Executive Summary

Given today's economic conditions, manufacturers are facing many challenges. Even as demand continues to increase, supplier costs and lead times are also rising while overall manufacturing employment remains depressed. To address these issues, this new research will examine how manufacturers that have best navigated the downturn are leveraging investments in a Manufacturing Operations Management (MOM) solution to outperform those that have not. Special attention will be paid to how visibility into manufacturing operations and the extended value chain help manufacturers remain agile through the downturn and into the rebound.

Best-in-Class Performance

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

- 89% Overall Equipment Effectiveness (OEE)
- 98% On-time and complete shipments
- 86% Successful new product introductions
- + 5% Operating margin versus corporate plan

Competitive Maturity Assessment

Aberdeen's survey analysis shows that enterprises enjoying Best-in-Class performance differentiate themselves in many ways, including:

- Best-in-Class manufacturers are over 50% more likely than the Industry Average to have deployed a MOM system
- Best-in-Class manufacturers are over 50% more likely than the Industry Average to create real time, bi-directional visibility between manufacturing operations and customer orders
- Best-in-Class manufacturers are over 50% more likely than the Industry Average to provide executives with real time visibility into manufacturing operations

Required Actions

To achieve Best-in-Class performance, manufacturers should:

- Focus on improving efficiency in manufacturing operations and reinvigorate Lean or other operational excellence initiatives - this includes extending Lean to the value chain and new products
- Leverage score-carding and other analytical tools to better understand the impact of manufacturing operations on corporate sustainability goals
- Focus on delivering more MOM functionality "out of the box" as compared to customizations or home grown software

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
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Chapter One: Benchmarking the Best-in-Class

Business Context

In JPMorgan’s most recent Global Manufacturing PMI report, further evidence was presented that the recovery in manufacturing is well underway and remaining strong. Production and new orders both expanded for the fifth straight month and the new orders to inventory ratio also increased slightly. However, the picture is not all positive for manufacturers. Input prices rose for the sixth straight month, which was coupled with supply chain bottlenecks that increased supplier lead times to the highest level since Q4 2006. Finally, many manufacturing executives are again going to be asked to do more with less as overall manufacturing employment finally stabilized after falling for the last 22 straight months.

Similarly, in the Aberdeen Business Review survey of over 250 manufacturers conducted in the last two months of 2009, the anticipated recovery was again well documented; with the average manufacturer now expecting a 7.9% increase in revenue from 2009 to 2010. However, this growth is expected to come with a headcount that is 5.5% lower and an operating budget that is 5.1% lower than the year prior. Based on this combined data, it is becoming clear that the recovery in manufacturing is underway but not without challenge.

Quality, Economics, and New Products, Drive Decisions

Even with all the focus so many different market players have put on economic conditions over the past 18 months, there is no single pressure driving a majority of manufacturers. In fact, with the high profile recalls of the past several months, ensuring finished product quality is now topping the list as the most prevalent pressure impacting manufacturing.

Figure 1: Top Five Market Pressures in Manufacturing Operations

Fast Facts

Best-in-Class enterprises significantly outperform their competition. These manufacturers enjoy:

- 98% on-time and complete shipments
- 89% Overall Equipment Effectiveness (OEE)

When compared to Laggard manufacturers, this accounts for:

- 15% more on-time and complete shipments
- 50% higher OEE

Aberdeen Business Review

The Aberdeen Business Review survey supplied the data for the Analyst Insight, 0H The Economic Outlook for 2010: High Growth? Low Growth? No Growth? In this research, Cindy Jutras and Zack Westenhoefer examine what happened in 2008 and 2009, they explore the challenges companies face today, and describe the prognosis for 2010.
However, it is highly advisable that no manufacturer disregards any of the top five market pressures or, for example, focuses on just quality issues or only on changing economic conditions. Many of these pressures are inextricably linked and in most cases if an organization’s attempts to improve corporate social responsibility or improve the performance of new product introductions the initiative would more than likely fall short of its’ goals if finished product quality or the current economic conditions weren’t also considered.

**The Maturity Class Framework**

In this study 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
- **OEE** - composite metric accounting for availability, performance, and 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, March 2010

“We saw a greater than 30% reduction in top line revenue over the course of the last year. Being in Detroit, we actually felt lucky to not see it greater! We had a reduction in staff, focused on cross training, downed tools and deployed the remaining workforce towards product development. This retrenchment positioned us for the up turn. ”

~ Director of Operations  
Mid-Size Contract Manufacturer
The Best-in-Class PACE Model

Ensuring finished product quality, responding to economic conditions, or successfully delivering new products to market can be a daunting task. Table 2 summarizes some of the strategic actions, business process capabilities, and technology enablers Best-in-Class companies have implemented to address these market pressures.

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>
<tbody>
<tr>
<td>• Ensure finished product quality</td>
<td>• Improve the efficiency of manufacturing operations</td>
<td>• Automated work flows to manage manufacturing non-conformance and non-compliance events across the enterprise</td>
<td>• Manufacturing Operations Management (MOM) solution extending across majority of manufacturing sites and the functional areas of production, quality, inventory, and maintenance</td>
</tr>
<tr>
<td></td>
<td>• Increase focus on Lean and operational excellence initiatives</td>
<td>• Dynamically update manufacturing business processes as best practices emerge</td>
<td>• Product Life Cycle Management (PLM), manufacturing process planning, and engineering change orders</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Automated data collection from across manufacturing operations</td>
<td>• Enterprise Manufacturing Intelligence - data collection, abstraction, and aggregation with analytical and dashboard capabilities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Real-time visibility into customer demand</td>
<td>• Supply Chain Management (SCM)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Executives have real-time visibility into the performance of global manufacturing operations</td>
<td>• Enterprise Resource Planning (ERP)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Scorecard for normalizing performance across operations</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Impact of operations on sustainability initiatives understood and reported</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source: Aberdeen Group, March 2010</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Best-in-Class Strategies

Regarding the strategic actions executives are taking in response to the market pressures faced, there are two strategic actions that are aligned with Best-in-Class performers. At the top of the list is improving efficiency in manufacturing operations and next is increasing focus on Lean or other operational excellence initiatives. Both of these are not new concepts in manufacturing and represent a back to basics approach that many manufacturers are adopting as they attempt to ensure the mistakes of the past are not repeated as we move out of the down turn and back to a state of growth.
It is often interesting to test different hypotheses and see if strategies change depending on demographics. In manufacturing operations, one logical place to start this analysis is company size and specifically analyzing single site manufacturers vs. multi-site manufacturers. Interestingly, Aberdeen did not find a significant difference in strategy between these two subsets. In both cases improving efficiency and increasing focus on Lean were the number one and two strategies. There were some differences in secondary strategies, including multi-site manufacturers being more focused on compliance, traceability, and collaboration across disparate groups like engineering and quality.

The key take-away here is the overall pervasiveness of the "back to basics" approach. Large or small, manufacturers don't want to make the same mistakes they did in the run up to the economic downturn. Many manufacturers were guilty of prioritizing throughput over efficiency and inventory levels over working capital, both of which cost them dearly.

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

"Demand and output in 2009 was off by 70% from 2008 but we still made a profit! Lean improves cash flow and position, agility improves productivity, and responsiveness improves customer service. We have achieved this performance in several ways. Standard work reduces variation and variation is waste. Furthermore, better control of service parts inventory (50% of which we manufacture) has improved on time delivery performance by 12%.

~ Director of Operations
Mid-Size Industrial Equipment Manufacturer
Chapter Two: Benchmarking Requirements for Success

The way in which manufacturers implement the business processes designed to manage manufacturing operations and support the strategic actions being taken is highly correlated to successfully responding to market pressures and the achievement of Best-in-Class performance.

Case Study — Ralco Industries

Ralco Industries is a tier one and two automotive supplier, serving worldwide OEMs with exhaust, steering, chassis, suspension, seating, and HVAC parts. Ralco suffered from many common shop flood issues, including a lack of standardized work procedures and poor data quality. In the words of president Jim Piper, “Every time we did a setup, it was different. Each of our guys had their own method. This resulted in lost time, inconsistent product quality, scrap, expedited shipments, etc. Additionally, the lack of accurate data from our systems was causing a number of expensive issues, including: quality problems, scrap, overtime, expedited shipments, etc. We knew we had to fix our system and get one to work for us.”

To address these issues Ralco decided to implement a system that spanned multiple areas of the enterprise, eliminating the need for multiple disparate systems. The ultimate solution spanned ERP, Engineering, Production Scheduling, Work Instructions, Shipping, Receiving, Quality Management, and PLC integration. By opting for such a comprehensive system, Ralco was able to effectively standardize production process across the organization, reduce work in process inventory levels by up to 15%, reduce scrap levels by 60%, and improve customer delivery performance while at the same time reducing expedited shipping costs by 20%.

Competitive Assessment

Aberdeen 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** (the standardization and management of processes across the enterprise); (2) **organization** (continuous improvement teams and role-based visibility to all levels of organization); (3) **knowledge management** (automating data collection and using it as actionable intelligence); (4) **technology** (the software and capabilities that are crucial for achieving operational excellence); and (5) **performance management** (measuring the metrics and linking those metrics to financials). These characteristics serve as guidelines for best practices, and correlate directly with Best-in-Class performance across the key metrics.
### Table 3: 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 capture ideas from employees, customers, and suppliers</td>
<td>42%</td>
<td>16%</td>
<td>0%</td>
</tr>
<tr>
<td>Standardized measurement of KPIs across enterprise</td>
<td>65%</td>
<td>54%</td>
<td>48%</td>
</tr>
<tr>
<td>Manufacturing business processes are dynamically updated as new best practices emerge</td>
<td>44%</td>
<td>25%</td>
<td>10%</td>
</tr>
<tr>
<td><strong>Organization</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cross-functional continuous improvement teams are focused on improving manufacturing operations</td>
<td>70%</td>
<td>62%</td>
<td>55%</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>39%</td>
<td>26%</td>
<td>24%</td>
</tr>
<tr>
<td>Real-time visibility between manufacturing operations and customer orders</td>
<td>52%</td>
<td>36%</td>
<td>35%</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>Scorecard used for displaying KPIs and managing performance across operations</td>
<td>52%</td>
<td>33%</td>
<td>21%</td>
</tr>
<tr>
<td>Energy consumption and costs are used as KPIs for operational decision making</td>
<td>35%</td>
<td>30%</td>
<td>21%</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td>83% ERP</td>
<td>71% ERP</td>
<td>45% ERP</td>
</tr>
<tr>
<td></td>
<td>30% SCM</td>
<td>30% SCM</td>
<td>21% SCM</td>
</tr>
<tr>
<td></td>
<td>22% MOM</td>
<td>16% MOM</td>
<td>14% MOM</td>
</tr>
<tr>
<td></td>
<td>22% PLM</td>
<td>12% PLM</td>
<td>10% PLM</td>
</tr>
</tbody>
</table>

**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

**Source:** Aberdeen Group, March 2010

### 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**

To start, many Best-in-Class manufacturers are formalizing initiatives to capture ideas for improvement from key stake-holders including employees, customers, and suppliers. Initiatives like this can come from many different sources, sometimes it starts with a continuous improvement initiative, other times it could come from product development and market research. The important thing is that as these initiatives mature and that they don’t stay confined to the areas where they start. Finally, more and more manufacturers are beginning to formalize these programs through social networking mediums.

The Best-in-Class are also differentiating themselves by putting in place the ability to standardize and then update best practices across the entire manufacturing network. Examples of this standardization can include the ability to create and update KPIs across multiple facilities or establishing best practices for optimizing production schedules or inventory levels. When put in the context of the top market pressures like ensuring finished product quality, it becomes clear that manufacturers can only accomplish this if best practices and standardized operating procedures are followed consistently and universally.

**Organization**

Having cross-functional teams focused on improving manufacturing operations ensures that there is a balanced approach and any new initiative is not pulled too far in any one direction like supply chain, engineering, IT, or finance. Having cross-functional teams also makes it more likely to gain acceptance of such initiatives on the shop floor because such initiatives inevitably involve change regarding processes and technology, which can only be effective with such buy in achieved first.

**Knowledge Management**

In order to make effective decisions, it is essential that manufacturing executives understand and have the necessary knowledge regarding how the enterprise is performing. As a starting point for effective decision making, Best-in-Class manufacturers are differentiating from the competition by investing in visibility capabilities. Two major areas of visibility associated with Best-in-Class performance include executive visibility into manufacturing operations and bi-directional visibility between customer orders and manufacturing operations. In the following technology section the necessary enablers for achieving this visibility are discussed in detail, including MOM and EMI.

Executive visibility allows manufacturers to make better decisions for balancing supply and demand across the manufacturing network and more effectively understand the impact and performance of new product introductions. Visibility between manufacturing operations and customer orders allows for better customer service in more accurate promise dates due to the use of actual manufacturing constraints in production planning.

"We are just starting our journey of corporate wide process standardization but several benefits are immediately obvious. One is the change in culture. In the past it was OK to 'protect' some key tool or technology that benefitted your plant or division as it gave you a competitive edge 'internally,' as each manager is trying to compete with other managers. The standardization internally has forced those people who are protecting information or technology out of hiding and forced people to share their keys to success.

Second we are starting to see a focus on delivering results not a focus on the how. The key here is that people are realizing it isn't how we get there that is important but actually achieving the goal."

~ Director of Operational Excellence
Large Packaging Manufacturer
and it also results in reduced levels of working capital through the use of actual demand signals in dispatching production orders.

The Best-in-Class are also responding more effectively to the increasing pressure to address corporate sustainability goals; with 23% of manufacturers now reporting sustainability as a top pressure driving operations. In addressing this, the Best-in-Class are 25% more likely than Laggards to have put in place the capability to understand the environmental impact of manufacturing operations and accurately report on this to the proper reporting bodies like the Carbon Disclosure Project and the Environmental Protection Agency.

**Performance Management**

Effectively managing performance is arguably the most important part of any initiative regarding Lean, Operational Excellence, or Manufacturing Operations Management. To help accomplish this the Best-in-Class are more likely than the Industry Average and Laggards to have put in place the capability to fairly measure and compare KPIs across different facilities with score-carding capabilities.

Taking this analysis one step further and in alignment with the above discussion of sustainability, the Best-in-Class also use energy usage as a KPI for operational decision making. Using energy as a KPI can positively effect a number of other KPIs including OEE and Operating Margins. In many cases, spikes in energy use can be a predictive indicator highlighting the need for preventive maintenance. In other cases, by considering the price of energy and differing production to off peak-times, the profitability of specific production runs can be dramatically improved.

**Case Study — Endicott Interconnect Technologies**

Endicott Interconnect Technologies, Inc. has had many successful years utilizing ERP together with internally developed data collection and reporting systems. However, they began using a Manufacturing Operations Management system approximately two and a half years ago; prompted by one of their largest customers - requesting that they start using a program to provide component traceability and real time visibility into process quality. To address this new business need, they began with implementing complete shop floor control capabilities, as well as machine integration with MOM.

Based on the success of the system for this one large customer’s products, Endicott is now extending the use of this system to the rest of the manufacturing organization. They plan to focus on improving operational efficiencies by creating role based reports and analytics. They also plan to improve integration between MOM and ERP, including the creation of bi-directional visibility between the supply chain and manufacturing. The ultimate goal is to create a true make-to-order production system.
Technology

There is a correlation between the technologies a manufacturer adopts, and achieving Best-in-Class performance. The technologies that correlate to Best-in-Class performance span the ISA-95 technology stack; starting at the controls layer, moving up through manufacturing operations management, and ending with enterprise applications focused on the interdependent functional areas of product development, engineering, inventory management, distribution, and production planning. By adopting such a technology strategy, Best-in-Class manufacturers are able to better address the market pressures they face including the need to ensure finished product quality, quickly ramping up to demand, and effectively introducing new products.

The Best-in-Class have also invested in Enterprise Manufacturing Intelligence (EMI), which allows manufacturers to aggregate automatically collected data from a number of different real time manufacturing data sources. Beyond just data aggregation, EMI also allows manufacturers to display and contextualize this data in native (EMI’s own) dashboard technology or integrate the data with Business Intelligence solutions that may already be deploying dashboards and analytics at the enterprise level.

Figure 3: Technology Enablers

```
<table>
<thead>
<tr>
<th>Technology</th>
<th>Best-in-Class</th>
<th>Industry Average</th>
<th>Laggard</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERP</td>
<td>83%</td>
<td>45%</td>
<td>71%</td>
</tr>
<tr>
<td>SCM</td>
<td>30%</td>
<td>30%</td>
<td>21%</td>
</tr>
<tr>
<td>PLM</td>
<td>12%</td>
<td>10%</td>
<td>22%</td>
</tr>
<tr>
<td>MOM*</td>
<td>16%</td>
<td>14%</td>
<td>22%</td>
</tr>
<tr>
<td>EMI</td>
<td>0%</td>
<td>12%</td>
<td>17%</td>
</tr>
</tbody>
</table>
```

Percentage of Respondents, n=130

Source: Aberdeen Group, March 2010

Enablers

In general, the technology enablers that are more likely to be used by the Best-in-Class transcend those that were traditionally delivered by a Manufacturing Execution System (MES) like: scheduling and dispatch and Work in Process (WIP) inventory optimization for example. When the set

"Through our new ERP system, real time visibility has enabled our operation to be more flexible and reduces the amount of communication time that was needed in the past. Everyone in the organization can see at a moment the status of where the product is in the flow. We can therefore pre-empt certain operational flows if need be which alerts all involved that a problem exists and a solution is required."

~ Director of Quality Management
Small Pharmaceutical Manufacturer
of functionalities shown in Figure 4 is looked at holistically it turns out that it spans all aspects of manufacturing operations, including: maintenance, production, quality, and inventory.

Furthermore, it also extends out beyond manufacturing operations to begin synchronizing manufacturing operations with the supplier network and helping to close the loop between design and manufacturing; further highlighting the need for interoperability between enterprise applications like SCM, PLM, QMS, ERP, and MOM.

Figure 4: Delivering Manufacturing Capabilities

A MOM solution is more than a single software application or set of functionalities. It involves the use of IT tools and best practices, conformance to standards, interoperability across the entire manufacturing technology stack, automated workflows, manufacturing data aggregation and more. An optimal solution should have the following characteristics:

- Functionality that spans production, inventory, quality, and maintenance management
- Real time interoperability between MOM and PLM, SCM, ERP, and EMI
Chapter Three: Required Actions

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**

- **Focus on reinvigorating Lean or other operational excellence initiatives.** Organizationally, focus has to start right at the top. Industry Average manufacturing organizations are over 50% more likely than Laggard organizations to be focused on Lean or other operational excellence initiative as a top strategic action. Focusing on these initiatives will help organizations avoid making the same mistakes made in the run up to the economic crisis and will refocus the organization on efficiency, quality, and customer satisfaction.

- **Standardize manufacturing KPIs across the enterprise.** There are a lot of different ways to measure OEE, on time and complete shipments, or new product introductions. Are specified or optimal machine speeds used? Are promise or re-promise dates used? Does time to quality matter for achieving new product targets? All of these questions should be answered and answered uniformly across all manufacturing sites. The Best-in-Class are 20% more likely than Laggards to have already standardized these metrics across the organizations.

- **Focus on creating visibility into manufacturing operations.** From a strategic perspective, visibility will be the cornerstone of improvement for your organization. Many of the higher level business capabilities differentiating Best-in-Class performance presuppose visibility across manufacturing operations. Executives at Best-in-Class companies are over 50% more likely than executives at Laggard organizations to have visibility into manufacturing operations.

**Industry Average Steps to Success**

- **Establish cross-functional continuous improvement teams focused on manufacturing operations.** To help shape the enterprise vision for manufacturing operations, executives should create cross functional continuous improvement teams focused on manufacturing operations. Cross functional teams improve the likelihood of change taking place and taking hold. Best-in-Class manufacturers are over 25% more likely than Laggard manufacturers to have such teams in place.

**Fast Facts**

To improve performance, organizations should consider taking the following steps:

- ✓ Executives need to focus on manufacturing operations
- ✓ Extend manufacturing best practices across the enterprise
- ✓ Establish an executive vision for manufacturing operations
- ✓ Extend the MOM platform across multiple facilities
- ✓ Create real time interoperability between MOM and other enterprise applications
- ✓ Leverage enterprise applications that extend beyond just MOM
• **Extend MOM functionality beyond the traditional definition of MES.** At the functional level, focus on spanning the full suite of manufacturing operations management. Best-in-Class manufacturers differentiate by going beyond scheduling and dispatch and Work in Process (WIP) optimization; Best-in-Class manufacturers also focus on advanced engineering, maintenance, and quality capabilities.

### Best-in-Class Steps to Success

• **Leverage enterprise applications that extend beyond just MOM.** With an enterprise-wide MOM solution in place, begin to leverage other enterprise applications such as PLM, SCM, ERP, and EMI. Use this technology stack to improve real-time visibility from executives into manufacturing operations and between manufacturing operations and customers.

• **Incorporate manufacturing operations into sustainability initiatives.** Many manufacturers today struggle with defining the scope of sustainability initiatives. Should such an initiative be facilities focused, product focused, or operations focused? It varies by company and industry but in most cases the answer is "d," all of the above. To address this need the Best-in-Class is more likely than the Industry Average to both use energy as a KPI in operational decision making and report the environmental impact of manufacturing operations.

### Aberdeen Insights — Summary

Executives face numerous challenges in effectively navigating the economic crisis andcapitalizing on the coming rebound. To help capture some of this opportunity, Best-in-Class manufacturers are creating a collaborative enterprise that drives operational excellence in manufacturing and significantly impacts market facing aspects of the organization, like: successful new product introductions and profitability. The coming months will be a test of both manufacturers resolve as well as their preparations, but the research shows that those manufacturers that have implemented systems for improving Manufacturing Operations Management are better positioned for continued success.
Appendix A: Research Methodology

Between January and February 2010, Aberdeen examined the use, the experiences, and the intentions of more than 130 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 Manufacturing Operations Management 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 (23%); Director (28%); Manager (24%); Staff (2%)
- **Industry:** The research sample included respondents exclusively from the following industries: High Tech Manufacturing (26%); Aerospace and Defense (16%); Automotive (12%); Industrial Equipment Manufacturing (12%); Industrial Products (9%); Medical Devices (9%); Consumer Packaged Goods (9%); Metal and Metal Products (7%)
- **Geography:** The majority of respondents (62%) were from North America. Remaining respondents were from the Europe (22%) and Asia Pacific (8%).
- **Company size:** Twenty-nine percent (29%) of respondents were from large enterprises (annual revenues above US $1 billion); 31% were from midsize enterprises (annual revenues between $50 million and $1 billion); and 40% of respondents were from small businesses (annual revenues of $50 million or less).

**Study Focus**

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

- The degree to which manufacturing operations management is deployed in their manufacturing operations and the financial implications of the technology
- The structure and effectiveness of existing manufacturing operations management implementations
- Current and planned use of manufacturing operations management to aid operational and promotional activities
- The benefits, if any, that have been derived from manufacturing operations management initiatives

The study aimed to identify emerging best practices for manufacturing operations management usage in manufacturing, and to provide a framework by which readers could assess their own management capabilities.
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:

**Pressures** — external forces that impact an organization’s market position, competitiveness, or business operations (e.g., economic, political and regulatory, technology, changing customer preferences, competitive)

**Actions** — 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)

**Capabilities** — the business process competencies required to execute corporate strategy (e.g., skilled people, brand, market positioning, viable products / services, ecosystem partners, financing)

**Enablers** — 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)

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**Table 5: The Competitive Framework Key**

The Aberdeen Competitive Framework defines enterprises as falling into one of the following three levels of practices and performance:

**Best-in-Class (20%)** — Practices that are the best currently being employed and are significantly superior to the Industry Average, and result in the top industry performance.

**Industry Average (50%)** — Practices that represent the average or norm, and result in average industry performance.

**Laggards (30%)** — Practices that are significantly behind the average of the industry, and result in below average performance.

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?

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**Table 6: The Relationship Between PACE and the Competitive Framework**

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.
Appendix B:
Related Aberdeen Research

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

- **A Platform Approach to Manufacturing Operations Management**: March 2009
- **Global Manufacturing Operations Management**: August 2008
- **Event Driven Manufacturing: Creating Closed Loop Performance Management**: May 2008
- **Manufacturing Operations Management: The Next Generation of Manufacturing System**: January 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(s): Matthew Littlefield, Sr. Research Analyst, Manufacturing (matthew.littlefield@aberdeen.com)
Mehul Shah, Research Analyst, Manufacturing (mehul.shah@aberdeen.com)

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