

How Lean Is Print?

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The concept of lean manufacturing has indisputably been embraced by a growing number of companies in the printing industry, as confirmed by a recent survey conducted by PIA/GATF and Point Balance, LLC. The survey, conducted this winter, showed that over half of the respondents were currently using some lean manufacturing techniques in their plant.

While the results showed a degree of implementation that was surprising, other signs have also pointed to the rising belief among print managers that lean can help raise corporate performance. Workshops conducted by PIA/GATF's Center for Lean Manufacturing have been well attended. The book, *Lean Printing: Pathway to Success*, was PIA/GATF Press's top selling book last year, and attendance at the PIA/GATF Continuous Improvement Conference (with its slate of lean topics) has surged in the last few years.

Background

The survey was sent by email in February to executives at 8,500 PIA/GATF member printing firms. Two hundred and one executives, representing the same number of companies, completed the twelve-question survey online.

More than three-fourths (77%) of respondents said they had heard or read about lean manufacturing. Of that group, over one-third (38%) said they were very familiar with the concepts and techniques of lean.

For those not familiar, lean manufacturing, which is often known simply as "lean," is a production philosophy concentrating on value-added activities, removing waste, implementing flow (as opposed to batch and queue), and reducing inventory. The process management philosophy is derived mostly from the Toyota Production System (TPS). It is renowned for its focus on reducing the *seven wastes* (i.e., overproduction, wasted motion, defects, waiting, etc.).

A look at the demographics of those who responded shows a wide distribution by both employee count and geographic regions. The largest number of U.S. responses was from the Midwest (31%) and the smallest number from the East (16%). Large (100+ employees) and

small companies (1–19 employees) were both well represented (30% and 27%, respectively).

Paralleling PIA/GATF's membership base, over half of the executives that completed the survey were from companies specializing in general commercial work with sheetfed offset press equipment. However, responses were received covering all other major processes, including digital printing, flexography, and gravure, as well as all other business segments (direct mail, prepress, trade bindery, greeting cards, labels, etc.).

There was a direct correlation between the size of the respondent's company and whether he/she had heard or read about lean. Ninety-five percent of executives from companies with over 100 employees said, "yes," they had been exposed to lean, compared to 53% from companies with less than twenty employees.

The Survey Results

Of those who had been exposed to lean, the majority of people responding from the largest companies described themselves as very familiar with lean concepts and techniques. This percentage dropped to 24% for the smallest companies. This difference is probably explained by the fact that lean has erroneously been thought of as only appropriate for large manufacturers like Toyota. The larger the printing company, the more it views itself as part of the manufacturing sector that can benefit from such tools. Executives from small companies may be so "hands on" they do not see the need for a production system, nor have the time to study one and put it in place. As one executive said, "because of our firm size, trial-and-error correction has worked in the forming of a smooth production process." Of course, even small companies have significant waste that lean can help target, but this comment probably indicates the prevailing small-company mentality. (See Figure 1.)

Additional insight was gained by delving further into the familiarity executives had with specific concepts and techniques. Of the sixteen items presented, over 50% of respondents claimed familiarity with five: just-in-time production, 5S, kaizen, and value-added/non-value

Familiarity With Lean Concepts & Techniques			
	Not Familiar	Somewhat Familiar	Very Familiar
All Respondents	14.19%	47.74%	38.06%
By Size of Firm (Number of Employees)			
1–19	17.24%	58.62%	24.14%
20–49	24.00%	40.00%	36.00%
50–99	16.28%	55.81%	27.91%
100+	7.02%	38.60%	54.39%

Figure 1. Survey results for the question, “How familiar are you with concepts and techniques of lean manufacturing?”

added activity. Others, such as cellular manufacturing, pull manufacturing, one-piece flow, and takt time, were cited far less often, understandably so as these are some of the hardest concepts to apply to a custom manufacturing industry like printing. However, only about one third of respondents were familiar with two concepts—quick changeover (i.e., fast makereadies) and standardized work (i.e., standard work instructions)—that are more applicable to our industry.

Perhaps the most telling indication of how important lean has become in our industry is that 51% of executives said they are currently using some lean tools and techniques in their plant. This finding surely overestimates what is going on throughout the entire industry as lean users were probably more likely to answer the survey and PIA/GATF members tend to be a bit more progressive than non-member firms. Additionally, the response assumes an accurate knowledge of lean and its implementation, which may not have been the case with some respondents. Still, had this survey been conducted as little as five years ago, it’s a safe bet that the responses would have been vastly different.

Once again, responses vary by company size. The largest companies are far more likely to be using lean than small companies. Even so, over one quarter of the small companies familiar with lean report applying it to at least some degree. (See Figure 2.)

In addition to measuring awareness of lean, familiarity with lean principles, and overall use of lean manufacturing techniques, our survey sought to identify what specific lean tools printing companies are using, which tools have been most beneficial, and which tools have been difficult to implement and use. To obtain these answers, we asked survey participants about thirteen widely used lean manufacturing tools (in alphabetical order):

- Cellular manufacturing
- 5S (sort, straighten, shine, standardize, sustain)
- Just-in-time production
- *Kaizen* (Japanese for “to change and make good”)

Respondents Using Lean Tools & Techniques			
	No	Have Used	Currently Using
All Respondents	36.84%	12.03%	51.13%
By Size of Firm (Number of Employees)			
1–19	54.17%	16.67%	29.17%
20–49	52.63%	5.26%	42.11%
50–99	44.44%	11.11%	44.44%
100+	18.87%	13.21%	67.92%

Figure 2. Survey results for the question, “Have you used or are you using any lean manufacturing tools/techniques in your business?”

- *Kanbans* (material replenishment system)
- Overall equipment effectiveness (OEE)
- Pull manufacturing (production based on customer demand)
- SMED/quick changeover (single-minute exchange of die)
- Standardized work (standard operating procedures)
- Takt time (German word for “pace” or “rhythm”)
- Total productive maintenance
- Value-stream costing
- Value-stream mapping

The three most widely used lean manufacturing tools identified in our survey were just-in-time production, 5S, and standardized work. Sixty-three percent of survey respondents said they are currently using just-in-time production, while 57% are using 5S, and 52% are using standardized work. The least-used lean manufacturing tools in our survey were takt time, value-stream costing, and overall equipment effectiveness.

According to our survey, the most beneficial lean manufacturing tools are just-in-time production, 5S, kaizen (continuous improvement), and standardized work. Seventy-six percent of survey respondents rated just-in-time production as “somewhat beneficial” or “very beneficial.” Seventy-three percent of executives gave the same ratings to 5S, and 65% of survey respondents rated kaizen and standardized work as somewhat or very beneficial. The three least beneficial lean manufacturing tools in our survey were value-stream costing, takt time, and pull manufacturing. Only 24% of survey respondents rated value-stream costing as somewhat or very beneficial, while only 25% gave good ratings to takt time, and only 37% judged pull manufacturing to be beneficial. (See Figure 3.)

Printing company managers have clearly found some lean manufacturing tools easier to implement and use than others. Forty-six percent of our survey respondents described 5S as “not difficult,” while 37% found kaizen easy to use. In contrast, 45% of responding executives described Standardized Work as “somewhat difficult” or “very

Which Lean Tools & Techniques Have Been the Most Beneficial?				
	Have Not Used	Not Beneficial	Somewhat Beneficial	Very Beneficial
5S	26.19%	1.19%	17.86%	54.76%
Kaizen	34.52%	0.00%	27.38%	38.10%
Just-in-Time Production	23.81%	0.00%	40.48%	35.71%
Standardized Work	34.52%	0.00%	29.76%	35.71%
Value-Stream Mapping	44.05%	2.38%	17.86%	35.71%
SMED/Quick Changeover	48.81%	1.19%	17.86%	32.14%
Total Productive Maintenance	54.76%	2.38%	16.67%	26.19%
Cellular Manufacturing	58.33%	3.57%	16.67%	21.43%
Kanbans	54.76%	1.19%	23.81%	20.24%
Pull Manufacturing	60.71%	2.38%	20.24%	16.67%
Overall Equipment Effectiveness	59.52%	1.19%	28.57%	10.71%
Value-Stream Costing	73.81%	2.38%	13.10%	10.71%
Takt Time	73.81%	1.19%	15.48%	9.52%

Figure 3. Survey results for the question, “Which of the following lean manufacturing tools/techniques have been most beneficial for your business?”

difficult” to implement and use. Forty-two percent of our respondents found just-in-time production difficult to implement, and 35% of respondents characterized value-stream mapping as hard to use.

The introduction of lean manufacturing practices into a business often creates a need for new performance measures. Lean manufacturing changes how companies operate, often in significant ways. But, lean companies still need to measure business performance effectively. The problem is that many traditional performance measures don’t fit lean practices. Over 70% of the executives in our survey whose companies are using lean tools indicated they have implemented new business performance measures.

To determine what new performance measures lean printing companies have implemented, we identified fifteen performance measures commonly used by companies that have implemented lean, and we asked survey participants to indicate whether or not they were using each measure. (See Figure 4.)

It’s important to note that not all of the performance measures included in our survey are used *exclusively* by companies implementing lean. For example, sales per employee is a productivity measure that is widely used by both lean and non-lean companies.

The three most popular performance measures identified in our survey were (1) makeready times, (2) sales per employee, and (3) on-time shipment. Sixty-five percent of survey respondents measure makeready times, while 55% track sales per employee, and 54% measure on-time shipment. None of these performance measures is uniquely “lean” in orientation. The most popular performance

measure that is uniquely lean is 5S performance audits, which 46% of our survey respondents are using.

Perhaps the most surprising finding in our survey related to the use of lean manufacturing principles in non-manufacturing areas of business. Fifty-one percent of our survey respondents reported they are using or have used lean manufacturing principles and techniques outside the shop floor. Fifty-eight percent of companies with 100 or more employees said they are using lean manufacturing practices and tools in non-manufacturing business operations. These results are surprising because most companies that implement lean begin on the shop floor and move to other business operations after their lean manufacturing practices have become well established. Our survey indicates a significant number of printing company managers have recognized lean principles can also be effective in non-manufacturing settings.

In Conclusion

Finally, our survey clearly demonstrates printing company managers view lean manufacturing as important for the future. Sixty-two percent of the executives responding to our survey said lean manufacturing is “very important” or “critical” to the future success of their companies. It is also clear, however, managers of large printing companies see lean as more important than managers of smaller companies. Seventy-five percent of managers whose companies have more than 100 employees see lean as very important or critical for the future, while only 45% of small company managers give lean this level of importance.

Which Performance Measures Are Currently In Use?

	Yes	No
Makeready (Setup) Times	65.48%	34.52%
Sales per Employee	54.76%	45.24%
On-Time Shipment	53.57%	46.43%
Accounts Receivable Days Outstanding	48.81%	51.19%
5S Performance Audits	46.43%	53.57%
Day-by-the-Hour Production	33.33%	66.67%
Value-Stream Productive Time	25.00%	75.00%
Operational Equipment Effectiveness (OEE)	22.62%	77.38%
Value-Stream Non-Productive Time	19.05%	80.95%
Value-Stream Floor Space	15.48%	84.52%
First Time Through Rates	14.29%	85.71%
Value-Stream Available Capacity	13.10%	86.90%
Value-Stream Gross Profit	13.10%	86.90%
Dock-to-Dock Time	4.76%	95.24%
Not Currently Using Lean Performance Measures	3.57%	96.43%
Other	2.38%	97.62%

Figure 4. Survey results for the question, "Which, if any, of the following lean performance measures are you using in your business?"

The results of our survey indicate that printing company managers view lean as an important performance improvement tool. These results also reflect what's generally happening in the business world. According to the *Management Tools and Trends 2007* survey conducted by Bain & Company, 59% of North American survey respondents are using lean tools and techniques in some part of their business operations. Obviously, our survey leaves some important questions unanswered. We need further research to learn more about how printing companies are applying lean principles that were originally developed for a very different kind of manufacturing environment. But now there is no doubt that lean is clearly on the radar screen of progressive printing company managers.

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