

IndustryWeek / Manufacturing Performance Institute

Census of Manufacturers 2004

Executive Summary



Manufacturing Performance Institute

The INDUSTRYWEEK/Manufacturing Performance Institute (MPI) Census of Manufacturers is one of the largest annual studies of manufacturing metrics, management practices, and financial results at the plant level conducted anywhere in the world. Each year MPI and INDUSTRYWEEK (IW) set out to capture ever more informative data from manufacturers for the benefit of all industry and for the improvement of individual plant performances. The 2004 Census of Manufacturers is yet another progression in this development of the Census, providing new findings, including:

- Spending on training as a percentage of total labor budget;
- Go-to-market strategies utilized by manufacturers;
- Pervasiveness of improvement methodologies *beyond the plant-floor* (e.g., engineering, accounting, administration);
- Current as well as three-year metrics for first-pass yield, on-time delivery, OEE, and ROIC;
- Drivers of employee productivity (e.g., process improvements, new equipment, sales increases);
- Changes in product pricing as well as changes in costs for purchased components and raw materials;
- Capital equipment and information technology spending in 2004 as percentages of sales; and
- China-sourced component and material volumes, and the impact of China on profitability and sales.

Presentation of Results

The results of the 2004 IW/MPI Census of Manufacturers are presented in the same way they appeared to survey respondents on the IW/MPI Census questionnaire, working through seven categories: *Plant Profile, Human Resources, Operations, Supply Chain, Capacity & Equipment, Information Technology, and Manufacturing Today*.

Census questions consisted of three types:

- Directive single-answer questions for which respondents were asked to “check one” answer category;
- Directive multiple-answer questions for which respondents were asked to “check all that apply” or “check three”; and
- Open-ended questions for which respondents provided a specific value.

For questions in which respondents selected from categories, responses are presented both as the number of plants selecting the category (the frequency) and the corresponding percentage of plants. The “Total” refers to the number of respondents that answered the question; for single-answer questions, total also is the sum of all responses for that question.

Tables for open-ended questions present the number of plants that responded as well as 25th percentile, median, 75th percentile, and 90th percentile statistics. The median is the midpoint value for open-ended questions—the value above and below which half the answers fall (equivalent to the 50th percentile). The 25th percentile is the value below which 25% of answers fall; the 75th percentile, the value below which 75% of answers fall; and the 90th percentile, the value below which 90% of answers fall. *Note: For presentation purposes, the array of values has been reversed from ascending order to descending order for metrics where better performances entail lower values. For example, for the measure of annual labor turnover rate, a lower percentage is a better performance, and thus the 25th percentile is listed as 12.6%, median 6.0%, 75th percentile 3.0%, and the 90th percentile 1.3%.*

Methodology

The IW/MPI 2004 Census of Manufacturers was designed to collect operational and business metrics and practices at *manufacturing facilities*. A four-page questionnaire with more than 100 questions, jointly developed by IW and MPI, was mailed to approximately 30,000 leaders and managers of plants (primarily IW subscribers) in late April 2004. Each survey recipient received a letter describing the survey, a questionnaire, and a business-reply envelope; a survey participation card also was included to ensure the anonymity of survey responses while enabling respondents to request this Executive Summary and/or participate in a random drawing. Survey recipients also were given the option of responding online. Approximately 10% of recipients received a survey reminder by email, and IW promoted the online-response option through an online newsletter. By late May, IW/MPI had received 681 valid, completed survey forms, and data was entered into a database, edited, and cleansed to ensure that answers were plausible.

■ PLANT PROFILE

Please indicate if this facility is part of a public or private company:

	# of Plants	% of Plants
Public	206	30.6%
Private	468	69.4%
Total	674	100.0%

In which state is the plant located? (reclassified by U.S. Census Bureau regions)

	# of Plants	% of Plants
Midwest	289	42.4%
South	162	23.8%
Northeast	128	18.8%
West	90	13.2%
Other*	2	0.3%
No region identified	10	1.5%
Total	681	100.0%

* Virgin Islands and Canada

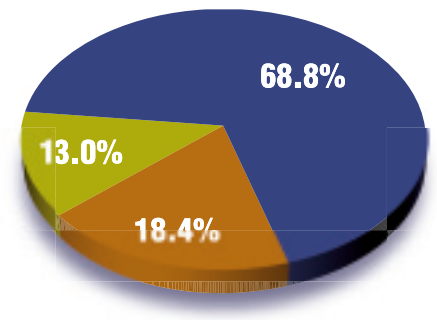
What is the primary product that this plant produces?

Product*	# of Plants	% of Plants
Machinery Manufacturing	110	16.2%
Fabricated Metal Product Manufacturing	102	15.0%
Computer and Electronic Product Manufacturing	60	8.8%
Transportation Equipment Manufacturing	58	8.5%
Chemical Manufacturing	57	8.4%
Miscellaneous Manufacturing	41	6.0%
Food Manufacturing	35	5.1%
Electrical Equipment, Appliance, and Component Mfg.	33	4.8%
Primary Metal Manufacturing	32	4.7%
Plastics and Rubber Products Manufacturing	29	4.3%
Furniture and Related Product Manufacturing	26	3.8%
Paper Manufacturing	20	2.9%
Textile Mills	17	2.5%
Nonmetallic Mineral Product Manufacturing	11	1.6%
Printing and Related Support Activities	10	1.5%
Wood Product Manufacturing	7	1.0%
Beverage and Tobacco Product Manufacturing	6	0.9%
Apparel Manufacturing	2	0.3%
Textile Product Mills	2	0.3%
Petroleum and Coal Products Manufacturing	1	0.1%
No product listed or classified	22	3.2%
Total	681	100.0%

* Industries above have been classified by three-digit North American Industry Classification System (NAICS) code. The 2004 IW/MPI Census database also contains data classified by four- and five-digit NAICS codes.

What is the nature of manufacturing operations for primary products at this plant?

	# of Plants
Discrete	458
Process	123
Both or hybrid	87
Total	668



Discrete Plants: More than two-thirds (68.6%) of plants answering the survey identify themselves as “discrete” plants, facilities in which the output is typically measured by numeric quantities (e.g., widgets, circuit boards, pencils). “Process” facilities are those plants at which output is typically measured as weight or volume (e.g., refined petroleum). “Hybrid” plants may exhibit a combination of process and discrete activities, such as a beverage manufacturer in which internal processes are running volumes of product while output is discrete units (e.g., cans of soda).

Approximately 65% of discrete plants report their production runs at low volume (54.3% low-volume/high-mix and 10.8% low-volume/low-mix) and 35% of discrete plants report their production runs at high volume (21.3% high-volume/high-mix and 13.7% high-volume/low-mix).

What is the approximate annual revenue of the plant's corporate parent?

	# of Plants	% of Plants
Less than \$100 million	356	53.5%
\$100 million - \$499 million	112	16.8%
\$500 million - \$999 million	37	5.6%
\$1 billion - \$5 billion	79	11.9%
\$5.1 billion - \$10 billion	39	5.9%
More than \$10 billion	43	6.5%
Total	666	100.0%

In which of the following industry value chains does this plant primarily participate?

	# of Plants	% of Plants
Industrial equipment and machinery	128	19.8%
Automotive	100	15.4%
Construction	82	12.7%
Consumer packaged goods/nondurables	73	11.3%
Consumer product durables	50	7.7%
High tech	40	6.2%
Pharmaceuticals, biotech, medical	31	4.8%
Aerospace	30	4.6%
Chemicals	25	3.9%
Printing and publishing	16	2.5%
None of the above	73	11.3%
Total	648	100.0%

Which criteria below best describe the volume and product mix of your plant's operations?

	# of Plants	% of Plants
High volume/High mix	153	23.3%
High volume/Low mix	110	16.8%
Low volume/High mix	324	49.4%
Low volume/Low mix	69	10.5%
Total	656	100.0%

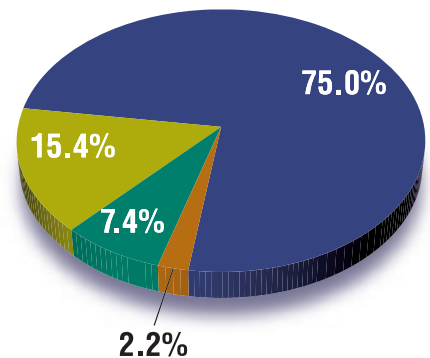
HUMAN RESOURCES

How many employees are at this plant location?

	# of Plants	% of Plants
Less than 100	231	34.1%
100 - 249	251	37.1%
250 - 499	124	18.3%
500 - 1,000	56	8.3%
More than 1,000	15	2.2%
Total	677	100.0%

How many years has it been since plant start-up?

	# of Plants
Less than 5 years	15
5 - 10 years	50
11 - 20 years	104
More than 20 years	508
Total	677



Human Resources *continued*

To what extent are plant production workers represented by a union(s)?

	# of Plants	% of Plants
No workers	512	75.5%
Some workers	69	10.2%
All workers	97	14.3%
Total	678	100.0%

What is plant's annual labor turnover rate for the most recent year?

	Labor Turnover %
25th percentile	12.6%
Median	6.0%
75th percentile	3.0%
90th percentile	1.3%
# of Plants	614

Please indicate anticipated employment change in calendar year 2004:

	# of Plants	% of Plants
Decrease 21% or more	10	1.5%
Decrease 11 - 20%	24	3.6%
Decrease 1 - 10%	94	14.0%
0%	134	20.0%
Increase 1 - 10%	323	48.2%
Increase 11 - 20%	65	9.7%
Increase 21% or more	20	3.0%
Total	670	100.0%

Please indicate anticipated employment change in calendar year 2005:

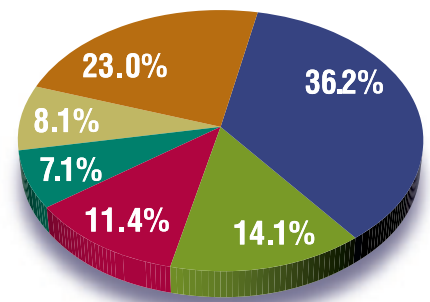
	# of Plants	% of Plants
Decrease 21% or more	6	1.0%
Decrease 11 - 20%	12	2.0%
Decrease 1 - 10%	67	10.9%
0%	138	22.4%
Increase 1 - 10%	346	56.3%
Increase 11 - 20%	37	6.0%
Increase 21% or more	9	1.5%
Total	615	100.0%

What are the average annual hours of formal training received by each plant employee?

	# of Plants	% of Plants
Less than 8 hours	145	21.5%
8 - 20 hours	292	43.3%
21 - 40 hours	164	24.3%
More than 40 hours	73	10.8%
Total	674	100.0%

What percentage of production employees participate in empowered or self-directed work teams?

	# of Plants
0%	153
1 - 25%	241
26 - 50%	94
51 - 75%	76
76 - 99%	47
100%	54
Total	665



What is the plant's approximate spending on training as a percentage of the total labor budget?

Training as % of labor budget	
25th percentile	1.0%
Median	2.0%
75th percentile	4.0%
90th percentile	5.0%
# of Plants	575

What is the approximate average wage for production employees?

Average Wage	
25th percentile	\$11.77
Median	\$13.50
75th percentile	\$16.00
90th percentile	\$19.00
# of Plants	652

Please indicate how effective the following human resource/employee programs are at your plant:

Recruiting and hiring	# of Plants	% of Plants
No program exists	98	14.5%
Not effective	44	6.5%
Somewhat effective	412	61.1%
Highly effective	120	17.8%
Total	674	100.0%

Performance management	# of Plants	% of Plants
No program exists	75	11.2%
Not effective	80	11.9%
Somewhat effective	403	60.0%
Highly effective	114	17.0%
Total	672	100.0%

Employee development and training	# of Plants	% of Plants
No program exists	50	7.4%
Not effective	94	13.9%
Somewhat effective	454	67.2%
Highly effective	78	11.5%
Total	676	100.0%

Leader/supervisor development and training	# of Plants	% of Plants
No program exists	81	12.1%
Not effective	117	17.5%
Somewhat effective	400	59.7%
Highly effective	72	10.7%
Total	670	100.0%

Teaming	# of Plants	% of Plants
No program exists	137	20.4%
Not effective	101	15.0%
Somewhat effective	339	50.4%
Highly effective	95	14.1%
Total	672	100.0%

Employment Upswing:

Approximately 61% of plants expect an increase in employment levels this year. (When asked via the 2003 Census to project the 2004 employment change, a comparable 58% of plants anticipated an increase in 2004, indicating that hiring plans appear to have stayed on course.) For 2005, the hiring upswing should continue, with 63.8% of plants anticipating an increase.

Human Resources *continued*

Safety and health	# of Plants	% of Plants
No program exists	16	2.4%
Not effective	18	2.7%
Somewhat effective	285	42.2%
Highly effective	356	52.7%
Total	675	100.0%

■ OPERATIONS

Please indicate the primary improvement methodology followed by the plant:

	# of Plants	% of Plants
Lean Manufacturing	263	41.7%
Total Quality Management	91	14.4%
Lean and Six Sigma	72	11.4%
Theory of Constraints	27	4.3%
Six Sigma	26	4.1%
Agile Manufacturing	18	2.9%
Toyota Production System	10	1.6%
Other	36	5.7%
No methodology	87	13.8%
Total	630	100.0%

Quality Focus:

Approximately 70% of plants rate “high quality” as one of the top three focuses of their go-to-market strategy. The only other attribute receiving a majority of responses was “service and support” (53.4% of plants). Of those plants with a focus on high quality, 59.2% report that quality certifications (e.g., ISO) occur at their plant, which is statistically no different than the percentage of all plants in the Census (58.9%) that report having quality certifications in place.

Please indicate the extent to which the methodology has been implemented:

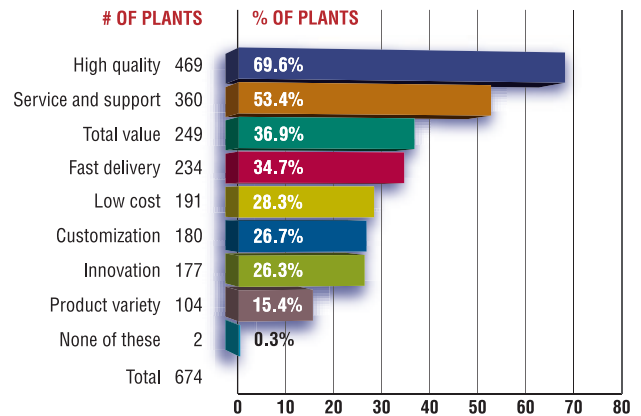
Agile Manufacturing	# of Plants	% of Plants
Some	4	25.0%
Significant	11	68.8%
Complete	1	6.3%
Total	16	100.0%

Lean Manufacturing	# of Plants	% of Plants
Some	94	36.7%
Significant	153	59.8%
Complete	9	3.5%
Total	256	100.0%

Six Sigma	# of Plants	% of Plants
Some	11	42.3%
Significant	13	50.0%
Complete	2	7.7%
Total	26	100.0%

Lean and Six Sigma	# of Plants	% of Plants
Some	27	40.3%
Significant	38	56.7%
Complete	2	3.0%
Total	67	100.0%

Please select the top three objectives that best describe the focus of your market strategy: (multiple responses)



<i>Theory of Constraints</i>	# of Plants	% of Plants
Some	9	37.5%
Significant	11	45.8%
Complete	4	16.7%
Total	24	100.0%

<i>Total Quality Management</i>	# of Plants	% of Plants
Some	26	30.2%
Significant	41	47.7%
Complete	19	22.1%
Total	86	100.0%

<i>Toyota Production System</i>	# of Plants	% of Plants
Some	3	37.5%
Significant	5	62.5%
Complete	0	0%
Total	8	100.0%

<i>Other</i>	# of Plants	% of Plants
Some	6	20.0%
Significant	19	63.3%
Complete	5	16.7%
Total	30	100.0%

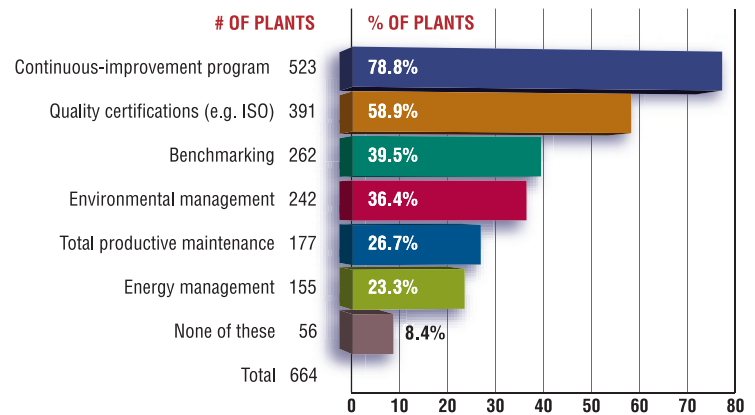
In which departments has your improvement methodology been implemented? (multiple responses)

	# of Plants	% of Plants
Production	571	89.6%
Materials management	346	54.3%
Shipping and logistics	308	48.4%
Purchasing	227	35.6%
Engineering	178	27.9%
Customer relations	150	23.5%
Supplier relations	135	21.2%
Administration	114	17.9%
Finance and accounting	97	15.2%
Research and development	71	11.1%
None of these	51	8.0%
Other	15	2.4%
Total	637	

What percentage of employees are solely assigned to continuous-improvement activities?

	% of Employees
25th percentile	0.0%
Median	1.0%
75th percentile	3.0%
90th percentile	5.7%
# of Plants	532

Which of the following strategic practices occur at this plant? (multiple responses)



Operations *continued*

How much progress has the plant made toward achieving world-class manufacturing status?

	# of Plants	% of Plants
No progress	103	15.4%
Some progress	366	54.8%
Significant progress	185	27.7%
Fully achieved	14	2.1%
Total	668	100.0%

How has total production output (unit volume) changed in the past 12 months?

	# of Plants	% of Plants
Decreased more than 20%	17	2.5%
Decreased 11 - 20%	21	3.1%
Decreased 1 - 10%	50	7.5%
Stayed the same	68	10.2%
Increased 1 - 10%	232	34.7%
Increased 11 - 20%	193	28.8%
Increased more than 20%	88	13.2%
Total	669	100.0%

What are the plant's costs (labor, overhead, and materials) as a percentage of costs of goods sold?

	Labor	Overhead	Materials
25th percentile	30.0%	38.5%	61.0%
Median	20.0%	27.0%	50.0%
75th percentile	12.0%	20.0%	35.0%
90th percentile	8.0%	10.0%	25.0%
# of Plants	585	585	585

What is the plant's cost of goods sold as a percentage of plant revenue?

	COGS as % of Revenue
25th percentile	80.0%
Median	70.0%
75th percentile	50.0%
90th percentile	35.0%
# of Plants	585

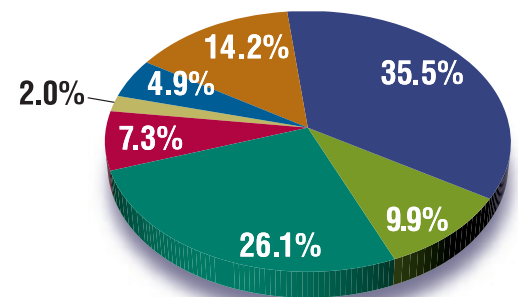
What is finished-product first-pass quality yield percentage for plant's primary products?

	Current Yield %	3 Years Ago Yield %	%-Point Change*
25th percentile	93.0%	85.0%	2.0 pts
Median	97.0%	92.0%	3.5 pts
75th percentile	98.0%	96.0%	8.0 pts
90th percentile	99.0%	98.0%	15.0 pts
# of Plants	530	501	500

* Plants reporting both current and 3-year metrics.

How have per-unit manufacturing costs, excluding purchased materials, changed in the last three years?

	# of Plants
Decreased more than 20%	32
Decreased 11 - 20%	93
Decreased 1 - 10%	232
Stayed the same	65
Increased 1 - 10%	171
Increased 11 - 20%	48
Increased more than 20%	13
Total	654



**What is the manufacturing cycle time for a typical finished product?
(start of plant production to completion of product)**

	Cycle Time (Hours)
25th percentile	336.0
Median	96.0
75th percentile	24.0
90th percentile	3.0
# of Plants	620

How has manufacturing cycle time changed in the last three years?

	# of Plants	% of Plants
Decreased more than 20%	125	19.0%
Decreased 11 - 20%	155	23.5%
Decreased 1 - 10%	189	28.7%
Stayed the same	127	19.3%
Increased 1 - 10%	41	6.2%
Increased 11 - 20%	14	2.1%
Increased more than 20%	8	1.2%
Total	659	100.0%

**For primary products, what is the plant's customer order lead time?
(order entry through production to shipment)**

	Lead Time (Days)
25th percentile	30.0
Median	14.0
75th percentile	5.0
90th percentile	2.0
# of Plants	626

How has customer order lead time changed in the last three years?

	# of Plants	% of Plants
Decreased more than 20%	135	20.5%
Decreased 11 - 20%	156	23.7%
Decreased 1 - 10%	147	22.3%
Stayed the same	186	28.2%
Increased 1 - 10%	19	2.9%
Increased 11 - 20%	7	1.1%
Increased more than 20%	9	1.4%
Total	659	100.0%

What is the plant's on-time delivery rate?

	Current Delivery %	3 Years Ago Delivery %	%-Point Change*
25th percentile	92.0%	80.0%	1.0 pts
Median	96.0%	90.0%	5.0 pts
75th percentile	98.0%	95.0%	10.0 pts
90th percentile	99.4%	98.0%	20.0 pts
# of Plants	606	570	570

* Plants reporting both current and 3-year metrics.

On-Time Delivery: The median on-time delivery rate among Census plants was 96%, identical to the median figure identified by the 2003 Census. This year, respondents also were asked to identify the delivery rate from three years ago: The median on-time rate improvement across all plants is 5 percentage points, with 10% of plants improving on-time delivery by 20 percentage points or more. For 2004, plants participating in the chemical value chain and the consumer-products-durables value chain had the best delivery performances (98%), while those plants involved with the aerospace value chain had the worst delivery performance (85%).

Operations *continued*

What are the plant's inventory turn rates?

	Raw Material	Work-in-Process	Finished Goods	Total Inventory
25th percentile	6.0	8.0	6.0	4.3
Median	12.0	15.0	12.0	7.0
75th percentile	24.0	31.0	25.0	12.7
90th percentile	50.0	73.9	52.0	20.0
# of Plants	435	395	414	504

How has the total inventory turn rate changed in the last three years?

	# of Plants	% of Plants
Decreased more than 20%	23	3.8%
Decreased 11 - 20%	48	7.9%
Decreased 1 - 10%	66	10.9%
Stayed the same	148	24.5%
Increased 1 - 10%	166	27.5%
Increased 11 - 20%	109	18.0%
Increased more than 20%	44	7.3%
Total	604	100.0%

Please indicate anticipated revenue change in 2004:

	# of Plants	% of Plants
Decreased more than 21%	11	1.7%
Decreased 11 - 20%	17	2.6%
Decreased 1 - 10%	53	8.1%
Stayed the same	52	8.0%
Increased 1 - 10%	304	46.5%
Increased 11 - 20%	150	22.9%
Increased more than 21%	67	10.2%
Total	654	100.0%

Please indicate anticipated revenue change in 2005:

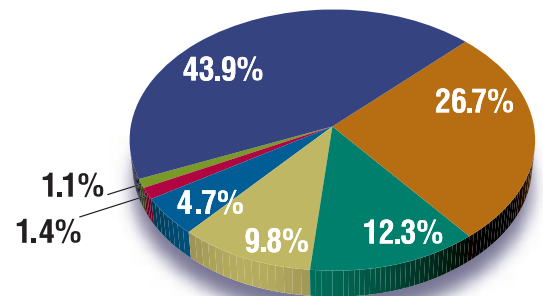
	# of Plants	% of Plants
Decreased more than 21%	5	0.8%
Decreased 11 - 20%	5	0.8%
Decreased 1 - 10%	28	4.4%
Stayed the same	41	6.5%
Increased 1 - 10%	346	54.9%
Increased 11 - 20%	171	27.1%
Increased more than 21%	34	5.4%
Total	630	100.0%

What are the approximate sales per employee for the most recent fiscal year?

	Sales Per Employee
25th percentile	\$120,000
Median	\$170,000
75th percentile	\$250,000
90th percentile	\$400,000
# of Plants	570

Indicate which factor below has most impacted productivity in the past year:

	# of Plants
Process improvements	278
Sales increase	169
New equipment/automation	78
Sales decrease	62
Employment decrease	30
New information technology	9
Employment increase	7
Total	633



Productivity Drivers: Nearly three-fourths of plants (72.4%) indicate that productivity (as sales per employee) had increased in the past year. The factor with the most impact on plant productivity across all Census plants was “process improvements” (43.9% of all plants regardless of direction that productivity has taken). Among those plants at which productivity had increased, 45.6% cite process improvements and 32.2% cite sales increases. At plants with decreasing productivity, the factors with the most impact were sales decreases (40.7%) and process improvements (25.9%).

How has sales per employee changed in the past year?

	# of Plants	% of Plants
Decreased more than 10%	16	2.6%
Decreased 6 - 10%	21	3.4%
Decreased 1 - 5%	47	7.6%
Stayed the same	86	14.0%
Increased 1 - 5%	193	31.4%
Increased 6 - 10%	156	25.4%
Increased more than 10%	96	15.6%
Total	615	100.0%

What is the plant's return on invested capital (ROIC)?

	Current ROIC	3 Years Ago ROIC	%-Point Change*
25th percentile	6.0%	5.0%	- 1.5 pts
Median	13.0%	11.7%	3.0 pts
75th percentile	25.0%	20.0%	9.0 pts
90th percentile	46.6%	39.6%	20.0 pts
# of Plants	301	283	275

* Plants reporting both current and 3-year metrics.

SUPPLY CHAIN

To what degree are operations integrated with suppliers?

	# of Plants	% of Plants
No integration	169	26.0%
Some integration	408	62.8%
Extensive integration	73	11.2%
Total	650	100.0%

To what degree are operations integrated with customers?

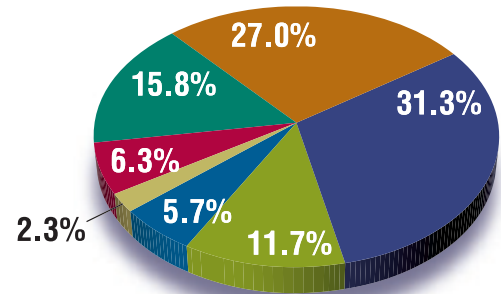
	# of Plants	% of Plants
No integration	147	22.7%
Some integration	396	61.1%
Extensive integration	105	16.2%
Total	648	100.0%

How has the cost (per unit) of components and raw materials for your primary product changed in the past year?

	# of Plants	% of Plants
Decreased more than 10%	12	1.8%
Decreased 6 - 10%	21	3.2%
Decreased 1 - 5%	65	9.9%
Stayed the same	65	9.9%
Increased 1 - 5%	184	28.0%
Increased 6 - 10%	172	26.2%
Increased more than 10%	137	20.9%
Total	656	100.0%

Please indicate how the price for primary products (per unit) charged to customers has changed in the past year:

	# of Plants
Decreased more than 10%	15
Decreased 6 - 10%	41
Decreased 1 - 5%	103
Stayed the same	176
Increased 1 - 5%	204
Increased 6 - 10%	76
Increased more than 10%	37
Total	652



Supply Chain *continued*

What percentage of components and raw materials are purchased outside of the U.S. (by dollar volume)?

	% of Components and Raw Materials
25th percentile	1.0%
Median	10.0%
75th percentile	20.0%
90th percentile	40.0%
# of Plants	570

Which of the following production and support activities are outsourced by this plant? (multiple responses)

	# of Plants	% of Plants
Transportation	278	42.1%
Fabrication and/or processing	179	27.1%
Information technology	78	11.8%
Warehousing and/or distribution	74	11.2%
Assembly	68	10.3%
Design and/or R&D	56	8.5%
Staging and/or packaging	27	4.1%
Maintenance/asset management	24	3.6%
Customer service	18	2.7%
Purchasing	16	2.4%
None of these	211	31.9%
Total	661	

Production Volume: Median production volume as a percentage of designed plant capacity for all 2004 Census plants was 70%, which is a small increase from the 2003 Census median of 66%. Manufacturers in the South report the highest production volumes as a percentage of designed capacity (75%), while those in the West report the lowest volumes (60%).

■ CAPACITY AND EQUIPMENT

What is production volume as a percentage of designed plant capacity?

	Volume as % of Designed Capacity
25th percentile	60.0%
Median	70.0%
75th percentile	80.0%
90th percentile	92.0%
# of Plants	620

What is the plant's average machine availability as a percentage of scheduled uptime?

	% Machine Availability
25th percentile	70.0%
Median	85.0%
75th percentile	95.0%
90th percentile	97.3%
# of Plants	536

What is the average operating equipment efficiency (OEE) for major production lines?

	Current OEE	3 Years Ago OEE	%-Point Change*
25th percentile	67.0%	60.0%	2.0 pts
Median	80.0%	75.0%	5.0 pts
75th percentile	88.0%	82.0%	10.0 pts
90th percentile	95.0%	90.0%	20.0 pts
# of Plants	386	347	347

* Plants reporting both current and 3-year metrics.

Please indicate the level of capital-equipment spending (as a percentage of sales) for 2004:

	% of Sales
25th percentile	2.0%
Median	3.0%
75th percentile	5.0%
90th percentile	10.0%
# of Plants	578

What is the anticipated change in capital-equipment spending for 2005?

	# of Plants	% of Plants
Decreased more than 20%	26	4.1%
Decreased 11 - 20%	13	2.1%
Decreased 1 - 10%	36	5.7%
Stayed the same	226	35.7%
Increased 1 - 10%	208	32.9%
Increased 11 - 20%	85	13.4%
Increased more than 20%	39	6.2%
Total	633	100.0%

Please indicate which of the following equipment practices occur at this plant: (multiple responses)

	# of Plants	% of Plants
Customization of OEM equipment	311	49.7%
Design and build equipment in-house	271	43.3%
Leasing equipment	252	40.3%
None of these	141	22.5%
Total	626	

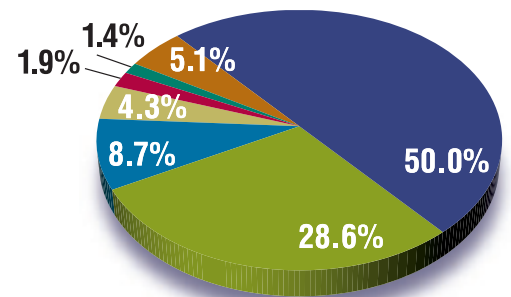
■ INFORMATION TECHNOLOGY

Please indicate the level of information-technology spending (as a percentage of sales) for 2004:

	% of Sales
25th percentile	1.0%
Median	1.4%
75th percentile	3.0%
90th percentile	5.0%
# of Plants	503

What is the anticipated change in information-technology spending for 2005?

	# of Plants
Decreased more than 20%	11
Decreased 11 - 20%	8
Decreased 1 - 10%	30
Stayed the same	292
Increased 1 - 10%	167
Increased 11 - 20%	51
Increased more than 20%	25
Total	584



To what degree has the use of each application below improved the plant's profitability?

<i>Enterprise resource planning (ERP)</i>	# of Plants	% of Plants
Not in use	345	57.5%
Plan to use	43	7.2%
In use and no improvement	42	7.0%
In use and some improvement	133	22.2%
In use and major improvement	37	6.2%
Total	600	100.0%

Information Technology *continued*

ERP II	# of Plants	% of Plants
Not in use	464	83.2%
Plan to use	24	4.3%
In use and no improvement	18	3.2%
In use and some improvement	41	7.3%
In use and major improvement	11	2.0%
Total	558	100.0%

Material requirements planning (MRP)	# of Plants	% of Plants
Not in use	206	34.7%
Plan to use	38	6.4%
In use and no improvement	84	14.1%
In use and some improvement	203	34.2%
In use and major improvement	63	10.6%
Total	594	100.0%

Manufacturing resource planning (MRP II)	# of Plants	% of Plants
Not in use	320	57.8%
Plan to use	31	5.6%
In use and no improvement	46	8.3%
In use and some improvement	116	20.9%
In use and major improvement	41	7.4%
Total	554	100.0%

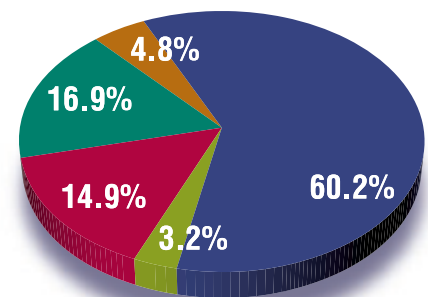
Manufacturing execution systems (MES)	# of Plants	% of Plants
Not in use	447	80.3%
Plan to use	20	3.6%
In use and no improvement	17	3.1%
In use and some improvement	54	9.7%
In use and major improvement	19	3.4%
Total	557	100.0%

Financial management systems	# of Plants	% of Plants
Not in use	120	20.6%
Plan to use	22	3.8%
In use and no improvement	107	18.4%
In use and some improvement	262	44.9%
In use and major improvement	72	12.3%
Total	583	100.0%

Warehouse management systems (WMS)	# of Plants	% of Plants
Not in use	358	62.4%
Plan to use	33	5.7%
In use and no improvement	46	8.0%
In use and some improvement	101	17.6%
In use and major improvement	36	6.3%
Total	574	100.0%

Transportation management systems	# of Plants	% of Plants
Not in use	390	69.3%
Plan to use	29	5.2%
In use and no improvement	41	7.3%
In use and some improvement	85	15.1%
In use and major improvement	18	3.2%
Total	563	100.0%

Asset management (e.g., CMMS)	# of Plants
Not in use	339
Plan to use	18
In use and no improvement	84
In use and some improvement	95
In use and major improvement	27
Total	563



<i>Demand-planning/forecasting systems (e.g., APS)</i>	# of Plants	% of Plants
Not in use	319	55.6%
Plan to use	42	7.3%
In use and no improvement	58	10.1%
In use and some improvement	126	22.0%
In use and major improvement	29	5.1%
Total	574	100.0%

<i>Design systems (e.g., CAD, CAE)</i>	# of Plants	% of Plants
Not in use	118	19.4%
Plan to use	10	1.6%
In use and no improvement	86	14.2%
In use and some improvement	246	40.5%
In use and major improvement	147	24.2%
Total	607	100.0%

<i>Product data management (PDM)</i>	# of Plants	% of Plants
Not in use	340	60.4%
Plan to use	39	6.9%
In use and no improvement	47	8.3%
In use and some improvement	101	17.9%
In use and major improvement	36	6.4%
Total	563	100.0%

<i>Customer relationship management (CRM)</i>	# of Plants	% of Plants
Not in use	324	56.7%
Plan to use	61	10.7%
In use and no improvement	50	8.8%
In use and some improvement	106	18.6%
In use and major improvement	30	5.3%
Total	571	100.0%

<i>Product lifecycle management (PLM)</i>	# of Plants	% of Plants
Not in use	466	83.1%
Plan to use	32	5.7%
In use and no improvement	19	3.4%
In use and some improvement	34	6.1%
In use and major improvement	10	1.8%
Total	561	100.0%

<i>Electronic data interchange (EDI)</i>	# of Plants	% of Plants
Not in use	177	30.4%
Plan to use	31	5.3%
In use and no improvement	106	18.2%
In use and some improvement	191	32.8%
In use and major improvement	77	13.2%
Total	582	100.0%

<i>Online purchasing</i>	# of Plants	% of Plants
Not in use	219	37.4%
Plan to use	49	8.4%
In use and no improvement	89	15.2%
In use and some improvement	198	33.8%
In use and major improvement	30	5.1%
Total	585	100.0%

Information Technology *continued*

<i>Online selling</i>	# of Plants	% of Plants
Not in use	344	59.3%
Plan to use	51	8.8%
In use and no improvement	61	10.5%
In use and some improvement	107	18.4%
In use and major improvement	17	2.9%
Total	580	100.0%

<i>Mobile management (wireless systems)</i>	# of Plants	% of Plants
Not in use	331	58.7%
Plan to use	55	9.8%
In use and no improvement	48	8.5%
In use and some improvement	103	18.3%
In use and major improvement	27	4.8%
Total	564	100.0%

China Sourcing: Approximately 45% of Census plants source components and materials from China (55.3% of plants indicate “no China sourcing”). Sixty-one percent of computer and electronic product plants report sourcing from China (39% report no China sourcing), which was the highest industry percentage, and paper manufacturers were the least likely industry to source from China (85% report no China sourcing)*. Of the 294 Census plants that report sourcing from China, 74.2% indicate the dollar volume of components and raw materials sourced has increased over the last three years (18.4% say the volume has increased by more than 20%).

* Among industries with at least 20 plants reporting.

■ **MANUFACTURING TODAY**

How has the dollar volume of components and raw materials sourced from China changed over last three years?

	# of Plants	% of Plants
Decreased more than 20%	6	0.9%
Decreased 11 - 20%	4	0.6%
Decreased 1 - 10%	2	0.3%
Stayed the same	64	9.7%
Increased 1 - 10%	107	16.3%
Increased 11 - 20%	57	8.7%
Increased more than 20%	54	8.2%
No China sourcing	364	55.3%
Total	658	100.0%

To what extent have competitors in China impacted your plant’s profitability?

	# of Plants	% of Plants
Decreased significantly	48	7.4%
Decreased somewhat	178	27.3%
No impact	333	51.2%
Increased somewhat	71	10.9%
Increased significantly	21	3.2%
Total	651	100.0%

To what extent has the emergence of the Chinese market impacted your plant’s sales?

	# of Plants	% of Plants
Decreased significantly	40	6.1%
Decreased somewhat	138	21.1%
No impact	348	53.3%
Increased somewhat	109	16.7%
Increased significantly	18	2.8%
Total	653	100.0%

About MPI

The Manufacturing Performance Institute is a Cleveland, Ohio-based research organization specializing in research development, analysis, and communications. MPI services include:

- Survey creation and fielding,
- Research analysis and white paper development,
- Webcast and live presentations of research findings,
- State-of-industry reports, and
- Creation of online, interactive database tools that house performance data, whether developed by MPI or others.

MPI is led by John R. Brandt, former editor and publisher of **INDUSTRYWEEK** and **CHIEF EXECUTIVE** magazines. MPI's customized products and services are designed for organizations, associations, and economic regions facing critical development issues. MPI's core research services address operational excellence, employee development, customer value, leadership and strategy, and innovation.

The Manufacturing Performance Institute
2835 Sedgewick Road
Shaker Heights, OH 44120
Phone: 216-991-8390
Fax: 216-991-8205
www.mpi-group.net

About **INDUSTRYWEEK**

INDUSTRYWEEK (IW), a Penton Media publication, has an audited circulation of approximately 200,000 senior manufacturing executives. **INDUSTRYWEEK** informs manufacturing executives of trends, technologies, and management strategies that drive continuous improvement enterprise-wide.

INDUSTRYWEEK
Penton Media Inc.
1300 East 9th St.
Cleveland, OH 44114-1503
Phone: 216-696-7000
Fax: 216-696-7670
www.industryweek.com



IndustryWeek / Manufacturing Performance Institute

2004 Census of Manufacturers