treatment procedures and discussing them with relevant authorities.

Site Liability

Site liability regulations vary among provinces, although the Canadian Council of Ministers of the Environment has developed national guidelines for contaminated site liability policies. Canada's Federal Metal Finishing Liquid Effluent Guidelines also provide guidance in this area.

Creditors perceive firms involved in custom coating as high risks because of their potential environmental impact and are reluctant to provide loans. Part of the concern involves potential liability of the financial institution for costly remediation of custom coating sites in the event of business failure. Another factor is that the ability of firms to service their loans declines as environmental costs assume a larger share of revenue.

5.2 Introducing Innovations

Metal finishing has traditionally been viewed as a low-technology industry. According to a limited survey conducted by Slinn and Associates in 1996, technology still does not play a particularly important role in the metal coating industry. For example, only one of the seven companies surveyed was using computers at that time.

Nevertheless, changes are occurring as higher standards for coating operations are introduced. The automotive, telecommunications and aerospace industries have been the

driving force behind the need for technical improvements. For example, automotive parts quality standards relate to corrosion resistance, adhesion, plating thicknesses and colour. To adequately meet these needs, custom metal coating firms are introducing computerized processes that can more accurately maintain the required standards. In turn, employee training is assuming increased importance.

A number of Canadian firms import all of their chemical supplies from the United States and apply them to their metal finishing operations. In many cases, American suppliers also provide technical support. As the Slinn survey points out, American suppliers provide expertise in selection and design of production equipment and processes, operating conditions, testing and quality control, and environmental precautions. Only two of the seven companies surveyed by Slinn and Associates had sufficient skilled technicians that they did not need to avail themselves of the expertise offered by American suppliers.

Research and development (R&D) is becoming increasingly important as the automotive and aerospace industries transfer part of the responsibility for technological improvements to supplier industries. Data on R&D expenditures in the metal coating industry are not readily available. However, one of the larger publicly held firms (Shaw Industries) shows R&D expenditures averaging 0.7% of sales over the 1994-98 period. Smaller firms likely spent significantly less as a proportion of sales.

5.3 Accessing Financing

The metal finishing industry requires significant financing to adopt more environmentally friendly production processes, improve quality standards to levels demanded by, for example, the automotive and aerospace industries, and expand production capabilities in line with market opportunities.

An important source of financing is retained earnings from the companies' own operations. The availability of funds from this source is dependent upon the profitability of the operation.

Table 4 suggests that profitability of establishments varies significantly based on the size of the operation. Because value added per employee is significantly higher in larger firms, there is the potential for higher profits. Although wages and salaries are also higher in larger firms, they do not fully offset productivity differentials. As a consequence, surplus earned per employee[5] in establishments with 200 or more employees ($27 780) was about 33% higher than that earned in small establishments with less than 50 employees ($18 600).

[5] Surplus, defined as operating income (revenue less operating expenses), must cover depreciation, interest expenses, R&D, income taxes and extraordinary expenses, as well as compensation for equity owners of the firm.

Table 4:
Financial capacity by size of establishment, 1996

Size range (employees)	Establishments	Value added per employee ($ 000)	Wages and salaries per employee ($ 000)	Financial surplus per employee* ($ 000)
0-49	218	46.74	28.14	18.60
50-99	56	57.44	31.36	26.08
100-199	15	64.41	31.42	32.99
200+	6	79.25	37.57	41.68
Total	295	59.23	31.45	27.78

*Financial surplus is calculated as value added per employee less wages and salaries per employee.
Source: Calculations based on data presented in Appendix Table A7.

The higher surplus per employee in larger firms suggests that these establishments are more capable of meeting costs associated with maintaining environmental standards, adopting new technologies and expanding operations in line with increasing demand. Because of their greater financial capacity to repay, they are also more likely to be successful in obtaining new loan capital. However, this advantageous position may be tempered by site liability as discussed earlier.

5.4 Meeting International Competition

Porter has noted that "Exporting clusters - those that export products or make investments to compete outside the local area - are the primary source of an area's economic growth and prosperity over the long run."[6]

As metal finishing shops represent part of the production process of various clusters they work closely with the firms that produce the final products that are exported. Industry clusters such as aerospace, automotive and information technologies are highly export oriented and require metal finishing services that meet those available to competitors in international markets. At the same time, some direct exports of metal finishing services take place. In 1996, exports totaled $8.2 million and imports were $3.9 million.

[6] Michael Porter, *Clusters and the New Economics of Competition,* Harvard Business Review, 1998.

6. Future Prospects

6.1 Favourable Factors

Demand Growth

The metal finishing industry serves diverse markets as discussed previously. A key growth area is likely to be printed circuit boards used in telecommunications equipment and computers, both of which are highly export oriented. Other markets, such as automotive parts, aerospace and construction products, are more mature. Among the more mature markets, automotive and aerospace are export oriented and are well positioned to benefit from the fast-growing U.S. economy and the low Canadian dollar. The fact that custom coatings, which improve performance characteristics (e.g., corrosion resistance), are increasing their penetration rates into mature markets is also positive for future growth. This combination of factors suggests that the industry could continue to grow somewhat faster than the aggregate economy.

One factor clouding future demand is the potentially negative affect on the metal finishing industry of recent measures taken by American authorities to end the special status formerly granted to Canadian firms bidding on U.S. defence contracts. Industry observers have estimated that about 200 Canadian companies could lose as much as $1 billion in defence contracts because Washington now requires a special export permit for every bid.

Another issue worth noting is the tendency of automakers to substitute plastics for metals in the production of vehicles. This trend moderates the demand for custom metal coatings.

Competitiveness

As noted earlier, the metal finishing industry is integral to the competitiveness of a number of Canada's export-oriented industry clusters, including telecommunications, automotive and aerospace. As such, its ability to improve productivity and meet higher quality standards is an important component of not only its own competitiveness but also that of the cluster as a whole.

The industry has been able to improve its productivity at a relatively fast rate. Shifts in production patterns have reduced the proportion of smaller establishments within the industry, leaving the higher productivity larger establishments to fill the gap. There is further potential in this trend to improve the cost effectiveness of supply.

6.2 Areas of Concern

Environmental Challenges

Meeting environmental standards continues to be a concern. The challenge is greatest for smaller firms that may not have the financial capacity to adopt the latest waste treatment technologies.

Access to Financing

As in a number of other manufacturing industries, smaller metal finishing firms have difficulty accessing financing. The difficulties associated with size are compounded if there are significant environmental risks associated with the firm's production sites. Apogee Research noted that the most financially vulnerable firms in their survey tended to serve low-quality/low-return markets.

Reliance on Foreign Suppliers

Reliance on foreign suppliers is a function of the new globalized economy. Nevertheless, the metal finishing industry pays a price during periods when the Canadian dollar is low, given that many inputs are imported from the United States.

The industry benefits from its reliance on American suppliers by availing itself of the technical expertise also provided by these suppliers. At the same time, however, this situation may contribute to low R&D effort domestically.

Skills Shortages

The industry is still viewed as labour intensive and to a large extent reliant on unskilled labour. This image may prevent young people from entering the industry, which would ultimately result in a shortage of specialized skilled labour and corresponding training programs.

Annex A: Metal Finishing Industry Data

Table A1:
Custom coating of metal products: shipments, employment and productivity

Year	Shipments (current dollars thousands)	Price index* (1992=1.0)	Shipments (constant 1992 dollars thousands)	Total employees	Productivity (constant dollar shipments per employee)
1981	351 876	0.842	417 904.99	5 636	74 149.22
1982	357 889	0.861	415 666.67	5 858	70 957.10
1983	370 906	0.914	405 805.25	5 873	69 096.76
1984	615 265	0.921	668 040.17	7 145	93 497.58
1985	686 943	0.902	761 577.61	8 181	93 091.02
1986	707 537	0.949	745 560.59	8 107	91 965.04
1987	842 054	1	842 054.00	9 697	86 836.55
1988	851 735	1.028	828 535.99	10 182	81 372.62
1989	915 861	1.026	892 652.05	10 870	82 120.70
1990	898 136	1.014	885 735.70	10 912	81 170.79
1991	821 703	1.016	808 762.80	9 647	83 835.68
1992	789 815	1	789 815.00	8 380	94 250.00
1993	922 915	0.989	933 179.98	8 868	105 230.04
1994	1 115 485	1.027	1 086 158.71	9 648	112 578.64
1995	1 305 185	1.134	1 150 956.79	10 724	107 325.33
1996	1 410 502	1.131	1 247 128.21	10 166	122 676.39
1997	1 680 036	1.147	1 464 721.88	11 135	131 542.15

Source: CANSIM Matrix 5524, June 14, 1999
*Price index for Stamped and Pressed Metal Products.

Table A2:
Custom coating of metal products: growth of shipments, employment and productivity

Year	Shipments (current dollars)	Price index* (1992=1.0)	Shipments (constant 1992 dollars)	Total employees	Productivity (constant dollar shipments per employee)
	Year-over-year growth				
1982	1.7%	2.2%	-0.5%	3.9%	-4.3%
1983	3.6%	6.2%	-2.4%	0.3%	-2.6%
1984	65.9%	0.8%	64.6%	21.7%	35.3%
1985	11.6%	2.1%	14.0%	14.5%	-0.4%
1986	3.0%	5.2%	-2.1%	-0.9%	-1.2%
1987	19.0%	5.4%	12.9%	19.6%	-5.6%
1988	1.1%	2.8%	-1.6%	5.0%	-6.3%
1989	7.5%	-0.8%	7.7%	6.8%	0.9%
1990	-1.9%	-1.2%	-0.8%	0.4%	-1.2%
1991	-8.5%	0.2%	-8.7%	-11.6%	3.3%
1992	-3.9%	-1.6%	-2.3%	-13.1%	12.4%
1993	16.9%	-1.1%	18.2%	5.8%	11.6%
1994	20.9%	3.8%	16.4%	8.8%	7.0%
1995	17.0%	10.4%	6.0%	11.2%	-4.7%
1996	8.1%	-0.3%	8.4%	-5.2%	14.3%
1997	19.1%	-1.4%	17.4%	9.5%	9.2%
	Average annual growth				
1981-97	10.3%	2.1%	8.2%	4.3%	3.6%
1989-97	7.9%	1.4%	6.4%	0.3%	6.1%

Source: CANSIM Matrix 5524, June 14, 1999
*Price index for Stamped and Pressed Metal Products.

Table A3:
Custom coating of metal products: dollar value of inputs

Year	Shipments (current dollars thousands)	Value added (current dollars thousands)	Wages and salaries (current dollars thousands)	Fuel and electricity (current dollars thousands)	Cost of materials and supplies (current dollars thousands)*
1981	351 876	204 749	100 403	13 281	133 846
1982	357 889	214 880	110 458	18 057	124 952
1983	370 906	210 737	116 964	21 001	139 168
1984	615 265	296 858	157 778	25 927	292 480
1985	686 943	335 745	179 427	28 497	322 701
1986	707 537	358 919	179 137	28 483	320 135
1987	842 054	431 876	217 905	30 864	379 314
1988	851 735	481 620	242 445	35 118	334 997
1989	915 861	527 916	267 040	38 666	349 279
1990	898 136	478 409	280 479	41 479	378 248
1991	821 703	452 493	260 105	39 487	329 723
1992	789 815	436 143	242 720	37 565	316 107
1993	922 915	498 462	258 305	45 524	378 929
1994	1 115 485	623 839	300 469	49 686	441 960
1995	1 305 185	648 881	324 060	51 299	605 005
1996	1 410 502	723 012	327 279	51 158	636 332
1997	1 680 036	882 268	363 598	50 853	746 915

Source: CANSIM Matrix 5524, June 14, 1999
*Calculated as a residual (shipments less value added and fuel and electricity).

Table A4:
Custom coating of metal products: input structure
(share of shipments in percent)

Year	Value added (current dollars)	Wages and salaries (current dollars)*	Fuel and electricity (current dollars)	Cost of materials and supplies (current dollars)
1981	58.20%	28.50%	3.80%	38.00%
1982	60.00%	30.90%	5.00%	34.90%
1983	56.80%	31.50%	5.70%	37.50%
1984	48.20%	25.60%	4.20%	47.50%
1985	48.90%	26.10%	4.10%	47.00%
1986	50.70%	25.30%	4.00%	45.20%
1987	51.30%	25.90%	3.70%	45.00%
1988	56.50%	28.50%	4.10%	39.30%
1989	57.60%	29.20%	4.20%	38.10%
1990	53.30%	31.20%	4.60%	42.10%
1991	55.10%	31.70%	4.80%	40.10%
1992	55.20%	30.70%	4.80%	40.00%
1993	54.00%	28.00%	4.90%	41.10%
1994	55.90%	26.90%	4.50%	39.60%
1995	49.70%	24.80%	3.90%	46.40%
1996	51.30%	23.20%	3.60%	45.10%
1997	52.50%	21.60%	3.00%	44.50%

Source: CANSIM Matrix 5524, June 14, 1999
* Wages and salaries are included in value added.

Table A5:
Custom coating of metal products: establishments and production workers

Year	Establishments	Production workers	Production workers per establishment	Production worker wages (current dollars thousands)	Average wage of production workers (current dollars thousands)
1981	-	4 798	-	77 985	-
1982	-	4 912	-	84 397	-
1983	262	5 020	19	90 244	17.98
1984	266	6 088	23	122 016	20.04
1985	283	7 292	26	150 297	20.61
1986	284	7 304	26	151 147	20.69
1987	288	-	-	-	-
1988	309	9 593	31	218 144	22.74
1989	315	10 210	32	240 424	23.55
1990	321	10 209	32	251 413	24.63
1991	298	8 917	30	229 610	25.75
1992	279	7 503	27	204 684	27.28
1993	265	7 962	30	220 231	27.66
1994	250	8 605	34	251 203	29.19
1995	252	9 717	39	272 662	28.06
1996	296	9 035	31	270 141	29.90
1997	295	10 030	34	303 489	30.26

Source: CANSIM Matrix 5524, June 14, 1999

Table A6:
Custom coating of metal products, Canada:
principal statistics for manufacturing by size of establishment, 1996

Size range (employees)	Establishments	Production workers	Person-hours paid (millions)	Wages ($ 000)	Fuel and electricity ($ 000)	Cost of materials ($ 000)	Shipments ($ 000)	Value added ($ 000)
0-49	218	3 482	7 277.8	94 000	16 932	99 395	292 456	176 338
50-99	56	3 203	6 830.3	93 044	16 781	193 189	415 041	204 025
100-199	15	1 893	4 005.0	54 356	13 246	180 596	334 780	142 181
200+	6	1 866	4 318.1	65 477	9 892	189 605	365 907	167 632
Total	295	10 444	22 431.2	306 877	56 851	662 785	1 408 184	690 176

Source: Special tabulation, Manufacturing, Construction and Energy Division, Statistics Canada

Table A7:
Custom coating of metal products, Canada:
principal statistics for total activity by size of establishment, 1996

Size range (employees)	Establishments	Administrative employees	Total employees	Administrative salaries ($ 000)	Total wages and salaries ($ 000)	Cost of materials and supplies ($ 000)	Shipments ($ 000)	Value added ($ 000)
0-49	218	279	3 761	11 840	105 840	103 839	296 337	175 775
50-99	56	316	3 519	17 327	110 371	197 093	417 056	202 136
100-199	15	309	2 202	14 820	69 176	186 443	340 269	141 823
200+	6	227	2 093	13 151	78 628	198 708	373 247	165 869
Total	295	1 131	11 575	57 138	364 015	686 083	1 426 909	685 603

Source: Special tabulation, Manufacturing, Construction and Energy Division, Statistics Canada

Table A8:
Principal statistics by province, 1996

	Establishments	Total employees	Salaries and wages ($ 000)	Shipments ($ 000)	Shipments per employee ($ 000)
Canada	296	10 166	327 000	1 429 000	141
Newfoundland	1	N/A	N/A	N/A	N/A
Prince Edward Island	-	-	-	-	-
Nova Scotia	1	N/A	N/A	N/A	N/A
New Brunswick	1	N/A	N/A	N/A	N/A
Quebec	57	1 669	43 000	240 000	144
Ontario	168	7 083	234 000	1 019 000	144
Manitoba	8	N/A	N/A	N/A	N/A
Saskatchewan	6	N/A	N/A	N/A	N/A
Alberta	21	523	23 000	81 000	155
British Columbia	33	346	12 000	31 000	91

Source: Statistics Canada, Catalogue 31-203, various tables
Notes: The data in this table may differ from those in Table A7. Table A7 is more recent and therefore takes precedence. N/A indicates that data are not published at this level of detail for the province in question.

Annex B

List of Industry Associations

- Canadian Association of Metal Finishers
  torontocad@msn.com

- Canadian Paint and Coatings Association
  http://www.cdnpaint.org/

- National Coil Coaters Association
  http://www.coilcoaters.org/about/index.html

- The American Electroplaters and Surface Finishers Society, Inc.
  http://www.aesf.org

Annex C

List of Relevant Web Sites

- Anodized Aluminum
  www.saf.com/aac.html

- The National Metal Finishing Resource Centre
  http://www.nmfrc.org/

- Thermal Spray Metal Coatings
  www.corrosion.com/thermal.html

Annex D

List of Companies

Industry Canada's Web site *Strategis* includes an on-line directory of Canadian companies in all industrial and service sectors. Known as the "Canadian Company Capabilities" (CCC), this directory enables Canadian companies the opportunity to connect with customers and suppliers around the world, 24 hours a day, 7 days a week.

Companies can register electronically by going to *Strategis* at: **http://strategis.ic.gc.ca/cdncc** and selecting the Register button. Companies that are not on the Internet can call the *Strategis* Help Desk toll-free at 1-800-328-6189 to receive a registration form.

The following is a list of companies involved in the metal finishing industry (SIC 3041-Custom Coating of Metal Products).

Acadia Group
6975 Davand Drive
Mississauga, Ontario
L5T 1L5
Tel.: (905) 564-1717
Fax: (905) 564-1723

Almaho Inc.
575 Rue des Calfats
Levis, Québec
G6V 7M5
Tel.: (418) 833-7997
Fax: (418) 833-8832

CGL Industries Ltd.
1880 No. 4 Road
Richmond, British Columbia
V6X 2L2
Tel.: (604) 244-7565
Fax: (604) 244-7675

CP Tech Inc.
2300 Cohen
St. Laurent, Québec
H4R 2N8
Tel.: (514) 333-0030
Fax: (514) 333-1146

Dovercourt Electro-Plating Co Ltd.
304 Bridgeland Avenue
Toronto, Ontario
M6A 1Z4
Tel.: (416) 789-3491
Fax: (416) 789-0805

Ebco Metal Finishing Ltd.
P.O. Box 32649
Richmond, British Columbia
V6X 3S1
Tel.: (604) 244-1500
Fax: (604) 244-1501

Hudson Plating Co Ltd.
275 5th Avenue
Vancouver, British Columbia
V5Y 1J3
Tel.: (604) 872-7107
Fax: (604) 872-1936

Kuntz Electroplating Inc.
851 Wilson Avenue
Kitchener, Ontario
N2C 1J1
Tel.: (519) 893-7680
Fax: (519) 893-5431

Placage des Metaux du Saguenay
3780 Panet
Jonquière, Québec
G7X 0E5
Tel.: (418) 695-3544
Fax: (418) 695-3340

Placage R.T. Ltd.
2908 Diab
St. Laurent, Québec
H4S 1M7
Tel.: (514) 332-0198
Fax: (514) 332-8304

Technichrom Inc.
12264 April
Montréal, Québec
H1B 5N5
Tel.: (514) 640-0333
Fax: (514) 640-6457

Torcad Ltd.
275 Norseman
Toronto, Ontario
M8Z 2R5
Tel.: (416) 239-3928
Fax: (416) 239-0049

Vac Aero International Inc.
7450 Verite
St. Laurent, Québec
H4S 1C5
Tel.: (514) 334-4240
Fax: (514) 334-6269