PMPA/PMRC Benchmarking and Statistics Project

Report 04-2

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Objectives:

The development of a statistical data base for the P/M parts industry to enable firms to:

• Benchmark key performance data vis-à-vis other part producers
• Develop relationships between success measures and independent variables

Strategies:

• Collect annual data from PMPA membership using three reports.

Objectives for the Fall meeting:

• Collect data for Reports A, B, and C
• Present 2003 results at 2004 PM²TEC
• Present results at the 2004 Fall Management Conference
• Consider other outlets for the data and results
• Improve measure and collection as important

Achievements

• Reports A and B completed and circulated to participants
• Paper presented at the 2004 PM²TEC meeting
• Significant efficiencies generated in the reporting process. The automation of the process has continued and we generated electronic reports this year, reducing time and production costs. That will reduce time. Production costs.
• MIMA has expressed interest in extending the statistics project to MIM
• We have continued to identify data collection error points and are working with the PMPA to resolve these.
Objectives for the Spring 2005 meeting

- Complete and disseminate Report C (Wage and Hourly Survey)
- Continue to investigate avenues for dissemination
- Follow-up with MIMA to expand data collection
PMPA/WPI Report A:
Expenses, Asset Management/End Market Sales Distribution
(Corporate Level)

September 8, 2004

Please address any questions or comments about this report to Jim Dale at MPIF, Craig Paullin at Pacific Sintered Metals, or Chick Kasouf at WPI/MPI.
This report summarizes the results of the 2004 MPIF/WPI Expenses, Asset Management and End Market Sales Distribution Study of the P/M Parts Industry. This is a corporate level project, i.e., companies with multiple operations consolidated their reporting for this survey.

After approval at the PMPA Winter Meeting in 2000, the PMPA statistics committee and WPI’s Metal Processing Institute worked together to develop three annual questionnaires. This year, participation was increased to include non-PMPA members. This is the fifth year of data collection and the first time that we are returning the reports in electronic format. Data were collected through John Pavlovsky’s office, and the research team did not know the identity of any company. After completing the analysis, the reports were returned to Mr. Pavlovsky who identified them and returned them to the participants.

In the pages that follow, each variable is presented with summary statistics and a graphic breakdown of small, medium, and large firms. For the purpose of this analysis, we developed the following categories:

<table>
<thead>
<tr>
<th>Category</th>
<th>Annual Net Sales of P/M Parts (in reporting year)</th>
<th>Number of Participating Companies</th>
<th>Median Annual Sales</th>
<th>Median Number of Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>$5,000,000 and under</td>
<td>3</td>
<td>$2,088,404.00</td>
<td>15</td>
</tr>
<tr>
<td>Medium</td>
<td>Over $5,000,000 up to $20,000,000</td>
<td>13</td>
<td>$2,646,992.50</td>
<td>54</td>
</tr>
<tr>
<td>Large</td>
<td>Over $20,000,000</td>
<td>7</td>
<td>$34,093,018.78</td>
<td>220</td>
</tr>
</tbody>
</table>

There was a significant decrease in participation because PMPA declined to extend the inclusion of non-members in the report.

Below the graphic breakdown of each variable is your company’s response and a statistical summary that includes the mean, and a table including the minimum and maximum values, and the 25th, 50th, and 75th percentiles. These values are the points below which 25%, 50%, and 75% of respondents fall. The 50th percentile is the median – the value that divides the sample equally. In cases with extreme values in either direction, the mean may be inflated or deflated and quite different from the median.

To protect confidentiality, the minimum and maximum values were left out of the report in sensitive areas (i.e., sales and total assets) since few in the industry do not know the identity of the largest firm.

There is a summary benchmarking table in the front of the document that includes your firm’s performance, and your quartile ranking. This will give you a snapshot of your performance. Complete analyses are included in the body of the report.

Each page includes:
1. A graph summarizing group performance (i.e., small, medium, and large firms).
2. Your in-group performance (i.e., ranking within your reference group of small, medium, or large firms) as well as your overall performance. **NOTE:** IN ALL CASES, WE RANKED RESPONSES FROM THE HIGHEST (i.e., the highest value = 1) TO THE LOWEST VALUE, WITH TIES BEING ASSIGNED THE LOWER VALUE (e.g., two companies tied for third both receive a rank of 3).
3. A trend of the mean and median values over the last five years.

Full data are reported in the pages that follow. Given the small size of the project and the potential impact of occasional extreme values, traditional statistical analysis (e.g., analysis of variance to compare means) was not advisable. However, some interesting trends were observed. Also, please bear in mind that any “trends” are the result of observing short time horizons. In our discussion, we typically focused on the median since it is less affected by extreme values.

**Expense structure:** The first 15 data points address the firm’s expense management.

- The median percentage of sales spent on raw materials increased from 19.1% to 21.3%. Small firms exhibited the highest variability in this expense.
- Wages as a percentage of sales decreased from 11.7% to 10.9%. However, benefits rose from 4.3% to 6.05%. Small firms spent a higher percentage of their sales on benefits than other groups.
- New tooling costs decreased but small firms reported the highest tooling costs relative to sales.
- R&D expenses continue to decrease. In 2002 the median R&D expenditure was 1.1%. In 2004 it was 0.10%.
- Total manufacturing expenses increased from 68.7% of sales to 77.2% of sales.
- Sales and marketing expenses and general and administrative expenses both decreased slightly, and both were inversely related to size.
- Income before interest and taxes was flat as a percentage of sales.

**Asset management:** The next ten variables were measures of asset management

- Return on adjusted gross assets fell slightly and return on adjusted net assets was stable.
- Small firms had the shortest average collection period.
- Average raw materials inventory fell slightly but was much higher in small firms.
Sales distribution: After summarizing size data, the next section of the survey asked companies to provide information about their sales distribution. Reported sales produced in the NAFTA market decreased considerably. Median sales decreased from $10,617,800 in 2003 to $5,463,264. The next ten items asked for the breakdown of sales by application. Not surprisingly, large firms generated the greatest percentage of automotive sales (OEM and tier 1, 2, and 3 sales).

Distribution of sales and production: As in past reports, the bulk of sales and production are in the United States but there are some firms in each group that have sales in international markets.
PMPA/WPI Report B:
Operational Benchmarking Analysis

(Plant Level)

September 8, 2004

Please address any questions or comments about this report to Jim Dale at MPIF, Craig Paullin at Pacific Sintered Metals, or Chick Kasouf at WPI/MPI.
This report summarizes the results of the *2004 MPIF/WPI Report B: Operational Benchmarking Analysis of the P/M Parts Industry*. This is a plant level project, i.e., companies with multiple operations report plants individually for this survey.

After approval at the PMPA Winter Meeting in 2000, the PMPA statistics committee and WPI’s Metal Processing Institute worked together to develop three annual questionnaires. This is the fifth year of data collection and the first time that we are returning the reports in electronic format. Data were collected through John Pavlovsky’s office, and the research team did not know the identity of any company. After completing the analysis, the reports were returned to Mr. Pavlovsky who identified them and returned them to the participants.

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<td>18</td>
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<td>Over $5,000,000 up to $20,000,000</td>
<td>16</td>
<td>$13,217,279.00</td>
<td>88</td>
</tr>
<tr>
<td>Large</td>
<td>Over $20,000,000</td>
<td>9</td>
<td>$33,954,006.89</td>
<td>256</td>
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To protect confidentiality, the minimum and maximum values were left out of the report in sensitive areas, e.g., pound shipments, sales and total sales, since few in the industry do not know the identity of the largest firm.

We have included a summary benchmarking table in the front of the document that includes your firm’s performance, and your quartile ranking. This will give you a snapshot of your performance. Complete analyses are included in the body of the report.
Each page includes:

4. A graph summarizing group performance (i.e., small, medium, and large firms).
5. Your in-group performance (i.e. ranking within your reference group of small, medium, or large firms) as well as your overall performance. **NOTE: IN ALL CASES, WE RANKED RESPONSES FROM THE HIGHEST (i.e., the highest value = 1) TO THE LOWEST VALUE, WITH TIES BEING ASSIGNED THE LOWER VALUE (e.g., two companies tied for third both receive a rank of 3).**
6. A trend of the mean and median values over the last five years.

Full data are reported in the pages that follow. Given the small size of the project and the potential impact of occasional extreme values, traditional statistical analysis (e.g., analysis of variance to compare means) was not advisable. In some cases, reported values very far from the median were eliminated from the graphic analysis, but were kept in the summary tables. These are noted as appropriate. However, some interesting trends were observed.

As in 2003, data are mixed, but the industry may be continuing its correction from 2002. Reported pounds shipped, dollar volume, pounds shipped per employee, and dollar sales for employee all increased. However, sales growth rates reported in pounds and dollars were not as strong as 2003. Moreover, some companies did report shrinkage in sales. In an interesting reversal from last year, small firms reported the strongest median growth rate. Moreover, they also demonstrated remarkable dispersion in growth and pounds shipped per employee, suggesting that some of these firms are performing quite well while others are still struggling with low or negative growth.

Percentage of sales from parts less than one year old was flat (and mean values decreased), and percentage of sales from parts less than three years old decreased slightly. Considering these data with the flat median in percentage of bids won last year (where the mean value also decreased), there may be a slowdown in new applications.
THE PMPA/MPI STATISTICS AND BENCHMARKING PROJECT: A FOUR-YEAR PERSPECTIVE

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ABSTRACT

In 2000, the Powder Metallurgy Parts Association (PMPA) and WPI’s Metal Processing Institute (MPI) began a data collection collaboration designed to develop a longitudinal data set of sales, expenses, and operational measures for P/M part producers. These statistics are collected through a double blind technique and distributed to participants with diagnostics and rankings for each company. However, these results are also of general interest for the industry since they can identify areas for collaboration to improve supply chain efficiency. The purpose of this paper is to discuss key performance trends identified over the last four years, with specific emphasis on suggestions for using the data to improve performance and to identify areas where upstream or downstream collaboration may result in mutually beneficial strategies.

INTRODUCTION

Financial and operational performance are critical issues for executives and all employees of P/M part producers. Profitability is generated not only by sales but also by how well associated expenses and assets are managed. Clinch [1] proposed an expense breakdown to ensure the financial health of the P/M part producer. While the requirements and strategies of individual firms will certainly vary, there is tremendous benefits that can be generated by understanding how a firms compares with competitors in key operating measures.

Since approval at the PMPA Winter Meeting in 2000, the PMPA statistics committee and WPI’s Metal Processing Institute worked together to develop three annual questionnaires. This year, participation was increased to include non-PMPA members. The data are collected in three reports:

- **Report A (Expenses and asset management/sales distribution):** Provides operating efficiency benchmarks and sales distribution at the corporate level.
- **Report B (Operational benchmarking analysis):** Provides industry benchmarks on operations at the plant level.
• **Report C (Wage and Salary Survey):** A continuation of the current wage and salary survey with additional data collected on turnover and absenteeism.

The three questionnaires are mailed each June to the official representative at each company. For Report B, a survey is sent to each plant for firms with multiple sites. Respondents are asked to complete the reports with data from the most recently completed fiscal year. The number of responses varied over the past four years, ranging from 30-40 companies participating in each report. To ensure confidentiality, the data are sent to MPIF’s CPA and forwarded to the research team identified only by code.

Participating firms were categorized using the following criteria:

- **Small:** Less than $5,000,000 in annual sales
- **Medium:** Over $5,000,000 and less than $20,000,000 in annual sales
- **Large:** Over $20,000,000 in annual sales

The following sections discuss key highlights of these reports, and the following sections will discuss results dealing with sales trends in the industry, expenses, asset management, and new sales. While the results are reported for part producers, the economic health of part producers is important for all players in the supply chain. Part producers are the consumers of upstream products such as powder and equipment, and the output of the part producer affects the products of the OEM or higher tier supplier.

**SALES AND PROFITABILITY**

There was a clear decline in sales in our 2002 reports, but there was some recovery evident in 2003. Figure 1 (reported at the plant level) indicates a median increase in sales of 4.2%. Mean sales increases were a bit higher (7.83%) but the mean is more sensitive to extreme values than the median.

![Figure 1. Percentage rate of sales growth or decline (in dollars)](image)
While the medians were about the same in small, medium, and large firms, the dispersion in small firms was remarkable, with several small firms still reporting sales decreases in 2003. Thus, it appears that while many small firms have generated robust sales growth, several are also struggling. In an era of consolidation in the P/M parts industry, the question of the viability of the small firm is often posed. Demanding customers may seek the sophistication of large suppliers, but it is clear to us that many small firms are also able to compete effectively. Whether the will result in a shakeout of small part producers in the future remains to be seen.

The trend in the growth rate in pounds is also striking (see figure 2). The 2000 growth rate was strong, but then pound sales were flat in 2001 and 2002, returning to growth in 2003. It is interesting to note the discrepancy between dollar growth and the corresponding growth in shipments in pounds. This probably suggests that part producers are continuing to absorb price pressure from customers. As with the growth in dollar sales, there is also dispersion of sales growth in small firms, with some companies growing at a strong pace while others are losing sales.

![Figure 2. Percentage rate of sales growth or decline (in pounds)](image)

At a company level, the sales trend is reflected in income before interest and taxes as a percentage of sales in figure 3. The decline from 2000-2002 is consistent with the sales decline. Again, as with the sales growth data, we found that the dispersion in income was by far the greatest in small firms, with some firms reporting double digit percentage losses. This was not the case with the medium or large firms.
Figure 3. Income before interest and taxes
EXPENSE STRUCTURE

While sales trends are critical, it is also important to consider the expense structure of part producers. Clinch [1] suggested that direct costs – the “truly variable” expenses such as raw materials, labor, and outside processing – should be around 34% of the P/M sales dollar. Since 2001, raw materials have been decreasing as a percentage of sales (figure 4). Wages have fluctuated between 12 and 14%, (figure 5) while reported out-of-pocket purchases of secondary operations have been increasing since 2001 (figure 6).

Figure 4. Raw materials as a percentage of sales

Figure 5. Wages as a percentage of sales
Utilities cost increased between 2001 and 2002 (see figure 7). This was also reflected on a per plant basis.

Total manufacturing expenses as a percentage of sales jumped in 2002 (see figure 8). Again, the dispersion was the greatest in small firms, some of which were very efficient while others had high manufacturing expenses. Again, this effect may be partially due to sales declines and a smaller base of revenues.
Sales and marketing expenses have been about 3% of sales, while general and administrative expenses have been approximately 7%-9% of sales. R&D expenses have been approximately 1% of sales or less, perhaps indicating a potential problem in an industry where R&D pressures are increasing [2].

**ASSET MANAGEMENT**

Efficient deployment and management of assets is critical for profitable performance. Assets represent the investments of owners, and the ability of these assets to generate profits and cash makes them valuable. Excessive materials inventory ties up capital that can be used for other productive purposes. Converting raw materials and work in progress to products affects the conversion of investment to cash. The speed with which accounts receivable is converted to cash affects the worth of the investment to owners. These are concerns not just of owners, but of other stakeholders as well. Employee compensation and benefits are affected by profitability. Customers will be better served by suppliers who are able to invest in capabilities.

The average collection period is illustrated in figure 9. This represents the number of days that sales take to convert to cash. This figure increased in 2001 and has stayed between 48.5 and 50 days. As the conversion to cash becomes longer, those funds are not available to the part producer for other uses such as meeting current liabilities.
Figures 10 and 11 address two important inventory management issues - raw materials inventory. Borrowing an often-cited strategy from another industry, Dell has minimized inventory since it ties up resources and exposes the firm to considerable risk [2]. While it may be unrealistic to expect to reduce inventories to a just-in-time (JIT) level such as Dell of the automotive OEMs enjoy, reductions may have help part producers generate much needed efficiencies. Currently, part producers carry, a median of 30 or more days of inventory, a figure that has been a steady increase since 2001 (after a decline from 2000). Moreover, large firms carry less inventory than medium or large firms, and, as in many other measures, there is more dispersion among small firms than those in the other categories, with some firms reporting 50 or more days of inventory.

Reducing inventory may be an area where upstream cooperation with powder producers helps part producers with comparatively little effect on suppliers. Reducing raw materials inventory can reduce expenses associated with storage and improve cash flow.
Figure 11 presents work-in-progress inventory in days. Reported 2003 results are a reduction of nearly a week from 2002. While small and large firms kept about the same mean days of inventory, there was, again, considerable variation among the small firms, with some reported values over 40 days. Reducing the level of work-in-progress inventory is another area where savings can be generated.

Figure 11. Work in progress inventory

Inventory turnover is measured by dividing average daily sales by average inventory. It is an efficiency measure that indicates how efficiently inventory is converted to sales. Higher inventory turnover indicates leaner inventories relative to sales. The reduction in turnover from 2002 to 2003 is substantial. There was little difference among small, medium, and large firms.

Figure 12. Inventory turnover
The return on gross assets has fluctuated between 2.5% and 3% for the last three years, and does not suggest strong returns for owners. While the means were about the same in each group, small firms had the widest dispersion of values with some firms posting negative double-digit returns while other reported the highest returns among respondents.

Figure 13. Return on adjusted gross assets

NEW SALES
Innovation and new business is the lifeblood of a firm and an industry. Figures 14 – 17 are measures of the impact of new business on the firm. Figure 14 reports the percentage of sales from parts less than one year old and figure 15 reports the percentage of bids won last year. There were decreases in both measures in 2003.

Figure 14. Percentage of sales from parts less than one year old
Figure 15. Percentage of bids won last year

Figure 16 indicates the expected impact of new business on business in the upcoming year, asking respondents to forecast the percentage of sales this year from bids won last year. Consistent with figure 15, this percentage is expected to decrease. The steeper decline may indicate that some bids were low in response to price competition.

Figure 16. Expected percentage of sales this year from bids won last year

Finally, the percentage of sales from parts less than three years old also decreased, dropping from 24.2% to 18%. Although so few data points must certainly be interpreted with caution, any slowdown in the development of new applications is probably an area that should be monitored. There was more dispersion in the reported new sales values among small firms than in medium or large firms. This indicates that some small firms are aggressive and successful in generating new business. However, it would be interesting to analyze these companies more deeply to discover if the new business is driven by necessity after losing contracts to larger customers. Moreover, what is the profitability of this new business? Is it generated at low prices and tight margins that are difficult to sustain?
Figure 17. Percentage of sales from parts less than three years old.

SUMMARY

This paper presented some of the key findings of the 2000-2003 PMPA/MPI benchmarking and statistics project. Certainly, as noted above, it is important to recognize that these data are the beginning of a potentially valuable set of time series that can aid managers in the future. Obviously, four years are a “trend” that, while interesting, must be interpreted with caution. As the project continues, there will be several interesting time series that can be analyzed for strategic purposes, and to discern variables affecting the underlying structure of the industry.

We think that there is value in the results to date, and potential implications for process efficiency and the generation of more mutually beneficial upstream and downstream relationships. However, we are even more excited about the prospects for even more significant insights as the program expands and generates a deeper set of data. The benchmarking provided in the reports against the entire industry and with size groups is giving many managers suggestions for improving operations. We look forward to continuing the project.

REFERENCES

