



MPI Manufacturing Study

Please provide a response to each question based on a single manufacturing plant. If you do not know the answer to a question or if a question does not apply or is unclear, simply leave that answer blank.

PLANT PROFILE

1. Please indicate if this plant is part of a public or private company: (check one) 1-1 Public 2 Private
2. In which state is the plant located? _____ 114
3. What is the nature of manufacturing operations for primary products at this plant? (check one)
 - 3-1 Discrete (measured by numeric quantities)
 - 4 Process (measured by weight or volume)
 - 3 Both or hybrid
4. What is the primary product that this plant produces (e.g., axles, software)? _____ 4
5. How many years has it been since plant start-up? (check one)
 - 5-1 Less than 5 years
 - 2 5 - 10 years
 - 3 11 - 20 years
 - 4 More than 20 years
6. In which of the following industry value chains does this plant primarily participate? (check one)

7-1 <input type="checkbox"/> Aerospace	5 <input type="checkbox"/> Consumer packaged goods/nondurables	9 <input type="checkbox"/> Pharmaceuticals, biotechnology, medical
2 <input type="checkbox"/> Automotive	6 <input type="checkbox"/> Consumer product durables	10 <input type="checkbox"/> Printing and publishing
3 <input type="checkbox"/> Chemicals	7 <input type="checkbox"/> High tech	12 <input type="checkbox"/> Defense industry
4 <input type="checkbox"/> Construction	8 <input type="checkbox"/> Industrial equipment and machinery	11 <input type="checkbox"/> Other
7. Which criterion below best describes the volume and product mix of your plant's operations? (check one)
 - 115-1 High volume/High mix
 - 2 High volume/Low mix
 - 3 Low volume/High mix
 - 4 Low volume/Low mix
8. What is the approximate annual revenue of the plant's corporate parent? (independently owned facilities should respond for the entire company) \$ _____ 300
9. What is the approximate annual revenue of this plant? (if plant is a cost center, please report as the value of shipments) \$ _____ 301
10. How do you anticipate plant revenue changing next year? (check one)

302-1 <input type="checkbox"/> Decrease more than 20%	2 <input type="checkbox"/> Decrease 11 - 20%	3 <input type="checkbox"/> Decrease 1 - 10%	4 <input type="checkbox"/> Stay the same
5 <input type="checkbox"/> Increase 1 - 10%	6 <input type="checkbox"/> Increase 11 - 20%	7 <input type="checkbox"/> Increase more than 20%	

HUMAN RESOURCES

11. Approximately how many employees (all staff) are at this plant location? _____ 303
12. How do you anticipate employment levels changing next year? (check one)

304-1 <input type="checkbox"/> Decrease more than 20%	2 <input type="checkbox"/> Decrease 11 - 20%	3 <input type="checkbox"/> Decrease 1 - 10%	4 <input type="checkbox"/> Stay the same
5 <input type="checkbox"/> Increase 1 - 10%	6 <input type="checkbox"/> Increase 11 - 20%	7 <input type="checkbox"/> Increase more than 20%	
13. What percentage of plant production workers are represented by a union(s)? (check one)
 - 250-1 0%
 - 2 1 - 25%
 - 3 26 - 50%
 - 4 51 - 75%
 - 5 76 - 99%
 - 6 100%
14. What is the plant's annual labor turnover rate for the most recent year? (number of voluntary and involuntary separations ÷ typical staffing level) % 10
15. What percentage of production employees participate in empowered or self-directed work teams?
 - 15-1 0%
 - 2 1 - 25%
 - 3 26 - 50%
 - 4 51 - 75%
 - 5 76 - 99%
 - 6 100%
16. What are the approximate wages for production employees? (hourly rate without overtime)

Average wage \$ _____ 16

Starting wage \$ _____ 305
17. What are the average annual hours of formal training received by each plant employee? (check one)
 - 13-1 Less than 8 hours
 - 2 8 - 20 hours
 - 3 21 - 40 hours
 - 4 More than 40 hours

18. Which of the following human-resource practices/programs are used at this plant? (check all that apply)

- | | | |
|---|--|--|
| <input type="checkbox"/> 311 Formal employee training program | <input type="checkbox"/> 312 Apprenticeship program | <input type="checkbox"/> 313 Teaming/team-building practices |
| <input type="checkbox"/> 314 Leader/supervisor development | <input type="checkbox"/> 315 Recruiting and hiring program | <input type="checkbox"/> 316 Paid medical benefits |
| <input type="checkbox"/> 317 Paid sick and/or personal days | <input type="checkbox"/> 318 Formal safety/health program | <input type="checkbox"/> 319 Paid vacation days |
| <input type="checkbox"/> 320 Annual review and raise program | <input type="checkbox"/> 321 Employee-ownership options | <input type="checkbox"/> 322 Profit or revenue-sharing plan |
| <input type="checkbox"/> 323 Bonus plan | <input type="checkbox"/> 324 Education reimbursements | <input type="checkbox"/> 325 None of these |

19. For the past year, how many: (total number in plant) **Job-related injuries and illnesses** _____ 370
Job-related injuries and illnesses resulting in lost work days _____ 371

OPERATIONS

20. How much progress has the plant made toward achieving world-class manufacturing status? (check one)

- 40-1 No progress 2 Some progress 3 Significant progress 4 Fully achieved

21. Please indicate which of the following improvement methodologies are followed at the plant: (check all that apply)

- | | | | |
|---|---|---|---|
| <input type="checkbox"/> 326 Agile Manufacturing | <input type="checkbox"/> 327 Lean Manufacturing | <input type="checkbox"/> 328 Theory of Constraints | <input type="checkbox"/> 329 Six Sigma |
| <input type="checkbox"/> 330 Total Quality Management | <input type="checkbox"/> 331 Toyota Production System | <input type="checkbox"/> 332 Other methodology(ies) | <input type="checkbox"/> 333 No methodology |

22. What percentage of plant processes (across all departments) have been addressed with improvement methodology(ies)? % 349

23. Which of these programs and/or practices occur at this plant? (check all that apply)

- | | | |
|---|---|--|
| <input type="checkbox"/> 138 Benchmarking | <input type="checkbox"/> 140 Total productive maintenance | <input type="checkbox"/> 142 Quality certifications (e.g. ISO) |
| <input type="checkbox"/> 139 Continuous-improvement program | <input type="checkbox"/> 141 Environmental management | <input type="checkbox"/> 143 Energy management |
| <input type="checkbox"/> 173 Open-book management | <input type="checkbox"/> 336 Recycling/reuse programs | <input type="checkbox"/> 337 Strategy/policy deployment |
| <input type="checkbox"/> 421 Waste elimination (i.e., seven wastes) | <input type="checkbox"/> 338 Value-stream mapping | <input type="checkbox"/> 340 Kaizen events/blitzes |
| <input type="checkbox"/> 071 PDCA problem-solving | <input type="checkbox"/> 070 Formal Green program/initiatives | <input type="checkbox"/> 144 None of these |

24. Please estimate the following operation/production measures for your plant:

Measures	Current Year	3 Years Ago
a. Manufacturing cycle time (start of plant production to completion of primary product)	hrs 49	hrs 174
b. Customer order lead time (order-entry through production to ship for specific product)	days 51	days 175
c. On-time delivery rate (% of goods delivered on time)	% 53	% 148
d. Perfect delivery rate (% of goods on time, perfect quality, and to customer specifications)	% 372	% 373
e. Finished-product first-pass quality yield (% of product that passes final inspection)	% 46	% 147
f. Scrap and rework (as % of plant sales)	% 176	% 177
g. Warranty costs (as % of plant sales)	% 178	% 179

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

- 146-1 Decreased more than 20% 2 Decreased 11 - 20% 3 Decreased 1 - 10% 4 Stayed the same
 5 Increased 1 - 10% 6 Increased 11 - 20% 7 Increased more than 20%

26. What are the plant's costs as a percentage of costs of goods sold (COGS)? (indicate % for each category)

a. Labor	% 41
b. Overhead	% 42
c. Material	% 43
Total COGS =	100%

27. What is the plant's cost of goods sold as a percent of plant revenue? (annual COGS ÷ annual revenue) % 44

28. What are the approximate sales per employee for the most recent fiscal year?
 (include all employees, not just direct labor) \$ _____ per employee 60

29. How have sales per employee changed in the past year? (check one)

- 149-1 Decreased more than 10% 2 Decreased 6 - 10% 3 Decreased 1 - 5% 4 Stayed the same
 5 Increased 1 - 5% 6 Increased 6 - 10% 7 Increased more than 10%

30. How have per-unit manufacturing costs, excluding purchased materials, changed in the last 3 years? (check one)

- 45-1 Decreased more than 20% 2 Decreased 11 - 20% 3 Decreased 1 - 10% 4 Stayed the same
 5 Increased 1 - 10% 6 Increased 11 - 20% 7 Increased more than 20%

31. Which of the following practices are used to manage inventory? (check all that apply)

- 180 One-piece flow techniques 181 Pull systems with kanban signals 182 Parts/goods supermarkets
 183 Quick equipment changeovers 184 RFID and computerized inventory tracking 185 Production leveling/heijunka
 186 Just-in-time supplier deliveries 187 Vendor-managed or -owned inventories 188 None of these

32. What are the plant's inventory turn rates for the following categories of material?

(If your plant has no inventory for a category because goods move just-in-time, report as 365 turns)

a. Raw material (annual COGS ÷ average value of raw material on hand)	turns per year ⁵⁵
b. Work-in-process material (annual COGS ÷ average value of WIP on hand)	turns per year ⁵⁶
c. Finished goods (annual COGS ÷ average value of finished goods on hand)	turns per year ⁵⁷
d. Total inventory (annual COGS ÷ average value of total inventory on hand)	turns per year ⁵⁸

33. Approximately what percentage of the plant's total inventory is obsolete? % ³⁴¹

34. How has the total inventory turn rate changed in the last three years? (check one)

- 59-1 Decreased more than 20% 2 Decreased 11 - 20% 3 Decreased 1 - 10% 4 Stayed the same
 5 Increased 1 - 10% 6 Increased 11 - 20% 7 Increased more than 20%

SUPPLY CHAIN

35. Which of the following best describes your relationship with suppliers and customers? (check one for each column)

	Suppliers	Customers
Buy and sell (e.g., cost and quality focus)	374-1 <input type="checkbox"/>	375-1 <input type="checkbox"/>
Certification (e.g., broad qualifications established)	2 <input type="checkbox"/>	2 <input type="checkbox"/>
Cooperation (e.g., sharing product ideas, best practices)	3 <input type="checkbox"/>	3 <input type="checkbox"/>
Partnership (e.g., sharing resources, intellectual property, cost savings)	4 <input type="checkbox"/>	4 <input type="checkbox"/>

36. To what degree are the following activities outsourced? (check one in each row)

	All	Some	None
a. Fabrication	376-1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
b. Assembly	377-1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
c. Electrical	378-1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
d. Design and/or R&D	379-1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
e. Maintenance/asset management	380-1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
f. Information technology	381-1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
g. Purchasing	382-1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
h. Transportation	383-1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
i. Customer service	384-1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
j. Human resources management	385-1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>
k. Sales and marketing	386-1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>

37. How have the following (on a per unit basis) changed in the past 12 months? (check one in each row)

	Decreased more than 10%	Decreased 6-10%	Decreased 1-5%	No change	Increased 1-5%	Increased 6-10%	Increased more than 10%
a. Price for your products	154-1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>
b. Component/material costs	342-1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>
c. Employee wages	343-1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>
d. Employee benefits	344-1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>
e. Logistics/transport costs	345-1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>
f. Utilities/fuel	346-1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>

38. Please estimate the following customer and supplier measures for your plant:

Measures	Current Year	3 Years Ago
a. Customer reject rates (parts per million)	ppm ²⁰⁸	ppm ²⁰⁹
b. Customer retention rate (% customers retained from previous year)	% ²¹⁰	% ²¹¹
c. Green products (% of plant products recyclable/reusable)	% ³⁸⁷	% ³⁸⁸
d. Overseas sales (as % of total dollar volume)	% ²¹²	% ²¹³
e. Imported material/components (% of dollar volume purchased outside home country)	% ¹⁵³	% ²¹⁴
f. Imported material/components from China (% of dollar volume from China)	% ²¹⁵	% ²¹⁶

39. Which of the following supply-chain programs and/or practices are in place? (check all that apply)

- | | | |
|---|---|---|
| ³⁸⁹ <input type="checkbox"/> Certification of major suppliers | ³³⁵ <input type="checkbox"/> Supplier-management program | ³⁹⁰ <input type="checkbox"/> Sharing forecasts with suppliers |
| ³⁹¹ <input type="checkbox"/> Collaborative design with suppliers | ¹⁷² <input type="checkbox"/> Customer-satisfaction surveys | ³⁹² <input type="checkbox"/> Kitting/preassembly for customers |
| ³⁹³ <input type="checkbox"/> Collaborative design with customers | ⁷² <input type="checkbox"/> Access to customer forecasts | ³⁹⁴ <input type="checkbox"/> None of these |

CAPACITY / EQUIPMENT / IT

40. Please estimate the following capacity/equipment measures for your plant:

Measures	Current Year	3 Years Ago
a. Production volume (as % of designed plant capacity)	% ⁷⁸	% ²¹⁷
b. Machine availability (as % of scheduled uptime)	% ⁷⁹	% ²¹⁸
c. Operating equipment efficiency (% machine availability X % quality yield X % of optimal rate that equipment operates)	% ⁸⁰	% ¹⁵⁶
d. Return on invested capital (net operating profit after taxes ÷ by capital invested)	% ⁶³	% ¹⁵¹

41. What are the following investments/expenses as a percentage of plant sales for the current year, and how is that percentage likely to change next year?

	Current %	Increase	Same	Decrease
a. Capital-equipment spending	% ¹⁵⁹	⁴⁰¹⁻¹ <input type="checkbox"/>	² <input type="checkbox"/>	³ <input type="checkbox"/>
b. Information technology spending	% ¹⁶⁰	⁴⁰²⁻¹ <input type="checkbox"/>	² <input type="checkbox"/>	³ <input type="checkbox"/>
c. Process improvement initiatives	% ³⁹⁵	⁴⁰³⁻¹ <input type="checkbox"/>	² <input type="checkbox"/>	³ <input type="checkbox"/>
d. Employee costs (all wages, benefits, etc.)	% ³⁹⁶	⁴⁰⁴⁻¹ <input type="checkbox"/>	² <input type="checkbox"/>	³ <input type="checkbox"/>
e. Utilities/energy	% ³⁹⁷	⁴⁰⁵⁻¹ <input type="checkbox"/>	² <input type="checkbox"/>	³ <input type="checkbox"/>
f. Material and components	% ³⁹⁸	⁴⁰⁶⁻¹ <input type="checkbox"/>	² <input type="checkbox"/>	³ <input type="checkbox"/>

42. For which functions were major information technology applications and/or systems purchased in the past 12 months?

(check all that apply)

- | | | | |
|---|--|--|--|
| ⁴⁰⁷ <input type="checkbox"/> Enterprisewide | ⁴⁰⁸ <input type="checkbox"/> Sales/selling | ⁴⁰⁹ <input type="checkbox"/> Design/development | ⁴¹⁰ <input type="checkbox"/> Procurement/purchasing |
| ⁴¹¹ <input type="checkbox"/> Production | ⁴¹² <input type="checkbox"/> Logistics and distribution | ⁴¹³ <input type="checkbox"/> Customer service/support | ⁴¹⁴ <input type="checkbox"/> Accounting/finance |
| ⁴¹⁵ <input type="checkbox"/> Supplier management | ⁴¹⁶ <input type="checkbox"/> Administrative | ⁴¹⁷ <input type="checkbox"/> Other | ⁴¹⁸ <input type="checkbox"/> No purchases |

43. How did the following affect your company's profitability in the most recent year? (check one in each row)

	Major increase	Some increase	No change	Some decrease	Major decrease	Not applicable
a. Use of improvement methodology(s)	³³⁴⁻¹ <input type="checkbox"/>	² <input type="checkbox"/>	³ <input type="checkbox"/>	⁴ <input type="checkbox"/>	⁵ <input type="checkbox"/>	⁶ <input type="checkbox"/>
b. Application of new capital equipment	³⁴⁷⁻¹ <input type="checkbox"/>	² <input type="checkbox"/>	³ <input type="checkbox"/>	⁴ <input type="checkbox"/>	⁵ <input type="checkbox"/>	⁶ <input type="checkbox"/>
c. Implementation of new IT	³⁴⁸⁻¹ <input type="checkbox"/>	² <input type="checkbox"/>	³ <input type="checkbox"/>	⁴ <input type="checkbox"/>	⁵ <input type="checkbox"/>	⁶ <input type="checkbox"/>
d. Development of new products/services	⁴¹⁹⁻¹ <input type="checkbox"/>	² <input type="checkbox"/>	³ <input type="checkbox"/>	⁴ <input type="checkbox"/>	⁵ <input type="checkbox"/>	⁶ <input type="checkbox"/>
e. Investments in the workforce	⁴²⁰⁻¹ <input type="checkbox"/>	² <input type="checkbox"/>	³ <input type="checkbox"/>	⁴ <input type="checkbox"/>	⁵ <input type="checkbox"/>	⁶ <input type="checkbox"/>