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August, 1998

Technology on the Factory Floor III: Technology Use and Training in US Manufacturing Firms

Paul Swamidass, Auburn University

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TECHNOLOGY ON THE FACTORY FLOOR III
Technology Use and Training in U.S. Manufacturing Firms
by Paul M. Swamidoss, Ph.D.
Technology on the Factory Floor III:
Technology Use and Training in U.S. Manufacturing Firms

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A report based on responses from more than 1,000 manufacturing plants participating in a study sponsored by:
The National Association of Manufacturers,
The National Science Foundation and
The Thomas Walter Center for Technology Management.

August 1998
This study was co-sponsored by:

The National Association of Manufacturers,
The National Science Foundation and
The Thomas Walter Center for Technology Management, Auburn University.

Partial funding provided by the Societal Dimensions of Engineering, Science and Technology Program of the National Science Foundation under grant number SBR-9619054 (April 1997).

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Technology on the Factory Floor III: Technology Use and Training in U.S. Manufacturing Firms
NAM Member Price: $25.00 Non-Member Price: $40.00
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Foreword

Technology accounts for as much as one-third of long-run economic growth and two-thirds of productivity gains, according to a consensus of leading economists and CEOs in my book, The Rising Tide (John Wiley, 1998). Paul Swamidass's careful and continuing work, in this third Technology on the Factory Floor study, complements this macro analysis and perspective with the most compelling plant-level data yet released. U.S. manufacturers are investing in technology, especially information technology, and they do, indeed, have positive operational and financial results to show for their investments. If there ever was a "productivity paradox" in manufacturing, it exists no more.

Likewise, this third report shows that the long, hard work by manufacturing companies and their employees to cut costs, improve quality and meet customer demands more quickly has taken hold. There is no going back. Companies are now poised to meet the next challenge: electronic integration of suppliers and customers. One can only rejoice that the domestic auto industry, whose prospects looked so poor 15 years ago, now moves its inventory nearly twice as fast as the rest of the economy.

Not everything is rosy. While companies are spending a surprisingly high amount on training, many workers lack even the basic educational foundation needed to progress to the higher-skill levels required by manufacturers using hardware, software, networking and rapid-response procedures. The results here confirm those of the Bureau of Labor Statistics and of a separate, recent NAM survey on workforce issues conducted by Grant Thornton LLP. We have our work cut out for us.

Executives will find useful, specific benchmarking data in this report. The success of manufacturers in putting the products of the information-technology industry to fruitful use makes for impressive reading.

Jerry Jasinowski
President
The Manufacturing Institute
Executive Summary

This study presents much good news about manufacturing in America. Skilled technology deployment and use is leading to operational excellence, which yields higher productivity and, ultimately, higher profitability. Plants are making substantial gains in manufacturing flexibility and agility — important reasons for productivity increases — through the increased use of computerized integration, manufacturing cells and just-in-time (JIT) inventory practices.

This is the third version of the Technology on the Factory Floor series, based on 1997 data from more than 1,000 plant managers. Following the previous survey by four years, it captures U.S. manufacturers in a very healthy condition. Table 1 (see page x) lists all the technologies surveyed, both “hard” ones like local area networks (LANs) and “soft” ones like JIT and manufacturing cells. Table 2 compares the 1997 and 1993 results.

The U.S. trend toward manufacturing excellence continues, as evidenced by a variety of different measures: overall financials, improved operational capabilities, specific technology use and successful classes of plants.

The Financial Performance of U.S. Manufacturing Continues To Improve

Profitability Shows Strong Gains. Return on investment now stands at 16.9 percent, compared to 13.0 percent in 1993. This gain is higher than expected.

Productivity (sales per employee) Increases. Strong annual gains in productivity, as measured by sales per employee, partially explain the strong gains in profitability. A group of 101 plants that participated in the 1993 and 1997 studies reported that sales per employee grew at about 3.5 percent per year, compounded. This is comparable to the rate reported by the Bureau of Labor Statistics.

Manufacturing Plants Gain in Operational Capabilities

Inventory Turnovers Increase. Turnover rates measure industry efficiency. As Table 2 indicates, the inventory turnover ratio was 9.7 in 1997. In other words, the average manufacturing plant covered in this report was turning over its inventory every 1.23 months. Our 1993 report found an 8.0 ratio, indicating that plants were then turning over their inventory every 1.5 months. The Commerce Department’s 1995 Office of Industry Analysis estimate of 8.5 confirms our findings.

Rejection and Rework Decrease. The rejection and rework rate is another important index of manufacturing performance. It measures the ability of the manufacturers to produce consistently high-quality products with few defects. Rejection and rework rates have decreased from 4 percent in 1993 to 3.5 percent in 1997.

Cycle Time and Manufacturing Costs Decrease. Seventy-six percent of all manufacturers report reduction in cycle time (from receipt of a customer order to delivery) and 75 percent report reduction in manufacturing costs as a result of technology use. Figure 11 (see page 8) displays other benefits of technology use by manufacturers.

Highlights of the Most Successful Groups of Plants

Larger Plants Use Technologies More Extensively and Effectively Than Small Plants. Eight positive performance measures increase with size: sales per employee; inventory turns; LAN use; cell use; percent of transactions computerized between shops and production planning; percent of plants with 90-percent-plus computerization between shops and production planning; percent of plants reporting cycle-time reduction as a result of technology use; and return on investment.

Four positive performance measures decrease with plant size: on-the-job training time; training budget as a percent of sales; percent of extremely skilled operators in the plant; and the delay in the skilled use of technologies for want of skilled workers.
Not all technologies may be appropriate for small plants. Small plants may need assistance to understand the use and benefits of several new technologies if they are to exploit all relevant manufacturing technologies. The lack of know-how and the training expense associated with the use of soft technologies may be holding back small manufacturers from using soft technologies more aggressively.

Exporters Use Manufacturing Technologies More. The use of technology rises with the degree to which firms gain their revenues from abroad. Without exception, exporters rely on technologies more extensively than non-exporters. The difference is most pronounced in soft technologies such as cells and concurrent engineering (which involves design, engineering, manufacturing, suppliers and vendors from the inception of new product development), as well as manufacturing resource planning. Overall, the evidence indicates that the use of manufacturing technologies adds a measure of competitive advantage to U.S. exporters.

The Transportation Industry Leads in Inventory Turnovers. Perhaps our most remarkable operational finding is the inventory turnover of 17.3 reported by the transportation industry (SIC 37), which includes the auto industry — nearly twice the national average of 9.7. The transportation industry has become a mature user of lean manufacturing principles; the industry is reaping the benefits of consistent, long-term use of such practices. Formerly, an average of 17.3 turnovers for an entire industry was only a dream.

The auto industry, which forms the bulk of this SIC class, started adopting soft technologies such as JIT, TQM and SQC about 15 years ago due to severe import competition from Japan and the rapid erosion of its domestic market share. The Big Three auto makers have instituted standards and certification for their suppliers based on world-class manufacturing principles, thus spreading the practice across the nation. In the process, the auto industry has proved to be a good training ground. Personnel moving from this industry to others may have contributed to the spread of such successful techniques.

Extremely Skilled Use of All Technologies Has Superior Operational Payoff. Not all manufacturers use manufacturing technologies with equal skill, and the level of skill matters considerably in how much a firm’s performance is improved. Extremely skilled use of technologies requires a thorough understanding of the technology being used, as well as constant training and retraining. Self-identified extremely skilled users of JIT and its variations report the best inventory turns (19.6), lowest manufacturing lead times (5.7 weeks), and one of

<table>
<thead>
<tr>
<th>Table 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of Technologies Covered by the Study</td>
</tr>
<tr>
<td>(A more detailed description of these technologies can be found in Appendix II.)</td>
</tr>
</tbody>
</table>

**Hard Technologies Investigated**

1. Automated Inspection
2. CAD Computer-aided design
3. CAM Computer-aided manufacturing, including programmable automation of single or multi-machine systems.
4. CIM Computer-integrated manufacturing
5. CNC Machines with computerized numerical control
6. LAN Local area networks
7. FMS Flexible manufacturing systems: automated multi-machine systems linked by an automated material-handling system.
8. Robots All kinds of robots

**Soft Technologies Investigated**

1. Bar Codes
2. Concurrent Engineering
3. JIT Just-in-time manufacturing
4. Manufacturing Cells
5. MRP Material requirements planning
6. MRP II Manufacturing resource planning
7. SQC Statistical quality control
8. Simulation and Modeling
9. TQM Total quality management

* Denotes technologies not included in the previous studies.
the highest returns on investment (20.8 percent). Extremely skilled users of manufacturing cells are found in the plants with the highest return on investment (21.8 percent).

Employers Invest Highly in Training, Yet Some Workers Are Not Ready To Progress. Without question, the manufacturing workforce must progress to higher skill levels to master new technologies. Accordingly, this third survey includes new questions not asked before about training investments, practices and results — questions whose answers confirm that the weakest dimension of U.S. manufacturers’ continued ability to lead the world is the education, training and skill level of the U.S. workforce.

First, the companies covered in our survey reported an average training budget of 5 percent of payroll. This is higher than most studies on this subject. By comparison, a 1995 Bureau of Labor study found that the training budget was about 4 percent of payroll. The unexpectedly high training expenses may reflect any of the following: import competition, the multiple skills needed in manufacturing cells, employee reassignment and new hires resulting from downsizing, and the need for maintaining high skill levels and corporate agility.

Second, on-the-job training (OJT) is the most commonly used training technique, although it takes more time to train an employee (8.3 months) than otherwise. Training by vendors is the quickest training method (5.3 months). If vendors can provide training, small plants have more to gain by using vendors than larger plants — about four months, compared with two months for larger plants. Each plant should evaluate its own time-money tradeoff.

Third, the lack of availability of trained operators causes delays in the skilled use of technologies by as much as 4.9 months.

Fourth, plant managers find 36 percent of operators lack the education for advanced training, while they consider 40 percent extremely skilled and 47 percent eager to solve problems and learn new skills.

Widespread Soft Technology Use Has Brought Systemic Changes. Since 1993, slightly fewer plants are reporting the use of JIT, TQM and SQC techniques; however, the benefits associated with the use of these soft technologies are on the rise. For example, inventory turns, and rejection and rework rates have improved to 9.7 and 3.3 percent, respectively. One can only conclude that, over the past 15 years, essential features of JIT, TQM and SQC have become such generic and ingrained manufacturing practices in this country that they are losing their association with any specific technique. These systemic changes bring permanence to the improvements we have noticed so far, and the continuous-improvement theme underlying these practices should continue to improve manufacturing performance in this country.
Technology Use Produces Faster Customer Response

Networking Leads Growth in Technology Use. Data from companies that answered both our 1993 and 1997 surveys (the NAM 100 plants) show that the use of local area networks (LANs) has grown more than the use of any other technology since 1993. As seen in Figure 5 (see page 5), 72 percent of these plants used LANs last year, compared with 46 percent then.

Clearly, by 1993, the use of certain discrete technologies had reached saturation. Manufacturers typically invest in several different technologies resulting in internal “islands of automation.” LAN technology enables the integration of these “islands” and taps the synergistic benefits that flow from integration of several technologies, both within the factory and between factories and their customers or suppliers.

The increase in networking has yielded paperwork-cutting, time-saving efficiencies. Transactions between the shop floor and production/materials planning are now 58 percent computerized, while transactions between design engineers and customers are 41 percent computerized. The growth in the use of individual technologies may taper off, but growth will continue in the integration of technologies, and through the computerization of transactions between internal and external units of manufacturing plants.

Manufacturing Cell Use Also Grows Dramatically. Next to LAN use, the use of relatively self-contained manufacturing cells has shown the second-highest increase among the NAM 100 plants (Figure 5). Manufacturing cells and computerized integration contribute to the flexibility of manufacturing plants. Further, manufacturing cells reduce inventory, increase quality and productivity, and enable factories to become better focused. Since the implementation of cells requires multi-skilled operators, the growing use of cells increases the need for operator training.

The upshot in the combination of LAN and cell growth is increased agility: the ability of a plant to respond faster to customer needs. Computerized integration of units inside and outside a factory contributes to agile manufacturing by enhancing the speed of information flow and the ability of manufacturing systems to respond to changes. Manufacturing cells require operators to be skilled in the use of multiple tasks, which also adds to the agility of the plant.
Appendix IV

The Questionnaire

Survey of Manufacturing Technology Use and Training, 1997

Sponsored by the National Association of Manufacturers and the Manufacturing Institute. This shortened survey is expected to take about 12 minutes.

Complete this box only if you want a free copy of the report.

Name (or attach business card)

Address

City State Zip

Important: If your company has many plants, evaluate any one plant with which you are most familiar. The following responses apply to the plant at:

4. The year this plant was commissioned: ___________________________

Please Note: Your company data will not be divulged to anyone. Return your completed questionnaire to the address shown at the bottom of page 4 in the postage-paid envelope for confidential processing at Auburn University. If you want a copy of this study, provide your name and address at the left, or attach a business card.

Important: The last time we did this study in 1993, the aggregate results of that study were nationally released as the widely used report, Technology on the Factory Floor II: Benchmarking Manufacturing Technology Use in the U.S. As many as 1,120 manufacturing plants participated in the previous survey. This year's survey will update the last benchmark and reveal trends in manufacturing-technology use in the United States. Further, this survey investigates training practices and their effectiveness in the use of manufacturing technologies.

A. Rate your plant's SKILL LEVEL in the use of the following technologies (If you are unfamiliar with a technology in the list below, please skip the item):

<table>
<thead>
<tr>
<th>Technology</th>
<th>Do not use</th>
<th>Used with some skill</th>
<th>Used with moderate skill</th>
<th>Used with extreme skill</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. FMS</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6. CIM</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. CAM</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. CAD</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9. JIT/Variations of JIT</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10. MRP</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11. MRP II</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12. Robots (all kinds)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13. Manufacturing cells</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14. SQC/SPC</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15. Bar codes</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16. Automated inspection</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>17. LAN (local area networks)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>18. CNC</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>19. TQM</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>20. Simulation and modeling of</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>processes and equipment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. Concurrent engineering</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
C. To what extent do all transactions between given units use computerized technologies? (circle one)

<table>
<thead>
<tr>
<th>18. Design and shop floor</th>
<th>0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>19. Design and customers</td>
<td>0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%</td>
</tr>
<tr>
<td>20. Design and vendors</td>
<td>0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%</td>
</tr>
<tr>
<td>21. Shop floor &amp; production/</td>
<td>materials planning</td>
</tr>
<tr>
<td></td>
<td>0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%</td>
</tr>
<tr>
<td>22. Manufacturing &amp; marketing</td>
<td>0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%</td>
</tr>
</tbody>
</table>

23. Which one source of assistance was most essential to your technology investment decisions? (check one)
   - 1. a government agency/center
   - 2. consultants
   - 3. vendors
   - 4. customers
   - 5. college/university
   - 6. other

24. We mostly use (check one):  
   - 1. line/flow production
   - 2. job shops
   - 3. manufacturing cells
   - 4. one of a kind
   - 5. small batch
   - 6. large batch
   - 7. mass production

25. We mostly produce (check one):  
   - 1. one of a kind
   - 2. small batch
   - 3. large batch
   - 4. mass production

26. The major product of this plant is

27. Plant exports as a percent of $ sales  
   - 1. none
   - 2. 10–19%
   - 3. 20–35%
   - 4. 36–49%
   - 5. 50% or more

28. In regards to ISO 9000, or 9001, etc., this plant is (check one):  
   - 1. certified
   - 2. in the process of certification
   - 3. very interested
   - 4. slightly interested
   - 5. not interested

29. 4-digit SIC code for majorities of products at this plant, if available

30. The industry this plant belongs to is (check one):  
   - 1. fabricated metal
   - 2. machinery (except electrical) and computers
   - 3. electrical machinery & other electrical
   - 4. transportation and aerospace
   - 5. measurement instruments, photo goods
   - 6. miscellaneous manufacturing

31. Number of manufacturing plants owned by your company/corporation (check one)  
   - 1. 2–4
   - 5–10
   - 11–25
   - 26+

D. Estimate how long the skilled use of typical manufacturing technologies are delayed in this plant by problems.

<table>
<thead>
<tr>
<th>Major problems impeding technology use</th>
<th>The number of months our skilled use of technologies was delayed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Availability of skilled operators</td>
<td>0 1 3 6 12 18 24 36+ months</td>
</tr>
<tr>
<td>2. Hardware problems</td>
<td>0 1 3 6 12 18 24 36+ months</td>
</tr>
<tr>
<td>3. Software problems</td>
<td>0 1 3 6 12 18 24 36+ months</td>
</tr>
<tr>
<td>4. Vendor support below expectations</td>
<td>0 1 3 6 12 18 24 36+ months</td>
</tr>
<tr>
<td>5. Lack of funds for training</td>
<td>0 1 3 6 12 18 24 36+ months</td>
</tr>
<tr>
<td>6. Employee resistance</td>
<td>0 1 3 6 12 18 24 36+ months</td>
</tr>
<tr>
<td>7. Frequent change of products and processes</td>
<td>0 1 3 6 12 18 24 36+ months</td>
</tr>
</tbody>
</table>

E. Rank the size of your training budgets (preceding 12 months) for various training methods used to train employees (exclude managers and executives) and, if you use a method, estimate how long it takes to produce skilled employees:

<table>
<thead>
<tr>
<th>Training method</th>
<th>Rank the training method by budget size (1-largest)</th>
<th>Effectiveness of the technology training method when used alone. Based on our plant’s experience, average number of months needed to produce skilled employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. Training by vendors</td>
<td>1 2 3 6 12 18 24 24+ months</td>
<td>% of payroll % of all operators % of all operators % of all operators % of all operators % of all operators % of all operators % of all operators</td>
</tr>
<tr>
<td>9. Computer-aided self training</td>
<td>1 2 3 6 12 18 24 24+ months</td>
<td>% of payroll % of all operators % of all operators % of all operators % of all operators % of all operators % of all operators % of all operators</td>
</tr>
<tr>
<td>10. On-the-job training</td>
<td>1 2 3 6 12 18 24 24+ months</td>
<td>% of payroll % of all operators % of all operators % of all operators % of all operators % of all operators % of all operators % of all operators</td>
</tr>
<tr>
<td>11. Other in-house training</td>
<td>1 2 3 6 12 18 24 24+ months</td>
<td>% of payroll % of all operators % of all operators % of all operators % of all operators % of all operators % of all operators % of all operators</td>
</tr>
<tr>
<td>12. Training by consultants</td>
<td>1 2 3 6 12 18 24 24+ months</td>
<td>% of payroll % of all operators % of all operators % of all operators % of all operators % of all operators % of all operators % of all operators</td>
</tr>
</tbody>
</table>

F. Please provide approximate estimates for this plant:

13. Percentage of payroll spent yearly on shop-floor operator training
14. Percentage of your shop-floor operators who are extremely skilled
15. Percentage of your shop-floor operators eager to solve problems and learn new skills
16. Percentage of your operators without the education to take advanced technical training
6. We have made significant progress toward attaining the following nine objectives as a direct result of our investments in the technologies on page 1 (check all applicable items below):

<table>
<thead>
<tr>
<th>Check here</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Zero defects</td>
</tr>
<tr>
<td>2. Zero inventory</td>
</tr>
<tr>
<td>3. Mixed-model lines</td>
</tr>
<tr>
<td>4. Focused production</td>
</tr>
</tbody>
</table>

Rate the increase or decrease over the past three years, where applicable:

<table>
<thead>
<tr>
<th>5. Product line increased by</th>
<th>□ 10%</th>
<th>□ 25%</th>
<th>□ 50%</th>
<th>□ 100% or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Return on investment increased by</td>
<td>□ 10%</td>
<td>□ 25%</td>
<td>□ 50%</td>
<td>□ 100% or more</td>
</tr>
<tr>
<td>7. Market share increased by</td>
<td>□ 10%</td>
<td>□ 25%</td>
<td>□ 50%</td>
<td>□ 100% or more</td>
</tr>
<tr>
<td>8. Manufacturing costs decreased by</td>
<td>□ 5%</td>
<td>□ 10%</td>
<td>□ 25%</td>
<td>□ 50% or more</td>
</tr>
<tr>
<td>9. Manufacturing cycle time decreased by</td>
<td>□ 5%</td>
<td>□ 10%</td>
<td>□ 25%</td>
<td>□ 50% or more</td>
</tr>
</tbody>
</table>

10. Approximate rejection plus rework rate at the plant: (_____% of manufacturing costs)

11. Approximate inventory turns (sales/total inventory): (____)

12. Approximate direct labor cost as a percentage of sales: (_____% of sales)

13. Approximate number of product lines produced at this plant: (____)

14. Average number of components in a typical product: (____)

15. Made-to-stock production as a percent of total production: (____% of total production)

16. We require investments in manufacturing equipment be recovered in (____ months)

17. For our typical product, the average lead time from order to shipment is (____ weeks)

18. Our automation and process technology use

<table>
<thead>
<tr>
<th>Extremely weak</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>World-class</th>
</tr>
</thead>
<tbody>
<tr>
<td>19. My overall evaluation of our manufacturing</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>20. Foreign ownership of the plant (check one): □ 1. none □ 2. 1–10% □ 3. 10–25% □ 4. 26–50% □ 5. 51% or more</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. Average annual return on investment (pre-tax) for this plant over the last three years (circle one): 42% or more 36% 30% 30% 24% 24% 18% 18% 12% 12% 6% 6% 6% 6% 6% 6% 6% 6% 6% 6% 6% 6% 6% 6% 42% or less</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. Approximate annual sales of this plant $______</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. Total employment (all employees) at this plant is approximately ______</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24. Approximate percent (based on $ value) of total sales to the U.S. Defense Department or any armed service (circle one): 1. none 2. 1–10% 3. 10–25% 4. 26–50% 5. 51–75% 6. more than 75% 7. don't know</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. Your title (check one) □ 1. owner □ 2. CEO □ 3. president □ 4. general manager □ 5. executive VP □ 6. other VP □ 7. manager □ 8. other</td>
<td></td>
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</tr>
</tbody>
</table>

Note: Questions C1 to C17 are left out by design.