



Aberdeen *Group*

[Send to a Friend](#) 

There is No Execution without Integration

MES Adoption Drives Performance

March 2007

— Underwritten, in Part, by —

APRISO
Adapt. Execute. Deliver.

Rockwell
Automation

SAP
®

invensys.
Wonderware



Executive Summary

Many manufacturers today are getting caught on the wrong side of a technology adoption wave that is quickly gaining momentum. Of the more than 200 surveyed manufacturers 54% are planning on adopting MI (Manufacturing Intelligence) within the next 24 months. Additionally, 56% of manufacturers having already implemented MES (Manufacturing Execution Systems) did so within the past two years. Moving forward, it is important that manufacturers embrace technology in order to either solidify or gain competitive advantages. However, in the many fast paced, low-margin, environments that make up the manufacturing industry it is crucial that manufacturers do not adopt technology for technology's sake. This benchmark is a roadmap for reducing overall manufacturing costs through the utilization of manufacturing technologies.

Best in Class Performance

Aberdeen used five key performance criteria to distinguish Best in Class; these manufacturers averaged the following performance across the five KPIs:

- **98%** On Time Delivery with a 9% improvement year over year.
- **88%** Throughput with a 10% Improvement year over year.
- **3** Stock Outs averaged per line per week with a 52% Improvement year over year.
- **2.9%** Direct Material Usage Variance with a 50% Improvement year over year.
- **61%** Work In Process Reduction year over year.

Competitive Maturity Assessment

Survey results show that Best in Class performers shared several common characteristics with respect to Manufacturing Execution Technology strategies:

- Best in Class manufacturers are 52% more likely to utilize MES, three times more likely to utilize MI, and 61% more likely to integrate MES with ERP.
- 77% of Best in Class manufacturers utilize automated data collection for production, inventory, and quality data and are 67% more likely than other manufacturers to provide this data to the necessary job roles for effective decision making.

Required Actions

In addition to the specific recommendations in Chapter 3, to achieve Best in Class performance manufacturers must:

- Focus on efficiency and cost reduction by adopting MES or MI and integrating with ERP.
- Utilize production scheduling optimization, quality assurance and control, and work in process resource management functionality.
- Measure On Time Delivery, Throughput, and Manufacturing Cycle Time; ideally in real time and at a minimum daily.
- Adopt automated data collection and dashboard visualization for production, inventory, and quality data.

[Send to a Friend](#) 



Table of Contents

Executive Summary	i
Best in Class Performance.....	i
Competitive Maturity Assessment	i
Required Actions.....	i
<i>Chapter One: Benchmarking the Best in Class.....</i>	<i>1</i>
Maturity Class Framework.....	2
Best in Class PACE Model	3
Aberdeen Insights – Part 1	4
<i>Chapter Two: Benchmarking Requirements for Success</i>	<i>5</i>
Competitive Maturity Assessment	5
Aberdeen Insights – Part 2.....	8
<i>Chapter Three: Required Actions.....</i>	<i>9</i>
Laggard Steps to Success	9
Industry Norm Steps to Success.....	9
Best in Class Next Steps	10
Featured Underwriters	11
<i>Appendix A: Research Methodology.....</i>	<i>15</i>
<i>Appendix B: Related Aberdeen Research.....</i>	<i>17</i>

Chapter One: Benchmarking the Best in Class

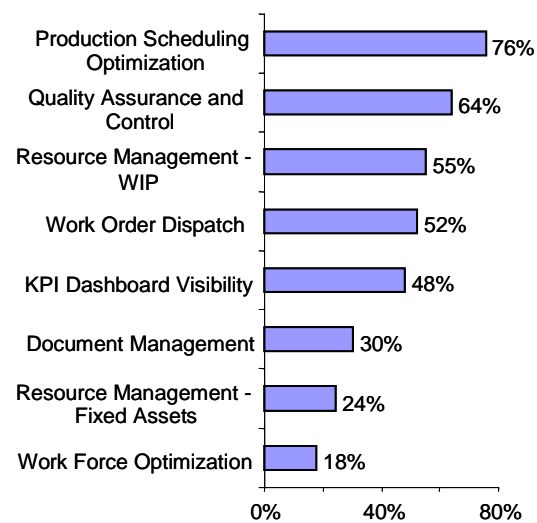
Fast Facts

- Over the past year there has been a major shift in the number one driving force behind manufacturing execution initiatives from closing the gap between ERP and plant floor (52%), to improving efficiency and reducing overall manufacturing costs (79%)
- Best in Class manufacturers handily outperform the competition, especially in On Time Delivery where the Best in Class average 98% compared to 87% for all other manufacturers.

For the past 2 decades Enterprise Resource Planning (ERP) has been releasing production requirements to the factory on a weekly or daily basis. The resulting work orders become the basis for managing materials, labor, and production. Recent Aberdeen research shows that all too often work in process disappears into a black hole on the plant floor leaving the enterprise lacking the necessary information to make dynamic decisions. To fill the gap between ERP and the plant floor manufacturers look towards Manufacturing Execution Systems (MES) to provide the necessary functionality to fill this gap and improve the efficiency of manufacturing operations.

For the purposes of this study the term “manufacturing technologies” refers to all those technology categories delivering, some but not necessarily all, the functionality traditionally delivered by MES. These technology categories include: MI solutions as well as MES.

Figure 1: Share of Best in Class Utilizing Specific Manufacturing Execution Technology Functionality



Source: AberdeenGroup, March 2007

However, manufacturers today can choose from many different technology categories, not only MES, for the feature functionalities that are traditionally associated with MES solutions. In fact, SCADA (Supervisory Control and Data Acquisition), HMI (Human Machine Interface), MI (Manufacturing Intelligence), and ERP (Enterprise Resource Planning) that is integrated with the plant floor all deliver some portion of this functionality to varying degrees. Having so many choices in regards to both feature functionality and technology delivery methods is leaving many manufacturers confused. These manufacturers all have questions as to what functionality is truly needed to improve the efficiencies of manufacturing operations and what are the best ways to deliver that which is truly needed.

To answer these questions Aberdeen has surveyed over 200 hundred manufacturers; these manufacturers will be segmented into Best in Class, Industry Average and Industry Laggard manufacturers based upon operational performance. These Best in Class manu-



facturers will then be benchmarked based upon several defining characteristics, including process, organizational structure, knowledge management, technology usage, and performance management.

Maturity Class Framework

The value of manufacturing technologies is tied to the results attributed to its utilization. Aberdeen used five key performance criteria to distinguish Best in Class manufacturers from Industry Average and Laggard manufacturers. These key performance indicators (KPI) are on time delivery, throughput, stock outs, direct material usage variance, the improvements in each over the past year and reductions in work in process inventory over the past year. This set of KPIs was chosen because each measures performance in a distinct aspect of the manufacturing process and when all five are considered in tandem the overall success of the operation becomes apparent. To better understand the overall performance of manufacturers Aberdeen has defined and calculated a weighted average across all five KPIs to establish which manufacturers are truly performing at the Best in Class level. Table 1 summarizes the mean performance that each segment of the market enjoys for each of the KPIs.

Competitive Framework Key
The Aberdeen Competitive Framework defines enterprises as falling into one of the three following levels of practices and performance:
<i>Best in class (20%)</i> —practices that are the best currently being employed and significantly superior to the industry norm
<i>Industry norm (50%)</i> —practices that represent the average or norm
<i>Laggards (30%)</i> —practices that are significantly behind the average of the industry

Table 1: Companies With Top Performance Earn “Best-in-Class” Status:

Definition of Maturity Class	Mean Class Performance
Best in Class: Top 20% of aggregate performance scorers	<ul style="list-style-type: none"> • On Time Delivery at 98% with a 9% Improvement year over year. • Throughput at 88% with a 10% Improvement year over year. • Stock Outs at 3 averaged per line per week with a 52% Improvement year over year. • Direct Material Usage Variance at 2.9% with a 50% Improvement year over year. • Work In Process Reduction at 61% year over year.
Industry Average: Middle 50% of aggregate performance scorers	<ul style="list-style-type: none"> • On Time Delivery at 91% with a 6% Improvement year over year. • Throughput at 87% with a 4% Improvement year over year. • Stock Outs at 9 averaged per line per week with a 6% Improvement year over year. • Direct Material Usage Variance at 4.1% with a 17% Improvement year over year. • Work In Process Reduction at 34% year over year.
Laggard: Bottom 30% of aggregate performance scorers	<ul style="list-style-type: none"> • On Time Delivery at 79% with a 7% Decrease year over year. • Throughput at 76% with a 0% Improvement year over year. • Stock Outs at 13 averaged per line per week with a 0% Improvement year over year. • Direct Material Usage Variance at 8.2% with a 47% Decrease year over year. • Work In Process Reduction at 14% year over year.

Source: Aberdeen Group, March 2007

Best in Class PACE Model

The manufacturing technology functionality utilized by Best in Class manufacturers clearly contributes to the performance Best in Class manufacturers enjoy. However, for organizations attempting to make the transition from Industry Average or Laggard performance levels there is much more to the story than simply adopting technology and a specific functionality set. Aberdeen's PACE framework gives these manufacturers a structured way to understand exactly how Best in Class manufacturers have coordinated the entire enterprise to best capitalize on the benefits of technology usage.

PACE Key — For more detailed description see Appendix A

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

Actions — the strategic approaches that an organization takes in response to industry pressures

Capabilities — the business process competencies required to execute corporate strategy

Enablers — the key functionality of technology solutions required to support the organization's enabling business practices

Through the PACE framework Aberdeen uncovers the specific pressures driving Best in Class manufacturing execution initiatives. The strategic actions Best in Class manufacturers are taking in response to the market pressures. The business capabilities Best in Class manufacturers have in place in order to make the strategic actions a reality and the technology enablers Best in Class manufacturers utilize to automate, standardize, and improve the necessary business capabilities.

Table 2: Best in Class PACE Framework

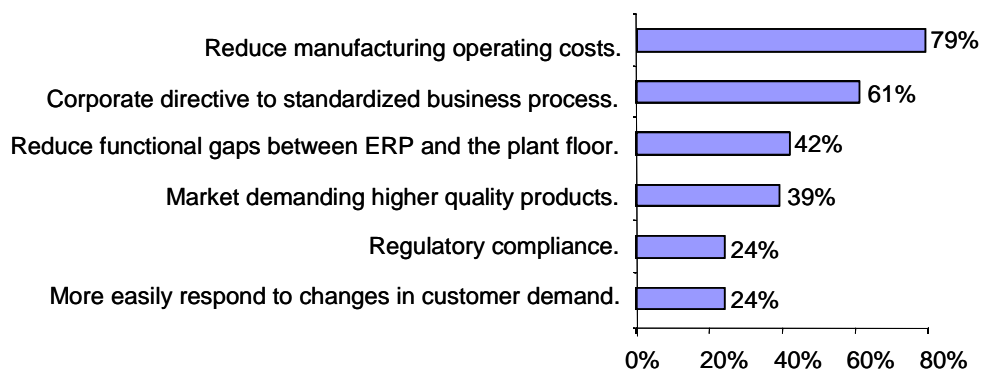
Pressures	Actions	Capabilities	Enablers
<ul style="list-style-type: none"> Improve efficiency and reduce the costs of manufacturing operations. 	<ul style="list-style-type: none"> Increase the visibility and control of manufacturing execution. Coordinate manufacturing execution processes across the enterprise. 	<ul style="list-style-type: none"> Production scheduling, resource optimization and quality assurance processes are standardized. Manufacturing execution technology is standardized at the corporate level. KPI data collection is automated and made available to the proper decision makers. Manufacturing execution technology is integrated with ERP. KPIs are visible and utilized in real time. 	<ul style="list-style-type: none"> Production schedule optimization Quality assurance and control Work in process resource management Work order dispatch Production process management Dashboard KPI visibility Automated document management Fixed asset resource management Work force performance optimization

Source: AberdeenGroup, March 2007



Today the number one pressure driving Best in Class manufacturers is the desire to improve operational efficiencies and reduce overall manufacturing costs, with 79% of Best in Class manufacturers indicating this as a driving pressure. This may be surprising to many manufacturers, especially when those pressures not filling the top spot are considered, namely, filling the gaps between ERP and the plant floor, which was only a driving pressure for 42% of Best in Class manufacturers. Two major conclusions can be drawn from this relationship; first Best in Class manufacturers are less likely than other manufacturers to be experiencing a gap between ERP functionality and plant floor operations and second Best in Class manufacturers are less likely to adopt technology without an operational objective to achieve

Figure 2: Pressures Driving Best in Class Manufacturing Execution Initiatives

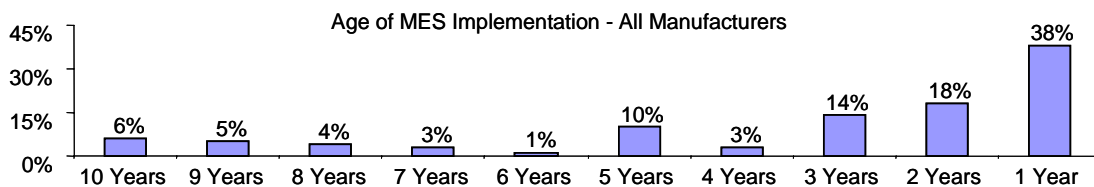


Source: AberdeenGroup, March 2007

To summarize, Best in Class manufacturers are not going to adopt technology simply because there is a gap in functionality or visibility; technology will be adopted to improve operational performance and ultimately reduce costs. Subsequently, Best in Class manufactures will improve visibility and control not as an objective in and of itself, but rather as a strategic action along the journey. This differentiation is a common one among Best in Class organizations and this theme is seen throughout the entire PACE framework, which is summarized in Table 1. In the next chapter, we will see what the top performers are doing to achieve these gains.

Aberdeen Insights – Part 1

MES has been around for over ten years, but when Aberdeen surveyed over 200 manufacturers a trend in the industry became readily apparent. MES is just now beginning to truly gain traction among manufacturers, with over half of all implementations being less than 2 years old. Manufacturers must understand this trend and embrace this robust technology category while it can still be utilized as a competitive advantage.





Chapter Two: Benchmarking Requirements for Success

Fast Facts

- Manufacturers having standardized labor management, production scheduling, and quality assurance business processes are 47% more likely to be Best in Class manufacturers.
- 77% of Best in Class manufacturers utilize automated data collection for production, inventory, and quality data and are 67% more likely than other manufacturers to provide this data to the necessary job roles for effective decision making.

A clear relationship exists between the pressures Best in Class manufacturers are facing to reduce operating costs and the utilization of manufacturing technologies. As stated previously, manufacturers are setting strategies and taking actions primarily around improving visibility into operations and coordinating decision making across the enterprise. However, these strategic actions can only be made a reality when the necessary business capabilities are in place. In order to help manufacturers put these business capabilities in a structured context Aberdeen created a competitive maturity assessment to characterize the necessary business capabilities.

Competitive Maturity Assessment

To better understand the business capabilities that precede Best in Class performance all manufacturers are examined based upon five key organizational attributes: process, organization, knowledge management, technology adoption, and performance management. In each of these categories Best in Class manufacturers are compared to Industry Average and Industry Laggard manufacturers and Table 3 summarizes how Best in Class manufacturers have differentiated from other manufacturers.

Process

The first way Best in Class manufacturers differentiate from other manufacturers is in the decision to standardize the processes surrounding labor management, production scheduling, resource optimization, and quality assurance. This is a curious finding because manufacturers do not view the costs of non-standardized business processes as a key pressure driving manufacturing execution initiatives (Figure 1). However, those manufacturers that have standardized these processes are 47% more likely to be Best in Class manufacturers.

This finding just further solidifies the fact that manufacturers must have a firm understanding of the difference between why technology should be implemented and how technology should be implemented. Manufacturers should not view the goal of Manufacturing Execution Technology as the standardization of business processes. The real goal

Before Purac moved from its own proprietary system only raw data was captured. Utilizing Wonderware's DT Analyzer we have moved from only one supervisor at a time having access to raw data to all of the necessary plant decision makers having access to trending graphs and charts in real time. This has led us to improved decision making and well on our way to achieving our ultimate goal of improving efficiency and reducing cost

Manuel Guil
Director, ENCO



is to reduce costs. However a key business capability for improving performance and lowering costs is standardized business processes.

Table 3: Competitive Framework

	Laggards	Average	Best-in-Class
Process	The processes regarding labor management, production scheduling, resource optimization and quality assurance are standardized across the enterprise.		
	24%	37%	47%
Organizational Structure	There is an enterprise wide coordinated manufacturing technologies implementation and upgrade strategy:		
	26%	30%	32%
Knowledge/Data Management	Production, inventory, and quality data collection is being automated and made available to the necessary job roles across the enterprise.		
	33%	54%	77%
Technology Usage	manufacturing technologies currently in use:		
	<ul style="list-style-type: none"> • SCADA – 58% • HMI – 46% • MES – 23% • MI – 15% • ERP – 62% • Integrate MES and ERP – 27%¹ 	<ul style="list-style-type: none"> • SCADA – 54% • HMI – 58% • MES – 25% • MI – 6% • ERP - 59% • Integrate MES and ERP – 26%¹ 	<ul style="list-style-type: none"> • SCADA – 66% • HMI – 62% • MES – 38% • MI – 27% • ERP - 71% • Integrate MES and ERP – 42%¹
Performance Management	Manufacturers are measuring the top three KPIs (Manufacturing Cycle Time, % Throughput, and % On Time Delivery) in real time:		
	<ul style="list-style-type: none"> •Today-2% •In one year 6% 	<ul style="list-style-type: none"> •Today-7% • In one year 22% 	<ul style="list-style-type: none"> •Today-22% •In one year 23%

¹Calculation based on those manufacturers currently utilizing both MES and ERP.
Source: Aberdeen Group, March 2007

Organizational Structure

Best in Class manufacturers also differentiate based upon the corporate strategy regarding implementations and upgrades of manufacturing technologies, being more likely to manage these aspects at the corporate level. This finding is closely mapped to an additional finding regarding the scope of implementation for manufacturing technologies: 38% of Best in Class manufacturers have manufacturing technologies standardized at the enterprise or business unit level compared to 33% and 32% of Industry Average and Laggard manufacturers respectively.

In both cases these are still not majority findings, but they all clearly precede and are bellwethers for Best in Class performance. The key take away here: many manufacturers are still not rolling out localized plant level benefits from manufacturing technologies to the entire enterprise. Subsequently, such a strategy can still be utilized as a competitive advantage for many manufacturers.



Knowledge/Data Management

When benchmarking knowledge and data management the first major connection between strategic actions and business capabilities becomes apparent. A full 77% of Best in Class manufacturers utilize automated data collection for production, inventory, and quality data. Furthermore, these Best in Class manufacturers also provide this data to the necessary job roles for effective decision making and are 43% more likely to be doing so than Industry Average firms and are twice more likely to be doing so than Industry Laggard firms.

Unlike the above minority findings regarding the corporate strategies surrounding the implementation and upgrade of manufacturing technologies the knowledge and data management findings are a majority finding among Best in Class manufacturers. Being a majority finding implies that Best in Class manufacturers have already achieved a competitive advantage by automating data collection and providing this data to the proper decision makers. Subsequently, Industry Average and Laggard manufacturers can not obtain a competitive advantage by doing so, but rather *must* do so just to keep pace with the Best in Class.

"Collected correctly, data turns into information and aids us in our '*Genchi Gembutsu*' or Go and See activity to grasp the situation. Grasping the Situation is one of the first things that we are taught to do at Toyota, as it is part of the Toyota Way. The Acitivplant Performance Management System enables our decision makers and the Go and See Process. "

Parker Shannon,
Project Manager
Toyota

Technology Usage

Best in Class manufacturers differentiate from Industry Average and Laggard firms in the utilization of every single technology category, including HMI, SCADA, MES, MI, ERP, and the integration of ERP with the plant floor. This differentiation is the strongest for MES and MI utilization and ERP integration. Best in Class manufacturers are 52% more likely to utilize MES, 61% more likely to integrate manufacturing technologies with ERP, and three times more likely to utilize MI than other manufacturers. Again we see that the adoption rate of manufacturing technologies is relatively low and clearly short of a common practice among manufacturers. Therefore, Industry Average and Laggard firms that have not yet implemented and integrated these technologies can do so to gain a competitive advantage. Additionally, those manufacturers that have already done so can rest assured that the proper steps are being taken to achieve Best in Class performance and the focus can be turned to the other organizational differentiators of Best in Class manufacturers.

"Our Global Manufacturing Engineering Group is responsible for supporting our division and is currently in the midst of installing an MES solution. We are integrating MES to our asset management and other business systems to align the quality, track and trace, shop order, customer demand, and service data for all the engines we produce. This will hopefully help us improve both our customer service and operational efficiency congruently."

Richard Lee,
Maintenance Functional Leader
Cummins Inc.

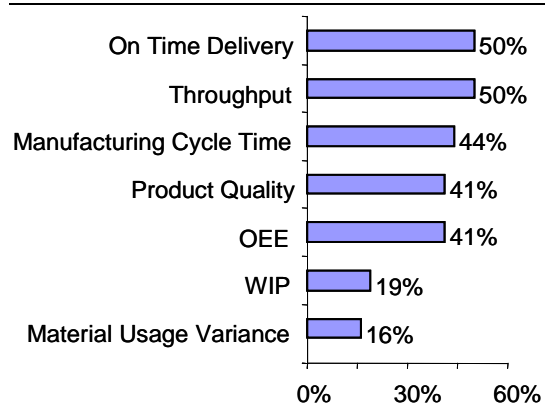


Performance Management

The final organizational characteristic where Best in Class manufacturers differ from their Industry Average and Laggard counterparts is in the real time measurement of KPIs. Currently, Best in Class manufacturers are the only segment of the market taking advantage of these capabilities. In fact, Best in Class manufacturers are over four times more likely to be currently measuring the top three KPIs in real time than other manufacturers.

Conversely, of the Best in Class manufacturers that do not currently have real time capabilities, virtually none are planning on moving to real time by next year. This does not bode well for these manufacturers when the adoption plans of Industry Average manufacturers are considered. In fact, if the Industry Average manufacturers make good on what has been planned, both Best in Class and Industry Average manufacturers will be in a dead heat by next year. This implies that Best in Class manufacturers must be completely secure in the fact that daily measurement is sufficient for meeting business needs.

Figure 3: Share of Best in Class Measuring KPIs



Source: AberdeenGroup, March 2007

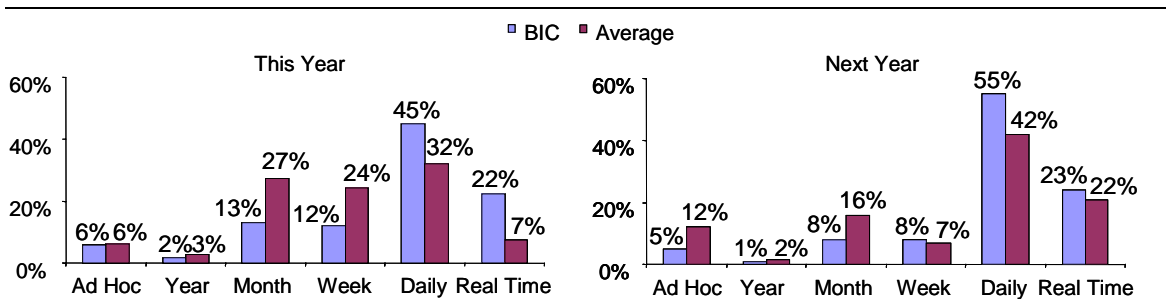
Aberdeen Insights – Part 2

“IBM utilizes a home grown MES solution for all of its chip fabrication facilities. In the fabrication business MES has become so institutionalized that cost reductions are no longer a driving force behind technology adoption, it has really become a requirement of doing business. We utilize the technology for optimizing build time, managing materials, and tool control. The KPIs we measure are cycle time, throughput, and yield. We have the capability to measure these KPI in real time but for our purposes daily measurement is all the business requires.”

Karl Gartlan, IT Architect, IBM Global Engineering Services

The above is a great example of a Best in Class manufacturers that leads the market in performance and has carefully analyzed the business needs and decided daily measurement is sufficient.

Figure 4: Trend in Frequency of KPI measurement





Chapter Three: Required Actions

Fast Facts

- Integrate manufacturing technologies with ERP.
- Measure On Time Delivery and Throughput ideally in real time and daily at a minimum.
- Standardize labor, production scheduling, and quality assurance business processes across the enterprise
- Implement dashboard KPI visibility technology.
- Adopt automated data collection technology for production, inventory and quality data.

Whether a company is trying to move its operational performance from “Industry 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

1. *Focus on efficiency and cost reduction by adopting manufacturing technologies and integrating with ERP.*

Do not adopt manufacturing technologies for fear of falling behind the competition nor because the plant floor is perceived to be a “black box”. Manufacturing technologies should be adopted to improve operational performance and ultimately reduce operating costs. Subsequently, manufacturers should first utilize functionality that has an immediate impact, namely: Production Scheduling Optimization, Quality Assurance and Control, WIP Management, Work Order Dispatch, and KPI Dashboards.

2. *Measure On Time Delivery and Throughput at a minimum daily and ideally in real time.*

The majority of Best in Class manufacturers measure two specific KPIs: On Time Delivery and Throughput. These KPIs are easily measured and when measured in tandem become a robust measure of the operations overall health. Often just measuring the correct aspects of the operation will drive significant improvements if it has not been done properly in the past.

Industry Norm Steps to Success

1. *Standardize labor, production scheduling, and quality assurance business processes across the enterprise.*

Many MES and MI vendors have recently released or are planning to release platforms enabling the use of standardized applications across the enterprise. Such a delivery method allows manufacturers to manage the implementation and upgrades of the solutions at the corporate level, which is a strategy that many Best in Class manufacturers utilize to coordinate the enterprise. It also fosters the standardization of production, inventory, and quality business processes,



which is an additional strategy commonly utilized by Best in Class manufacturers.

2. *Implement dashboard KPI visibility technology.*

Best in Class manufacturers start by measuring just a few major KPIs such as Throughput or On Time Delivery, but this is not where Best in Class manufacturers stop. Industry Average firms looking to follow the lead of Best in Class manufacturers and leap into this performance category should consider measuring one or two additional KPIs; suitable options include manufacturing cycle time, product quality, and OEE (Overall Equipment Effectiveness). Adding quality and cycle time visibility gives additional insight into the performance of operations. At this point additional cost savings can be found, whether it is in production capacity bottlenecks, re-work scrap losses, et cetera. Furthermore, the measurement and visibility of these KPIs should be moved to real time and provided to the necessary decision makers within the organization, i.e. dashboard solutions. When this all comes together is the point where manufacturers truly stop living off of low hanging fruit and move into the meat of continuous improvement.

Best in Class Next Steps

1. *Accelerate real time capability adoption.*

Best in Class manufacturers currently lacking real time capabilities are almost entirely disregarding the benefits of real time capabilities. These manufacturers are also woefully behind Industry Average manufacturers in regards to plans for adopting real time capabilities over the next year. If these Best in Class manufacturers are not careful, a year from now the entire group could easily become Industry Average firms looking to adopt real time technologies just to remain competitive with the “new” Best in Class. Real time capabilities can still be utilized as a competitive advantage and manufacturers should utilize it as such before it becomes another mandated requirement to maintain competitive positioning.

2. *Adopt automated data collection technology for production, inventory and quality data.*

Utilization of manufacturing technologies is the number one way manufacturers can prepare for and institutionalize Best in Class performance. However, overall adoption is still relatively low and manufacturers from all performance levels can still benefit from and achieve a competitive advantage from utilizing this class of technology in the ways described in this benchmark. An often overlooked functionality is automated data collection yet Best in Class manufacturers are 43% more likely than other manufacturers to utilize this technology.

[Send to a Friend](#) 



Featured Underwriters

This research report was made possible, in part, with the financial support of our underwriters. These individuals and organizations share Aberdeen's vision of bringing fact based research to corporations worldwide at little or no cost. Underwriters have no editorial or research rights and the facts and analysis of this report remain an exclusive production and product of Aberdeen Group.



Apriso

Apriso Corporation is a software company dedicated to providing competitive advantage for its customers. It does so by enabling organizations to adapt quickly and easily to market changes and unexpected events. Apriso's FlexNet platform provides global visibility, adaptability and real-time control of manufacturing operations across the enterprise and supply chain network. This is accomplished by integrating planning, execution and control, increasing operational efficiency and eliminating errors in the production process. Apriso serves more than 150 customers in 40 countries across the Americas, Europe and Asia, powering more than 550 installations worldwide.

For additional information:

Apriso Corporation
One World Trade Center
Suite 1000
Long Beach, CA 90831
www.apriso.com
+1-562-951-8000
sales@apriso.com



There is No Execution without Integration

Rockwell Automation

Rockwell Automation

Rockwell Automation (NYSE: ROK) is a leading global provider of automation, power, control, and information solutions that help manufacturers achieve a competitive advantage. The company helps manufacturers use automation as a means to get their products and services to market faster, reduce their total cost of ownership, better utilize power and plant-floor assets, and minimize the risks in their manufacturing environments.

At the core of the plant-wide information capability from Rockwell Automation is the FactoryTalk® integrated production and performance software suite. FactoryTalk provides an integrated suite of highly scalable, modular and standards-based production and performance software applications featuring tight integration with the Rockwell Automation Logix control platform, as well as extensive connectivity to third-party and legacy systems.

For additional information:

Rockwell Automation
1201 South Second Street
Milwaukee, WI 53204
(414)382-2000
www.rockwellautomation.com



SAP

Founded in 1972, SAP is the recognized leader in providing collaborative business solutions for all types of industries and for every major market.

Serving more than 32,000 customers worldwide, SAP is the world's largest business software company and the world's third-largest independent software provider overall. We have a rich history of innovation and growth that has made us a true industry leader. Today, SAP employs more than 35,000 people in more than 50 countries. Our professionals are dedicated to providing the highest level of customer service and support.

For additional information:

SAP Americas

3999 West Chester Pike

Newtown Square, PA 19073

USA

Phone: +1-610-661-1000

www.sap.com

<http://www.sap.com/usa/contactsap/index.epx>



There is No Execution without Integration



Wonderware

Wonderware is the world's leading supplier of industrial automation and information software. Wonderware powers intelligent plant decisions in real-time with Production & Performance Management, SCADA and Supervisory HMI software solutions across a wide range of discrete, process and hybrid manufacturing industries. Wonderware's powerful yet easy-to-use software solutions leverage the industry standards-based, ArchestrA software architecture for integrating systems and applications from virtually any other vendor. Wonderware delivers significant cost reductions associated with designing, building, deploying and maintaining secure and standardized applications for manufacturing operations. Wonderware enables manufacturers to synchronize their production operations with business objectives, obtaining the speed and flexibility to attain sustained profitability. Wonderware has over 400,000 software licenses installed in over 100,000 plants worldwide.

For additional information:

Wonderware

26561 Rancho Parkway South

Lake Forest, CA 92630 U.S.A.

Tel: 949-727-3200

www.wonderware.com

Email: info.northamerica@wonderware.com



Appendix A: Research Methodology

Between January and February 2007, Aberdeen Group examined more than 200 enterprises from a diverse set of manufacturing enterprises. Responding manufacturing executives completed an online survey and Aberdeen supplemented this online survey effort with telephone interviews with select survey respondents, gathering additional information on manufacturing strategies, experiences, and results.

The study aimed to identify emerging best practices for utilizing manufacturing technologies and provide a framework by which readers can assess their own management capabilities.

Responding enterprises included the following:

- **Job title/function:** The research sample has the following breakdown by job titles: Staff (14%), Manager (35%), Director (9%), Vice President (6%), CEO (5%), Internal Consultant (225), and Other (8%).
- **Industry:** The research sample has the following breakdown by industry: Automotive (18%), Consumer Packaged Goods (10%), Food and Beverage (13%), Industrial Equipment (19%), Metals (13%), and Pharmaceuticals (12%) among others.
- **Geography:** The research sample has the following breakdown by geography: North America (58%), Asia/Pacific (17%), EMEA (19%), South/Central America and Caribbean (5%)
- **Company size:** The research sample has the following breakdown by company size: Small (25% less than 50 million), Medium (41% between 50 million and 1 billion), and Large (34% greater than 1 billion).

Solution providers recognized as sponsors of this report were solicited after the fact and had no substantive influence on the direction of the *MES Benchmark Report*. Their sponsorship has made it possible for Aberdeen Group to make these findings available to readers at no charge.



Table 4: PACE Framework

PACE Key
<p>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:</p> <p><i>Pressures</i> — external forces that impact an organization’s market position, competitiveness, or business operations (e.g., economic, political and regulatory, technology, changing customer preferences, competitive)</p> <p><i>Actions</i> — 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)</p> <p><i>Capabilities</i> — the business process competencies required to execute corporate strategy (e.g., skilled people, brand, market positioning, viable products/services, ecosystem partners, financing)</p> <p><i>Enablers</i> — 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)</p>

Source: Aberdeen Group, March 2007

Table 5: Competitive Framework

Competitive Framework Key
<p>The Aberdeen Competitive Framework defines enterprises as falling into one of the three following levels of FIELD SERVICES practices and performance:</p> <p><i>Best in class (20%)</i> — Retail RFID practices that are the best currently being employed and significantly superior to the industry norm, and result in the top industry performance.</p> <p><i>Industry norm (50%)</i> — Retail RFID practices that represent the average or norm, and result in average industry performance.</p> <p><i>Laggards (30%)</i> — Retail RFID practices that are significantly behind the average of the industry, and result in below average performance</p>

Source: Aberdeen Group, March 2007

Table 6: Relationship between PACE and Competitive Framework

PACE and Competitive Framework How They Interact
<p>Aberdeen research indicates that companies that identify the most impactful 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.</p>

Source: Aberdeen Group, March 2007

Appendix B: Related Aberdeen Research

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

- [*Global Manufacturing: MES and Beyond*](#)
- [*MES Solutions and Managing Compliance*](#)
- [*The Manufacturing Intelligence Benchmark Report: Bridging the ERP and Shop Floor Divide*](#)
- [*Manufacturing Intelligence - Implementation Strategies*](#)
- [*Manufacturing Flexibility: Synchronizing the Shop Floor and Supply Chain.*](#)

Information on these and any other Aberdeen publications can be found at www.Aberdeen.com.

*Aberdeen Group, Inc.
260 Franklin Street
Boston, Massachusetts
02110-3112
USA*

*Telephone: 617 723 7890
Fax: 617 723 7897
www.aberdeen.com*

*© 2007 Aberdeen Group, Inc.
All rights reserved
March 2007*

Founded in 1988, Aberdeen Group is the technology-driven research destination of choice for the global business executive. Aberdeen Group has over 100,000 research members in over 36 countries around the world that both participate in and direct the most comprehensive technology-driven value chain research in the market. Through its continued fact-based research, benchmarking, and actionable analysis, Aberdeen Group offers global business and technology executives a unique mix of actionable research, KPIs, tools, and services.

The information contained in this publication has been obtained from sources Aberdeen believes to be reliable, but is not guaranteed by Aberdeen. Aberdeen publications reflect the analyst's judgment at the time and are subject to change without notice.

The trademarks and registered trademarks of the corporations mentioned in this publication are the property of their respective holders.

THIS DOCUMENT IS FOR ELECTRONIC DELIVERY ONLY

The following acts are strictly prohibited:

- **Reproduction for Sale**
- **Transmittal via the Internet**

Copyright © 2007 Aberdeen Group, Inc. Boston, Massachusetts

Terms and Conditions

Upon receipt of this electronic report, it is understood that the user will and must fully comply with the terms of purchase as stipulated in the Purchase Agreement signed by the user or by an authorized representative of the user's organization. Aberdeen has granted this client permission to post this report on its Web site.

This publication is protected by United States copyright laws and international treaties. Unless otherwise noted in the Purchase Agreement, the entire contents of this publication are copyrighted by Aberdeen Group, Inc., and may not be reproduced, stored in another retrieval system, or transmitted in any form or by any means without prior written consent of the publisher. Unauthorized reproduction or distribution of this publication, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent necessary to protect the rights of the publisher.

The trademarks and registered trademarks of the corporations mentioned in this publication are the property of their respective holders.

All information contained in this report is current as of publication date. Information contained in this publication has been obtained from sources Aberdeen believes to be reliable, but is not warranted by the publisher. Opinions reflect judgment at the time of publication and are subject to change without notice.

Usage Tips

Report viewing in this PDF format offers several benefits:

- **Table of Contents:** A dynamic Table of Contents (TOC) helps you navigate through the report. Simply select "Show Bookmarks" from the "Windows" menu, or click on the bookmark icon (fourth icon from the left on the standard toolbar) to access this feature. The TOC is both expandable and collapsible; simply click on the plus sign to the left of the chapter titles listed in the TOC. This feature enables you to change your view of the TOC, depending on whether you would rather see an overview of the report or focus on any given chapter in greater depth.
- **Scroll Bar:** Another online navigation feature can be accessed from the scroll bar to the right of your document window. By dragging the scroll bar, you can easily navigate through the entire document page by page. If you continue to press the mouse button while dragging the scroll bar, Acrobat Reader will list each page number as you scroll. This feature is helpful if you are searching for a specific page reference.
- **Text-Based Searching:** The PDF format also offers online text-based searching capabilities. This can be a great asset if you are searching for references to a specific type of technology or any other elements within the report.
- **Reader Guide:** To further explore the benefits of the PDF file format, please consult the Reader Guide available from the Help menu.