Manufacturing Operations Management 2011

November 2011
Kevin Prouty

~ Underwritten, in Part, by ~

APRISO
CDC Software
Executive Summary

Manufacturing companies are preparing for growth and expanding markets around the world. They must keep their manufacturing operations continuously improving while at the same time expanding their infrastructure and capabilities. This study, conducted from September 2011 to October 2011 of 150 manufacturers, examines how companies are preparing their manufacturing infrastructure for growth, while laying the foundation for continuous improvement and greater efficiencies. This research focuses on how companies deploy Manufacturing Operations Management (MOM) systems beyond single plants.

Best-in-Class Performance

Aberdeen uses four Key Performance Indicators (KPIs) to identify Best-in-Class performance, with the Best-in-Class averaging:

- 91% Overall Equipment Effectiveness (OEE)
- 94% on-time and complete shipments
- 88% successful new product introductions
- + 3% operating margin versus corporate plan

Competitive Maturity Assessment

Survey results show that the firms enjoying Best-in-Class performance shared several common characteristics, including:

- Best-in-Class companies deploy to 40% more of their plants than all others
- Best-in-Class manufacturers deploy almost twice as much MOM functionality to their operations
- Best-in-Class manufacturers are over 30% more likely than the all others to have automated their engineering change process

Required Actions

In addition to the specific recommendations in Chapter Three of this report, to achieve Best-in-Class performance, companies must:

- Deploy MOM functions to more plants
- Use MOM deployments to capture best practice business processes throughout manufacturing operations
- Automate the engineering change process and use it to dynamically update best practices into business processes

Research Benchmark

Aberdeen’s Research Benchmarks provide an in-depth and comprehensive look into process, procedure, methodologies, and technologies with best practice identification and actionable recommendations.

How Does Your Performance Compare to the Best-in-Class?

- Compare your processes
- Receive a free, personal PDF scorecard
- Benefit from custom recommendations to improve your performance, based on the research

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### Chapter One: Benchmarking the Best-in-Class

#### Business Context

Aberdeen’s *ERP in Manufacturing 2011* study from June 2011 found that one of the top business pressures on manufacturing companies was managing growth. This comes down to being able to effectively grow the business while maintaining operational efficiency. That same report showed that this growth is expected while still reducing costs. This means that for a manufacturing company to be a top performer, they must have visibility into not only their manufacturing operations, but into the performance of the systems and infrastructure that support manufacturing.

#### Figure 1: Top Business Pressures for Manufacturing Overall

![Bar chart showing top business pressures for manufacturing, with blue, yellow, and red bars for Small, Midsize, and Large companies.]

- We need to be easier to do business with (improve overall customer experience): 42% Small, 38% Midsize, 35% Large
- Need to manage growth expectations: 32% Small, 30% Midsize, 35% Large
- Must reduce costs: 32% Small, 38% Midsize, 35% Large
- Must improve customer response time: 19% Small, 15% Midsize, 19% Large
- Pressures to innovate (products or services) to deliver more value to the customer: 19% Small, 13% Midsize, 19% Large

Percentage of Respondents, n = 104

Source: Aberdeen Group, June 2011

Part of any manufacturing infrastructure is the Manufacturing Operations Management (MOM) systems. MOM, by S95 defined in the sidebar, is a Manufacturing Execution System (MES) that also encompasses production, quality, maintenance, and inventory systems and processes. MOM plays a critical role in automating business processes in manufacturing and laying a foundation for continuous improvement.

#### The Maturity Class Framework

In this study, conducted from September 2011 to October 2011, Aberdeen uses four key performance criteria to distinguish the Best-in-Class from Industry Average and Laggard organizations:

- **On-time and complete shipments** - products delivered on time and complete as compared to total original commitment
- **Overall Equipment Effectiveness (OEE)** - composite metric accounting for availability, performance, and product quality
- **Successful new product introductions** - measured as the average share of new product introductions that hit quality, time, and volume targets
- **Operating margin versus corporate plan** - measured as operating margin realized relative to the corporate goals established
Respondents were divided among three categories based on their aggregate performances in these four metrics. Table 1 displays the average performance of Best-in-Class, Industry Average, and Laggard organizations.

Table 1: Top Performers Earn Best-in-Class Status

<table>
<thead>
<tr>
<th>Definition of Maturity Class</th>
<th>Mean Class Performance</th>
</tr>
</thead>
</table>
| Best-in-Class: Top 20% of aggregate performance scorers | • 89% OEE  
  • 98% on time and complete shipments  
  • 86% successful new product introductions  
  • +5% operating margin vs. plan |
| Industry Average: Middle 50% of aggregate performance scorers | • 80% OEE  
  • 91% on time and complete shipments  
  • 75% successful new product introductions  
  • +1% operating margin vs. plan |
| Laggard: Bottom 30% of aggregate performance scorers | • 59% OEE  
  • 85% on time and complete shipments  
  • 62% successful new product introductions  
  • -4% operating margin vs. plan |

Source: Aberdeen Group, October 2011

The Best-in-Class PACE Model

To achieve these types of benefits from an MOM solution, a combination of strategic actions, organizational, knowledge and performance management capabilities, and enabling technologies are required. These are summarized as shown in Table 2.

Table 2: The Best-in-Class PACE Framework

<table>
<thead>
<tr>
<th>Pressures</th>
<th>Actions</th>
<th>Capabilities</th>
<th>Enablers</th>
</tr>
</thead>
</table>
| • Globalization of manufacturing operations | • Improve visibility into global manufacturing operations  
  • Increase focus on Lean and operational excellence initiatives | • Automated work flows to manage manufacturing non-conformance and non-compliance events across the enterprise  
  • Dynamically update manufacturing business processes as best practices emerge  
  • Automated data collection from across manufacturing operations  
  • Real-time visibility into customer demand  
  • Executives have real-time visibility into the performance of global manufacturing operations  
  • Automation of the engineering change management process  
  • Impact of operations on sustainability initiatives understood and reported | • Manufacturing Operations Management (MOM) solution extending across majority of manufacturing sites and the functional areas of production, quality, inventory, and maintenance  
  • Product Life Cycle Management (PLM), manufacturing process planning, and engineering change orders  
  • Enterprise Manufacturing Intelligence - data collection, abstraction, and aggregation with analytical and dashboard capabilities  
  • Supply Chain Management (SCM)  
  • Enterprise Resource Planning (ERP) |

Source: Aberdeen Group, October 2011

Operational Pressures and Best-in-Class Strategies

As Figure 2 shows, the top driver for Best-in-Class companies is the globalization of their manufacturing operations. This particular driver is way down on the list for all other companies. But all manufacturing companies in...
this study felt significant pressure from customer demands, increasing costs, and ensuring product quality.

**Figure 2: Top Pressures Impacting Manufacturing Operations**

<table>
<thead>
<tr>
<th>Pressure</th>
<th>Percentage of Respondents, n = 150</th>
</tr>
</thead>
<tbody>
<tr>
<td>Globalization of the manufacturing plant network</td>
<td>41%</td>
</tr>
<tr>
<td>Increasing demands of customers to deliver on time and complete</td>
<td>37%</td>
</tr>
<tr>
<td>Increasing operational costs</td>
<td>39%</td>
</tr>
<tr>
<td>Ensure finished product quality</td>
<td>30%</td>
</tr>
</tbody>
</table>

As the research demonstrates, the major discrepancy in the pressures companies are feeling is really around the globalization issue. Best-in-Class organizations are very much focused on supporting global operations, and then providing visibility into those distributed operations.

Additionally, Figure 3 shows the top strategies that companies put in place to address the aforementioned pressures. Lean and operational efficiency look to be some of the top strategies that companies are setting in motion. In most cases operational efficiency is akin to Lean, but can also be other continuous improvements programs like Six-Sigma.

**Figure 3: Top Strategies that Impact Manufacturing Operations**

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Percentage of Respondents, n = 150</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase focus on Lean and operational excellence initiatives</td>
<td>46%</td>
</tr>
<tr>
<td>Promote visibility between manufacturing operations and the enterprise</td>
<td>31%</td>
</tr>
<tr>
<td>Improve the efficiency of manufacturing operations</td>
<td>46%</td>
</tr>
<tr>
<td>Synchronize operational performance with corporate performance objectives</td>
<td>25%</td>
</tr>
</tbody>
</table>

“We deployed our MOM system in order to help us reduce process variation; to help identify root causes of downtime and hence improve OEE; to improve traceability and reduce batch sizes in the event of customer concerns or warranty issues. The projects were largely successful on all counts, but the big challenges came in interfacing to a wide variety of shop floor machines and consistently capturing data from the PLC/SCADA layer.”

~ IT Manager, Large aerospace and automotive manufacturer

**Acronyms**

- **MOM**: Manufacturing Operations Management
- **MES**: Manufacturing Execution Systems
- **MI**: Manufacturing Intelligence
- **OI**: Operational Intelligence
- **QMS**: Quality Management Systems
- **PLM**: Product Lifecycle Management
- **SCM**: Supply Chain Management
- **ERP**: Enterprise Resource Planning

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But where it gets a little more interesting is the second most common strategy for Best-in-Class companies – promoting visibility between manufacturing operations and the enterprise. Here we see a divergence between Best-in-Class and all others (the Industry Average and Laggard companies combined), with almost a third (31%) of the Best-in-Class and only a fifth (20%) of all others indicating this was a top strategy. Beyond operational efficiency, this can be a key driver for MOM deployments. Operational visibility and transparency is often seen as a major benefit of a MOM deployment. It can give executive decision-makers the tools and information they need to make enterprise-wide manufacturing decisions closer to real-time.

Aberdeen Insights — Deployment

MOM systems typically provide benefits even in single deployments, but our research has shown that Best-in-Class companies deploy more MOM to more facilities. Best-in-Class companies deploy MOM to 78% of their plants, while all others tend to deploy to less than half. Additionally, Best-in-Class companies are leveraging over twice as much of the systems’ functionality based on the ISA-95 (S95) standard for MOM and MES.

What this means is that Best-in-Class companies typically spend more on deployment than other companies (Table 3).

<table>
<thead>
<tr>
<th>Maturity Class</th>
<th>Deployment costs for MOM</th>
</tr>
</thead>
</table>
| **Best-in-Class:** Top 20% of aggregate performance scorers | • $2,880/user services and software for the first plant  
• $2,200/user for subsequent plant implementations  
• 47% reduction in services for new plants |
| **Industry Average:** Middle 50% of aggregate performance scorers | • $2,100/user services and software for the first plant  
• $1,900/user for subsequent plant implementations  
• 29% reduction in services for new plants |
| **Laggard:** Bottom 30% of aggregate performance scorers | • $2,200/user services and software for the first plant  
• $1,800/user for subsequent plant implementations  
• 32% reduction in services for new plants |

Source: Aberdeen Group, October 2011

The Best-in-Class spend almost 30% more than all others to deploy more MOM functions on the initial plant. They also spend only about 10% more on subsequent plants. They do this by reducing spending on services to subsequent plants by 47% on average. While other companies also reduce service costs by a significant margin, Best-in-Class companies are able to reduce these costs substantially more than others.

In the next chapter, we will see what the top performers are doing to achieve these gains.

“We had to put in a MOM system. We were doing business around the globe with scattered and disconnected systems. We always felt we were making decisions with only half the information we needed.”

~ Manager, Large aerospace avionics manufacturer
Chapter Two: Benchmarking Requirements for Success

Best-in-Class performance does not just happen because someone buys a new system. You have to take into account what a company is capable of in terms of organization, business process, knowledge management, and performance management. It's when the capabilities are combined with technology enablers that Best-in-Class performance happens. And keep in mind that the direction is set for what capabilities are important at the strategy level, which in turn is driven by the pressures a company is feeling.

The following is a great example of a company transitioning from a single point MOM solution to a successful global MOM strategy.

Case in Point

A $200M manufacturer of brake components for the automotive industry went through several iterations of MOM strategies before developing a successful strategy that allowed it to deploy a system to 15 of its 20 rake plants. The Director of Manufacturing IT explained that they spent three years trying to implement several different strategies into multiple plants before senior management put a halt to all projects to come up with a global strategy.

He stated that not only did the global deployment strategy for MOM reduce overall implementation costs by over 50%, it allowed the company to examine and roll out best practices for quality management and maintenance management. The new strategy and system allowed them to consolidate production plants by aligning them better to the customer for each plant. That by itself generated over $3M in savings through inventory and headcount reduction. It also improved customer service and reduced charge backs due to incorrect product packaging from an average of $200K per plant to less than $70K per plant per year.

He was also adamant that those savings weren’t the biggest benefits for a global MOM strategy. He said that senior management’s global view of all manufacturing operations has allowed them to quickly see which plants are performing well and which ones need improvement. It has also allowed them to move business around to better match plant capabilities.

The main hurdle this director had was resistance from plant managers to global deployments. Each plant manager ran their plants like a fiefdom and actually resisted the full transparency that MOM brings. They were eventually won over by a combination of demonstrating the plant-specific benefits of MOM and the benefits of enhanced views into enterprise-wide operations.

Fast Facts
For this survey, the value chain position breakdown for respondents is:

- 74% original equipment manufacturers
- 21% private label manufacturers
- 18% tiered component and raw material suppliers
Competitive Assessment

Aberdeen Group analyzed the aggregated metrics of surveyed companies to determine whether their performance ranked as Best-in-Class, Industry Average, or Laggard. In addition to having common performance levels, each class also shared characteristics in five key categories: (1) **process** (demonstrated ability to standardize processes and ERP implementation); (2) **organization** (executive commitment and assigned ownership of ERP implementation); (3) **knowledge management** (providing visibility in order to drive decision-making); (4) **technology** (effective use of modules of and extensions to ERP, along with providing users with immediate access to data, regardless of location); and (5) **performance management** (the ability of the organization to measure its results to improve its business). These characteristics (identified in Table 4) serve as a guideline for best practices, and correlate directly with Best-in-Class performance across the key metrics.

Table 4: The Competitive Framework

<table>
<thead>
<tr>
<th></th>
<th>Best-in-Class</th>
<th>Average</th>
<th>Laggards</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Process</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formal process in place to manage engineering data through plant lifecycle</td>
<td>63%</td>
<td>51%</td>
<td>24%</td>
</tr>
<tr>
<td>Standardized measurement of KPIs across enterprise</td>
<td>68%</td>
<td>62%</td>
<td>49%</td>
</tr>
<tr>
<td>Manufacturing business processes are dynamically updated as new best practices emerge</td>
<td>55%</td>
<td>46%</td>
<td>21%</td>
</tr>
<tr>
<td><strong>Organization</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operations and IT leadership collaborate on the design and deployment of manufacturing systems</td>
<td>53%</td>
<td>50%</td>
<td>44%</td>
</tr>
<tr>
<td><strong>Knowledge Management</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Executives have real-time visibility into the performance of global manufacturing operations</td>
<td>44%</td>
<td>33%</td>
<td>24%</td>
</tr>
<tr>
<td>Real-time visibility from manufacturing operations to supplier performance</td>
<td>36%</td>
<td>25%</td>
<td>15%</td>
</tr>
<tr>
<td>Environmental impact of operations is understood and reported</td>
<td>35%</td>
<td>35%</td>
<td>28%</td>
</tr>
<tr>
<td><strong>Performance Management</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operational metrics are linked financial metrics</td>
<td>69%</td>
<td>63%</td>
<td>50%</td>
</tr>
<tr>
<td>Energy consumption and costs are used as KPIs for operational decision making</td>
<td>32%</td>
<td>32%</td>
<td>15%</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 87% ERP</td>
<td>• 76% ERP</td>
<td>• 71% ERP</td>
<td></td>
</tr>
<tr>
<td>• 64% SCM</td>
<td>• 44% SCM</td>
<td>• 43% SCM</td>
<td></td>
</tr>
<tr>
<td>• 45% MOM</td>
<td>• 42% MOM</td>
<td>• 31% MOM</td>
<td></td>
</tr>
<tr>
<td>• 44% PLM</td>
<td>• 32% PLM</td>
<td>• 36% PLM</td>
<td></td>
</tr>
</tbody>
</table>

Source: Aberdeen Group, October 2011
Capabilities and Enablers

Based on the findings of the Competitive Framework and interviews with manufacturing executives, Aberdeen’s analysis demonstrates that there are a number of different business capabilities and technology enablers driving Best-in-Class performance.

Process

One of the most important aspects of a dynamic manufacturing environment that is a these plants are consistently struggling to manage change. This includes being able to adapt to changing demands and business processes. Best-in-Class companies are over twice as likely as Laggards to be able to capture and change new business process. This is especially important as we saw above that Lean and other continuous improvement initiatives are a critical strategy for all companies. Even Industry Average companies are over twice as likely to be able to dynamically change their business processes, though slightly less likely than the Best-in-Class. This is critical as continuous improvement initiatives develop new and more efficient process.

Another aspect of the change process is the more formal engineering change process. As Figure 4 shows, Best-in-Class companies outstrip all companies in managing manufacturing process changes and product changes.

Figure 4: Engineering Change Process Capabilities

![Figure 4](image)

<table>
<thead>
<tr>
<th>Capability</th>
<th>Best-in-Class</th>
<th>Industry Average</th>
<th>Laggard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing effectively collaborates with</td>
<td>63%</td>
<td>56%</td>
<td>51%</td>
</tr>
<tr>
<td>Product Engineering / Design</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing data is fed back into Product</td>
<td>44%</td>
<td>21%</td>
<td>20%</td>
</tr>
<tr>
<td>Development or Product Lifecycle Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>systems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plant engineering data (process, P&amp;ID, E&amp;I&amp;C,</td>
<td>50%</td>
<td>36%</td>
<td>42%</td>
</tr>
<tr>
<td>3d/2d CAD, etc) managed in a central data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>repository</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Aberdeen Group, October 2011

Being able to dynamically change both business processes and effectively manage the engineering change process makes Best-in-Class companies overall better able to adapt to changes inside and outside the organization.

Organization

Historically, there has been a great amount of tension between manufacturing and IT over MOM-type systems. In fact, my own plant in my
past had a “clandestine IT system” to help us manage our day-to-day operations. We had this IT organization because our goals and our corporate IT organization’s goals were different. They were about reporting and we were about operating.

Thus, the tension comes from IT and manufacturing not collaborating effectively on what these systems should provide. Table 4 shows us that Best-in-Class companies are almost 20% more likely to have manufacturing and IT working together. But even then, across the board, less than half of all companies have effective collaboration between IT and operations.

**Knowledge Management**

The key to effective global operations of a manufacturing company is visibility into all manufacturing operations in a timeframe where decisions are relevant. The same can even be said about operations of a single plant and striving to enable continuous improvement. Table 4 shows that Best-in-Class companies were 70% more likely than all others to provide that global visibility to senior executives that are tasked with managing global operations.

We also see from Table 4 that the Best-in-Class not only provide that broad geographic visibility, but also the depth of visibility into manufacturing operations. Best-in-Class companies are almost twice as likely as all others to provide management with visibility from manufacturing order to supplier performance. This allows them to make strategic decisions on suppliers within the context of how it impacts operations.

**Performance Management**

One thing that is consistent throughout all of Aberdeen’s research is that companies that measure well tend to succeed. Manufacturing operations is no different. In the most important area, linking operational metrics with financial metrics, having this capability would seem obvious. But unfortunately it is not universal. Table 4 shows that the Best-in-Class are almost 40% more likely to link financial metrics with operational metrics. It may sound crazy, but I have personally seen companies where a plant manager is measured on things that completely unrelated to corporate goals. It is usually just a communications problem, but can drive counterproductive behavior. For example, in my plant, corporate set a goal for overtime percentage, yet I tracked employee cost directly and knew it was a better metric than strictly overtime. You can probably guess I slowly became more concerned with corporate’s metric the closer bonus time came.

**Technology Enablers**

When we look at technology for manufacturing operations, it is important to understand the overall picture at the enterprise-level. That environment will define the infrastructure that manufacturing operations has to work with as it grows. Figure 4 shows the enterprise application layout of the manufacturing companies in our research.
As we can see, ERP is almost universal at well over 75% for all companies. Even with MOM there is little difference in all companies. As we have already stated, it’s not how much MOM you have as much as it what you do with it.

We do start to see a divergence in maturity class at PLM and SCM. Best-in-Class companies are much more likely to be using both PLM and SCM as enterprise-level tools. And looking back at the difference in how change management is handled, we can see that Best-in-Class companies are most likely using MOM and PLM integration.

**Business Process Automation with MOM**

While we already showed how Best-in-Class companies deploy more MOM functions than all others, we did not layout the most important aspect; business process automation. The key to using the most of MOM as possible is automating business processes in the manufacturing area. As an example, Figure 6 shows important business processes for quality execution and how a company used MOM to automate the process.

"Our MOM system started as a simple quality system to manage one customer. It now runs our entire plant and has reduced the time to respond to an ECN from a week to three hours."

~ Executive, $100M industrial equipment manufacturer
Note that Best-in-Class companies are much more likely to have automated these key business processes. Figure 7 shows, when it comes to workforce management, Best-in-Class companies have also automated more of the business processes than all others. This is reflected directly in the amount of functions deployed by Best-in-Class companies.

"We deployed MOM and MES to improve response time, shorten lead time and reduce indirect cost through better information availability. Our success is based in large part on 1) improving processes and standardization prior to implementation and 2) involvement of appropriate operations management personnel."

~ Joe Papp, IT Manager, CIRAS, a small industrial products manufacturer
Using this aspect of our research we were able to determine that, on average, Best-in-Class companies made use over twice as much MOM functionality as other companies. And we can see from Table 1 that Best-in-Class companies significantly outperform all other manufacturing companies.

Aberdeen Insights – Interoperability

One aspect of the S95 standard for MOM is the interoperability of a MOM system with other enterprise-level systems. Those systems are called Level 4 systems and are defined as including ERP, Quality Management Systems (QMS), Product Lifecycle Management (PLM), and Enterprise Asset Management (EAM). Figure 8 shows the distinction between Best-in-Class companies and all others when it comes to interoperability.

Figure 8: Real-time Interoperability with MOM

As can be seen, Best-in-Class companies are twice as likely to have some real-time interoperability between MOM and all the above systems, with the exception of ERP. With ERP, all companies are fairly even in this capability. Having this real-time interoperability can significantly reduce the time to move information and can be a large factor in time to decision and the ability to automate certain business processes.
Chapter Three: Required Actions

The success or failure of a MOM strategy is not just whether it delivers benefits to an isolated part of your operations. It is dependent on pushing as much of the MOM system out to as many business processes and plants as possible. Whether a company is trying to move its performance in manufacturing operations from Laggard to Industry Average, or Industry Average to Best-in-Class, the following actions will help spur the necessary performance improvements:

Laggard Steps to Success

- **Extend the visibility of your manufacturing operations.** Best-in-Class companies are almost twice as likely to provide visibility into global manufacturing operations as Laggards. This lets senior managers make decisions with the context of the entire organization, not just isolated plants.

- **Connect operations to supplier performance.** Once again, Best-in-Class companies are over twice as likely as Laggards to give operations real-time visibility into supplier performance. That visibility allows operations to prepare for disruptions and more effectively choose its key suppliers.

- **Automate engineering change management.** Getting control of the chaos that can be change management is a critical step that Best-in-Class companies have taken. They are over 30% more likely than all other companies to have automated this process.

Industry Average Steps to Success

- **Extend your MOM system to more users.** While Industry Average companies were able to reduce the cost of multiple deployments by 30%, Best-in-Class companies save 47% on services in subsequent plants. Best-in-Class companies do this through deploying to more users and capturing best practices.

- **Implement more formal processes for capturing new best practices.** Industry Average companies are doing a good job of this, as 46% already have this capability, but the Best-in-Class companies are at 55%. The next step for Industry Average companies is to adopt this as a goal for the continuous improvement teams. This will allow rapid MOM deployment and move towards standardized processes.

Best-in-Class Steps to Success

- **Drive more visibility in supplier performance.** Even though Best-in-Class companies outpace all others in having visibility into supplier performance by a factor of over two, only about a third of

Fast Facts

Extensions take ERP usage into areas outside the core system. The most common ERP extensions for the Best-in-Class are:

- Quality system at 63% of respondents
- Manufacturing Execution System (MES) at 57% of respondents
- Warehouse management system at 50% of respondents

How Does Your Performance Compare to the Best-in-Class?

Technology Enablers

- Compare your processes
- Receive a free, personal PDF scorecard
- Benefit from custom recommendations to improve your performance, based on the research

Take the Assessment

Receive Your Free Scorecard
Best-in-Class companies actually do this. Getting that visibility will significantly reduce the tendency for operations to be whipped around by supplier instability.

- **Use MOM to drive sustainability.** Best-in-Class companies lead all others in using MOM to manage electrical usage. But even then, only one-third of are actually using it for any type of electrical monitoring and reporting. MOM is the perfect system for this because it has the capability to connect to electrical systems and has the business context for reporting usage. This lets a manufacturing company intelligently reduce its power footprint.

<table>
<thead>
<tr>
<th>Aberdeen Insights — Summary</th>
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<tbody>
<tr>
<td>As companies are growing, it is easy to treat MOM as an individual system and deploy it as a local plant manager sees fit. But Best-in-Class companies are creating global MOM strategies that take advantage of their own key capabilities. They are putting the right processes in place, leveraging the appropriate tools, and applying best practices, in order to reduce the cost of MOM deployments and deliver more of the tangible business benefits to a wider audience within the organization.</td>
</tr>
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</table>

"ERP has brought more visibility to our manufacturing and service organization. Earlier, our time to invoice was 100 days, now it is reduced to less than 15 days. Inventory accuracy was around 80%, now it is around 90%. We expect to reduce purchasing costs and other operations costs by improving our usage."

~ Manager, large oil and gas company
Appendix A: Research Methodology

Between September and October 2011, Aberdeen examined the use, the experiences, and the intentions of more than 150 enterprises using Manufacturing Operations Management (MOM) applications in a diverse set of manufacturing enterprises.

Aberdeen supplemented this online survey effort with interviews with select survey respondents, gathering additional information on MOM strategies, experiences, and results.

Responding enterprises included the following:

- **Job title / function:** The research sample included respondents with the following job titles: CxO, President or Vice President (16%); Director (24%); Manager (41%); Staff (9%)

- **Industry:** The research sample included respondents exclusively from the following industries: High Tech Manufacturing (21%); Aerospace and Defense (17%); Industrial Equipment Manufacturing (14%); Industrial Products (12%); Medical Devices (14%); Consumer Packaged Goods (8%); Automotive (8%); Metal and Metal Products (4%)

- **Geography:** The majority of respondents (67%) were from North America and South America. Remaining respondents were from the Europe (22%) and Asia Pacific (11%).

- **Company size:** Twenty-nine percent (33%) of respondents were from large enterprises (annual revenues above US $1 billion); 39% were from midsize enterprises (annual revenues between $50 million and $1 billion); and 28% of respondents were from small businesses (annual revenues of $50 million or less).

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**Study Focus**

Responding manufacturing executives completed an online survey that included questions designed to determine the following:

- The benefits, if any, that have been derived from manufacturing operations management initiatives

- How much of the functions in their MOM systems they have deployed

- The relative costs of deployments for manufacturing operations management and changes in costs as deployment accelerates

- What business processes they are automating in their manufacturing operations

The study identified how manufacturing companies captured best practices, managed change, and deployed technology to drive operational efficiency. It can be used as a framework so readers can assess their own management capabilities.
### Table 5: The PACE Framework Key

<table>
<thead>
<tr>
<th><strong>Overview</strong></th>
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<tbody>
<tr>
<td>Aberdeen applies a methodology to benchmark research that evaluates the business pressures, actions, capabilities, and enablers (PACE) that indicate corporate behavior in specific business processes. These terms are defined as follows:</td>
</tr>
<tr>
<td><strong>Pressures</strong> — external forces that impact an organization's market position, competitiveness, or business operations (e.g., economic, political and regulatory, technology, changing customer preferences, competitive)</td>
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<td><strong>Actions</strong> — the strategic approaches that an organization takes in response to industry pressures (e.g., align the corporate business model to leverage industry opportunities, such as product / service strategy, target markets, financial strategy, go-to-market, and sales strategy)</td>
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<tr>
<td><strong>Capabilities</strong> — the business process competencies required to execute corporate strategy (e.g., skilled people, brand, market positioning, viable products / services, ecosystem partners, financing)</td>
</tr>
<tr>
<td><strong>Enablers</strong> — the key functionality of technology solutions required to support the organization’s enabling business practices (e.g., development platform, applications, network connectivity, user interface, training and support, partner interfaces, data cleansing, and management)</td>
</tr>
</tbody>
</table>

Source: Aberdeen Group, November 2011

### Table 6: The Competitive Framework Key

<table>
<thead>
<tr>
<th><strong>Overview</strong></th>
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<td>The Aberdeen Competitive Framework defines enterprises as falling into one of the following three levels of practices and performance:</td>
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<td><strong>Best-in-Class (20%)</strong> — Practices that are the best currently being employed and are significantly superior to the Industry Average, and result in the top industry performance.</td>
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<tr>
<td><strong>Industry Average (50%)</strong> — Practices that represent the average or norm, and result in average industry performance.</td>
</tr>
<tr>
<td><strong>Laggards (30%)</strong> — Practices that are significantly behind the average of the industry, and result in below average performance.</td>
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</tbody>
</table>

In the following categories:

- **Process** — What is the scope of process standardization? What is the efficiency and effectiveness of this process?
- **Organization** — How is your company currently organized to manage and optimize this particular process?
- **Knowledge** — What visibility do you have into key data and intelligence required to manage this process?
- **Technology** — What level of automation have you used to support this process? How is this automation integrated and aligned?
- **Performance** — What do you measure? How frequently? What’s your actual performance?

Source: Aberdeen Group, November 2011

### Table 7: The Relationship Between PACE and the Competitive Framework

<table>
<thead>
<tr>
<th><strong>PACE and the Competitive Framework – How They Interact</strong></th>
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<tbody>
<tr>
<td>Aberdeen research indicates that companies that identify the most influential pressures and take the most transformational and effective actions are most likely to achieve superior performance. The level of competitive performance that a company achieves is strongly determined by the PACE choices that they make and how well they execute those decisions.</td>
</tr>
</tbody>
</table>

Source: Aberdeen Group, November 2011
Appendix B: Related Aberdeen Research

Related Aberdeen research that forms a companion or reference to this report includes:

- **ERP in Complex Manufacturing**: February 2011
- **Manufacturing Operations Management 2010**: March 2010
- **ERP in Manufacturing 2010: Measuring Business Benefit and Time to Value**: June 2010
- **A Platform Approach to Manufacturing Operations Management**: March 2009
- **Global Manufacturing Operations Management**: August 2008
- **Event Driven Manufacturing Intelligence: Creating Closed Loop Performance Management**: May 2008
- **Compliance and Traceability in Manufacturing**: December 2007

Information on these and any other Aberdeen publications can be found at [www.aberdeen.com](http://www.aberdeen.com).

Author: Kevin Prouty, Research Director, Enterprise Applications, (kevin.prouty@aberdeen.com)

For more than two decades, Aberdeen's research has been helping corporations worldwide become Best-in-Class. Having benchmarked the performance of more than 644,000 companies, Aberdeen is uniquely positioned to provide organizations with the facts that matter — the facts that enable companies to get ahead and drive results. That's why our research is relied on by more than 2.5 million readers in over 40 countries, 90% of the Fortune 1,000, and 93% of the Technology 500.

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