



Aberdeen *Group*

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The Business Value of Plant Floor Visibility

Empowering Executive Decision Makers

March 2007

— Underwritten, in Part, by —



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Executive Summary

Key Business Value Findings

Best in Class manufacturers are driven to improve plant floor data management initiatives by two related yet distinct pressures. In fact, both the desire to improve performance improvement program effectiveness and the desire to improve operational performance visibility motivates the majority of Best in Class manufacturers, *70% in both cases*. These manufacturers have also realized that the best way to address these pressures is with a technology centric approach. Again, the majority of Best in Class manufacturers, *65% and 55% respectively*, are utilizing technology to both automate the collection of plant floor data and then subsequently display relevant data to the appropriate decision makers in a timely manner.

Implications & Analysis

Aberdeen's analysis of over 150 plant floor data management initiatives has resulted in the correlation of specific business capabilities in the areas of process, organization, knowledge and technology to Best in Class operational performance. Best in Class manufacturers are 15% more likely to be utilizing plant floor data that has been collected from an automated source. This data is 40% more likely to have been collected in real time and 31% more likely to have been integrated with ERP. Best in Class manufacturers, in regards to enterprise organization and knowledge management, are 13% more likely to manage plant floor data initiatives at the corporate level and are 26% more likely to give executive decision makers plant floor visibility. These characteristics of Best in Class business capabilities are the foundation for the following recommendations.

Recommendations for Action

- Collected data should be integrated with ERP to solidify corporate buy in and ownership of plant floor data management initiatives.
- Utilize an automated visualization and analytics solution to provide plant floor visibility to executive decision makers.
- Utilize an automated plant floor data collection solution to provide real time plant floor data visibility.
- Best in Class manufacturers are four times more likely to be utilizing Manufacturing Intelligence solutions. Manufacturers should adopt this type of solution and utilizing the technology to implement the above three recommendations.

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Chapter One: Issue at Hand

Key Takeaways

- 70% of manufacturers are focusing on plant floor data initiatives to increase the effectiveness of performance improvement programs and increase visibility into operational performance.
- 65% of manufacturers are currently planning to automate plant floor data collection and 55% of manufacturers are planning on presenting the data with a dashboard solution.
- Only 32% of performance improvement programs currently utilize plant floor data that is collected via an automated technology.

Aberdeen research shows that 72% of manufacturers are currently using or planning to implement ERP (Enterprise Resource Planning), 59% are currently using or are planning to implement MES (Manufacturing Execution Systems), and 48% are currently using or are planning to implement MI/MPM (Enterprise Manufacturing Intelligence / Manufacturing Performance Management). The effects of such broad based technology adoption can be profound especially when considering the effect technology adoption has on plant floor data.

The lifecycle of plant floor data no longer begins and ends on the plant floor; rather it has been transformed into a complex network of many to many information flows. This network includes collected plant floor data, job roles and functional groups utilizing collected data, and the enabling technology utilized. Consequently, these information flows are defined by the answers manufacturers' give to the following questions:

- Which pieces of plant floor data are collected?
- How is plant floor data collected?
- Which job roles and functional groups within the enterprise utilize plant floor data?
- How is technology utilized in regards to shop floor data?

This Benchmark Report will provide the answers to these questions and also provide further analysis drawing correlations between the answers to these questions and Best in Class performance. However, the stage must first be set before any analysis can begin.

Competitive Framework Key

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

Best in class (20%) —practices that are the best currently being employed and significantly superior to the industry norm

Industry Average (50%) —practices that represent the average or norm

Industry Laggards (30%) —practices that are significantly behind the average of the industry



Operational Performance Defines Best in Class

Five major KPIs are used in this study to benchmark manufacturers' performance: On Time Delivery, Average Number of Stock Outs, Overall Equipment Effectiveness (OEE), Direct Material Usage Variance, and Throughput. By taking a weighted average across all five KPIs, and accounting for improvements over the past year, Aberdeen will categorize manufactures as Best in Class, Industry Average, or Industry Laggard, and subsequently correlate operational performance with plant floor data management best practices. Furthermore, these KPIs are utilized because they measure the many different facets of manufacturing operations. The KPIs particularly measure how effectively manufacturers manage production, equipment use, material use, waste, and customer satisfaction. Additionally, all of the aforementioned KPIs utilize plant floor data for calculation, which makes them all excellent candidates for categorizing the success of a manufacturer in regards to the management of the shop floor data and operational performance.

Driving Pressures

There are two main pressures currently driving Best in Class manufacturers' plant floor data initiatives: *to improve the effectiveness of performance improvement programs, such as Lean and Six Sigma (70%) and to improve visibility into operational performance (70%)*. With the next most frequently faced pressure, *improve finished product quality (45%)*, only having a minority of respondents viewing it as a relevant pressure, which truly shows the focus manufacturers are placing on the top two pressures faced. In garnering insights from the pressures driving manufacturers' plant floor data initiatives, a relationship between the two reveals itself. Plant floor visibility and the success of performance improvement programs are closely related and serially aligned.

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

Figure 1: Share of Best in Class Manufacturers Driven by Specific Pressures

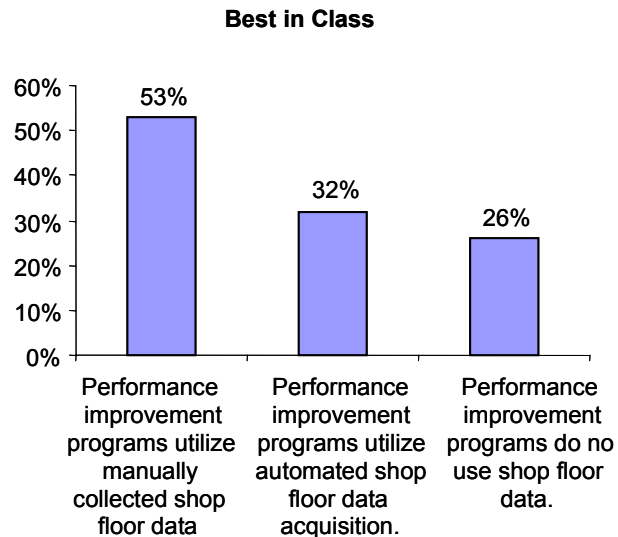


Source: AberdeenGroup, February 2007

As visibility into plant floor data improves, the capabilities of performance improvement initiatives will follow suit. In fact, the presence of these two pressures as the top two can be viewed as a changing of the guard among Lean and Six Sigma professionals. The traditional thinking surrounding Lean manufacturing espouses the elimination of all activities and entities within the manufacturing enterprise that are not a net value add. In the eyes of many Lean and Six Sigma professionals this includes the elimination, or at the very least a lack of further adoption, in the area of technology utilization.

The manifestation of this broad view among Lean and Six Sigma professionals can be seen in the share of manufacturers that utilize plant floor data that is collected in an automated way (32%). However, as the follow on analysis concerning strategic actions will show; manufacturers are not only realizing that to successfully improve operational performance, operational visibility is needed, technology utilization is a key component of the strategy.

Figure 2: Lean, Six Sigma, and Plant Floor Data



Source: AberdeenGroup, December 2006

Strategic Actions

Closely related to the pressures driving plant floor data initiatives are the strategic actions Best in Class manufacturers are taking to address the pressures faced. The top two strategic actions Best in Class manufacturers are currently taking include *utilizing technology to automate the process of plant floor data collection (65%)* and *utilizing visualization and dashboard technology to present plant floor data (55%)*. Again, as there was between the top two pressures, there is a relationship between the top two strategic actions Best in Class manufacturers are taking to address the pressures faced. Both are technology centric and address the two main ways technology contributes to the overall lifecycle of plant floor data: data collection and data presentation.

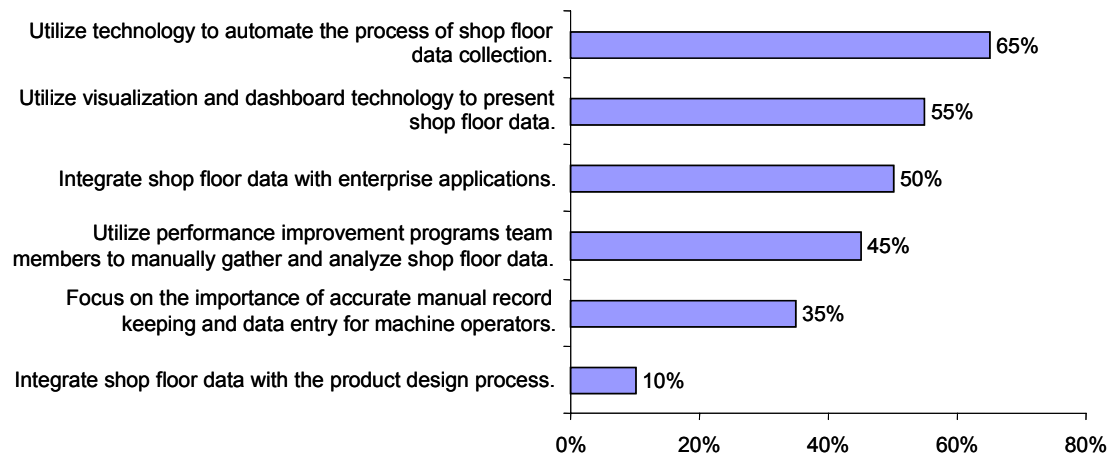
Manufacturers are no longer satisfied with the manual collection of plant floor data. Nor are manufacturers satisfied with simply having plant floor data being presented in day old ERP based reports. Manufacturers are now demanding that plant floor data be collected in an automated way and presented to decision makers via a visualization or dashboard solution giving visibility to plant floor performance.

“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 Acityplant Performance Management System enables our decision makers and the Go and See Process.”

Parker Shannon,
Project Manager
Toyota



Figure 3: Share of Best in Class Manufacturers Utilizing Strategic Actions



Source: [AberdeenGroup](#), February 2007

Clearly these strategic actions support both improved decision making and the improved effectiveness of performance improvement programs. However, the business capabilities and technologic functionality needed to make the above strategic actions a reality are not necessarily as clear. The remainder of this benchmark will establish the business capabilities and technological enablers that Best in Class manufacturers are utilizing to implement the aforementioned strategic actions. The business capabilities and technological enablers that will be benchmarked include:

- The type of plant floor data collected.
- The specific KPIs that are utilized.
- The frequency with which plant floor data is measured.
- The technology that is utilized to collect plant floor data.
- The integration of plant floor data with the enterprise.
- The presentation of plant floor data to the executive suite.

Chapter Two: Competitive Maturity Assessment

Key Takeaways

- Best in Class manufacturers are 31% more likely than other manufacturers to have integrated plant floor data with ERP.
- Best in Class manufacturers are 26% more likely than other manufacturers to be providing plant floor data to executive decision makers.
- Best in Class manufacturers are four times more likely than other manufacturers to be utilizing MI/MPM and 40% more likely to have real time plant floor data capabilities.

The value of plant floor visibility and enabling 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, OEE and the improvements in each 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.

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 96% with a 14% Improvement year over year. • Throughput at 93% with a 8% Improvement year over year. • Stock Outs at 3 averaged per line per week with a 37% Improvement year over year. • Direct Material Usage Variance at 2.9% with a 50% Improvement year over year. • OEE at 69% with a 9% Improvement year over year.
Industry Average: Middle 50% of aggregate performance scorers	<ul style="list-style-type: none"> • On Time Delivery at 93% with a 9% Improvement year over year. • Throughput at 89% with a 2% Improvement year over year. • Stock Outs at 5 averaged per line per week with a 29% Improvement year over year. • Direct Material Usage Variance at 4.1% with a 17% Improvement year over year. • OEE at 65% with a 5% Improvement year over year.
Laggard: Bottom 30% of aggregate performance scorers	<ul style="list-style-type: none"> • On Time Delivery at 80% with a 5% Decrease year over year. • Throughput at 84% with a 0% Improvement year over year. • Stock Outs at 7 averaged per line per week with a 21% Improvement year over year. • Direct Material Usage Variance at 28.2% with a 47% Decrease year over year. • OEE at 57% with a 5% Improvement year over year.

Source: AberdeenGroup, December 2006



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.

	Laggards	Industry Average	Best in Class
Process	28% established business rules and data models used for automated data collection.	31% established business rules and data models used for automated data collection.	35% established business rules and data models used for automated data collection.
Organization	29% extend plant floor visibility all the way up to executive level decision makers.	45% extend plant floor visibility all the way up to executive level decision makers.	53% extend plant floor visibility all the way up to executive level decision makers.
Knowledge	37% manage plant floor data initiatives at the corporate level.	40% manage plant floor data initiatives at the corporate level.	45% manage plant floor data initiatives at the corporate level.
Technology	35% integrate plant floor data with ERP. 22% Utilize MES to automate plant floor data collection. 3% Utilize MI / MPM to automate plant floor data collection.	43% integrate plant floor data with ERP. 26% Utilize MES to automate plant floor data collection. 3% Utilize MI / MPM to automate plant floor data collection.	58% integrate plant floor data with ERP. 47% Utilize MES to automate plant floor data collection. 11% Utilize MI / MPM to automate plant floor data collection.

Source: AberdeenGroup, February 2007

Data Collection

It has already been established that the most prevalent strategic action among Best in Class manufacturers is to automat plant floor data collection. Furthermore, Best in Class manufactures are 15% more likely to have automated plant floor data collection than other manufacturers. Clearly, based upon the relevance automated data collection has in the strategies and performance of manufacturers, further analysis is warranted.

Data Types

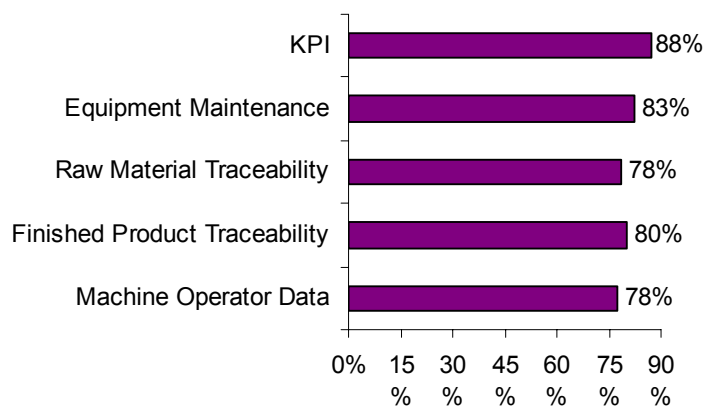
The first area of interest, in regards to the collection of plant floor data, is exactly which pieces of shop floor data are manufacturers currently collecting. Interestingly, there is a broad and relatively uniform distribution among the different types of plant floor data that manufacturers are currently collecting. The uniform distribution across types of plant floor data indicates that manufacturers don't want to make choices around which types of

data are collected. Rather, manufacturers desire a broad array of data to be collected and then maintain the ability to manipulate and display the data as needed.

This must not be confused with a propensity to overwhelm users with too much data to be effectively leveraged. Rather, it means manufacturers want access to data that provides insight into the many facets of a manufacturing enterprise: performance, maintenance, quality, compliance, and work force management, but not an overwhelming amount of data within each broader category.

When considering the second strategic action of Best in Class manufacturers, the use of visualization and dashboard technology, in conjunction with the first, automated data collection, and the aforementioned data collection results, an underlying principle of Manufacturing Intelligence and data presentation becomes apparent. When plant floor data is being collected and subsequently displayed, there is an advantage to have the proper data provided to the proper decision maker at the proper time. This idea will be expanded upon when the integration of plant floor data and the corporate enterprise is analyzed.

Figure 4: Manufacturers Collecting Specific Data



Source: Aberdeen Group, February 2007

Frequency of Data Collection

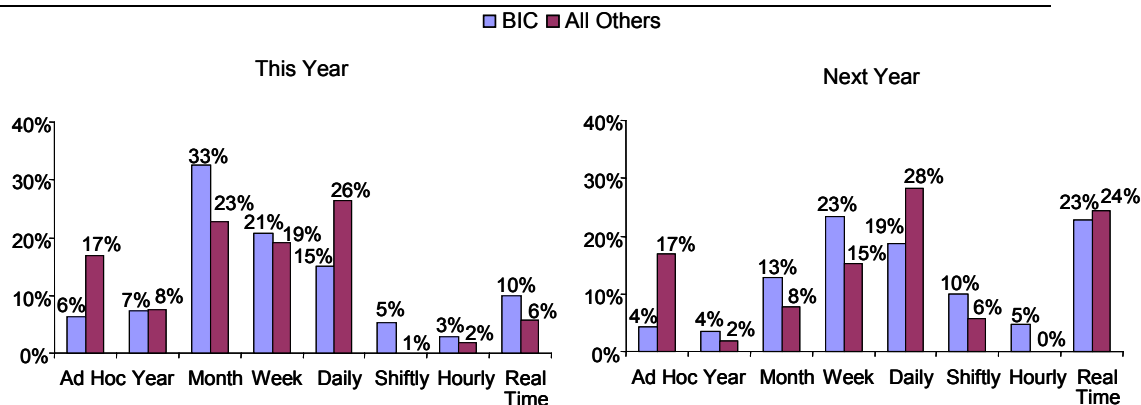
The second major area of interest concerning data collection is the frequency with which manufacturers are currently collecting plant floor data and the trend regarding how quickly and with what numbers are manufacturers moving towards real time data collection. The trend is clearly towards real time data collection and the number of manufacturers participating in the trend is impressive. If over the next year manufacturers follow through on current plans, almost a full quarter of surveyed manufacturers will be measuring KPIs in real time by 2008.

“We have automated the collection of quality, inventory, cost, and process data from the plant floor and integrated with ERP. We have provided this information to the job roles that require the information for decision making and we have seen improvements in both our manufacturing flexibility and the response rate for responding to event exceptions.”

Manufacturing Manager
Large Chemical Manufacturer



Figure 5: Frequency of KPI Measurement



Source: AberdeenGroup, February 2007

The other actionable result from the above analysis is the differentiation among manufacturers currently measuring KPIs in real time. In spite of the fact that the overall adoption rate of real time KPIs measurement capabilities is relatively low, those manufacturers with the capability are nearly twice as likely to be performing at Best in Class levels.

When the relationship between Best in Class performance and real time data collection is considered, in terms of the aforementioned adoption trend, it becomes apparent that the market intuitively realizes a relationship exists. The above result simply acts to codify the relationship and shows that the level of effect on performance may be more substantial than many manufacturers may have previously assumed.

Technology Utilized

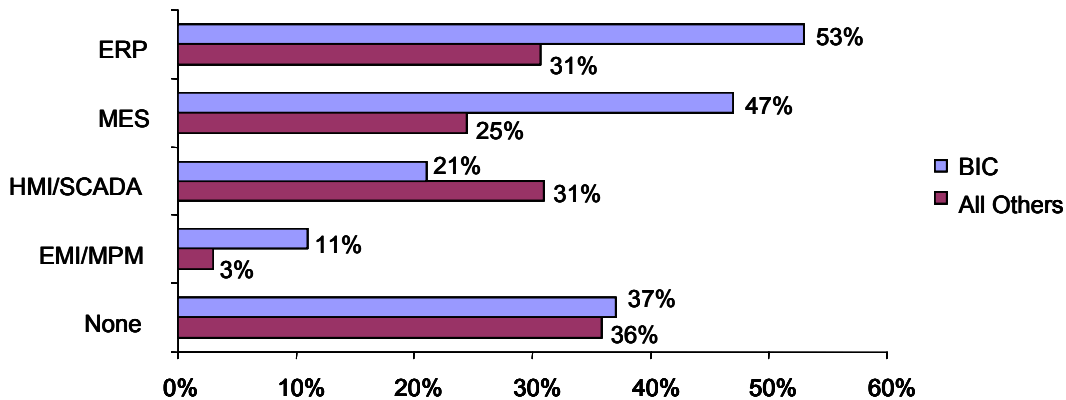
Manufacturers have many choices in regards to the type(s) of technology that can be utilized in collecting plant floor data. As a general result, Best in Class manufacturers are more likely to utilize technology in the collection of plant floor data than those manufacturers not performing at the Best in Class level. Additionally, many Best in Class manufacturers are choosing to collect plant floor data with multiple types of technology, including ERP, MES, HMI/SCADA, and MI/MPM. However, the most significant differentiator for Best in Class performance is the utilization of MI/MPM software. In spite of the relatively low adoption rate this class of technology is still subject to, those Best in Class manufacturers that have adopted the technology are nearly four times more likely to be utilizing this type of technology than other manufacturers. When this result is considered in conjunction with the previous result, that being the prevalence of real time capabilities among Best in Class

We utilize the RealTime Production Monitoring offering from IQMS for all of our plant floor data and visibility needs. Specifically, we collect schedule compliance, down time, rejects, and ISO compliance data and since moving to real time we have realized a significant increase in our ability to both see and capitalize on opportunities for corrective actions. In fact, our continuous improvement team leaders now receive automated email alerts, which often drive team improvement initiatives.

Carl Morris
President, Injection Molding

manufacturers, a pattern emerges. Best in Class manufacturers are considerably more likely to be utilizing MI/MPM to provide real time and dashboard capabilities.

Figure 6: Technology Utilized to Collect Plant Floor Data



Source: AberdeenGroup, February 2007

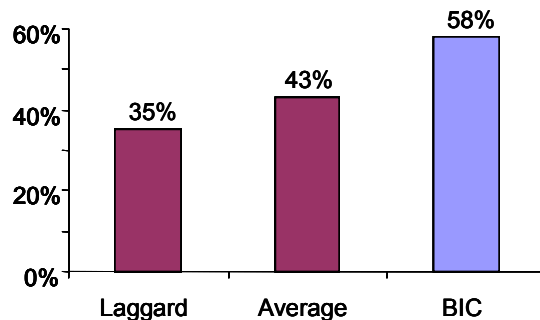
Integrating Plant Floor Data

There are several aspects regarding the integration of plant floor data that will be examined in this analysis. However, the unifying theme between the different aspects of the analysis will be surrounding the utilization of MI/MPM and the associated real time and dash board capabilities.

Integration with ERP

The first significant way Best in Class manufacturers differ from other manufacturers is in the integration of plant floor data with ERP. This result speaks directly to one of the traditional short comings of ERP implementations, which often results in the plant floor being described as a “black box”. When plant floor data is not integrated with ERP visibility will be reduced. Often, the only visibility manufacturers have is which raw materials have been received, which finished products have been shipped, and what the production schedule was as of yesterday. This means there is limited if any visibility into work in process (WIP) and current operational performance. Integration of

Figure 7: Manufacturers Integrating Plant Floor Data with ERP



Source: AberdeenGroup, February 2007

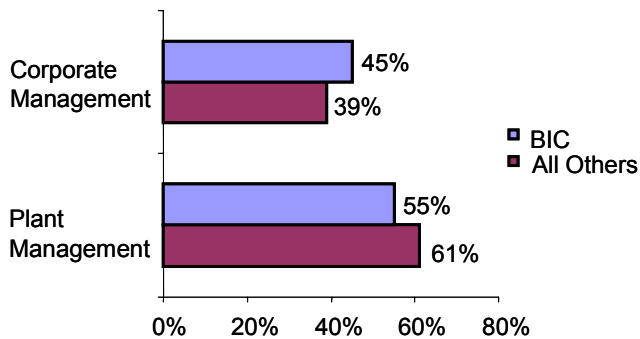


plant floor data can often improve this lack of visibility and this observation is supported by the result that Best in Class manufacturers are 31% more likely to have accomplished this ERP and plant floor data integration than other manufacturers.

Plant Floor Data Management

The final way in which Best in Class manufacturers differentiate in regards to integrating plant floor data with the enterprise is in organizational structure. When examining the level in the organization at which plant floor data is managed, it becomes apparent that manufacturers managing plant floor data initiatives at the corporate level are more likely to perform at the Best in Class level than those manufacturers managing plant floor data at the plant level. The organizational dynamics motivating this result are not immediately apparent until the following result surrounding plant floor data utilization is also considered.

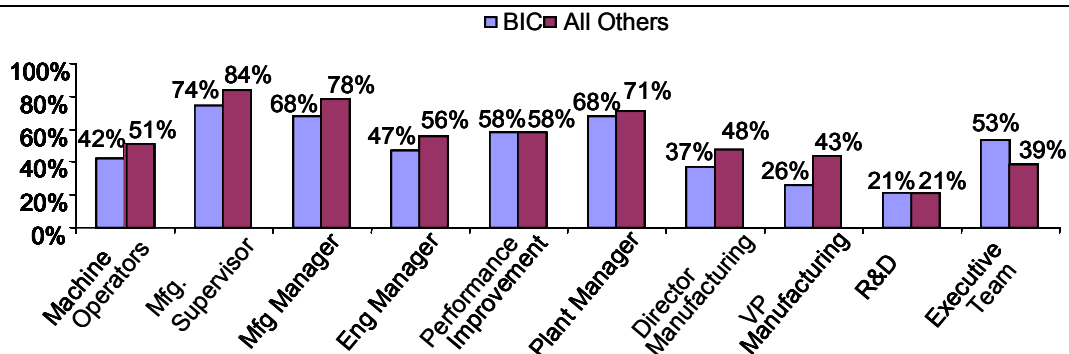
Figure 8: Corporate vs. Plant Level Management



Source: AberdeenGroup, February 2007

The following chart displays the job roles that manufacturers currently provide plant floor visibility to. Not surprisingly, those job roles that are most likely to have visibility into plant floor data are those job roles closest to the plant floor, i.e. supervisors and managers. The real surprise comes when examining the visibility provided to those decision makers furthest from the plant floor, the executive team. Those manufacturers providing plant floor visibility to the executive team are 26% more likely to be performing at Best in Class levels. Combining both results, the actionable insight is that manufacturers managing plant floor data at the corporate level and rolling standardized data from multiple sources within the enterprise up to executive decision makers are performing at a higher level than manufacturers relying on point solutions that aren't yet integrated.

Figure 9: Job Roles Utilizing Plant Floor Data



Source: AberdeenGroup, February 2007

Chapter Three: Recommendations for Action

Key Takeaways

- Industry Laggards must evaluate the current state of technology functionality and utilize technology adoption to eliminate ERP gaps and integrate shop floor data with ERP.
- Industry Average firms must transition to a corporate management of plant floor data initiatives, which means enterprise wide technology implementations and improved functionality.
- Overall technology adoption is still woefully low. Best in Class manufacturers must acknowledge this and continue adopting relevant technology solutions to maintain market leadership.

Plant floor visibility and access to real time plant floor data is an issue that is not only top of mind for those manufacturing professionals that are closest to the floor itself. The analysis presented within this benchmark has shown that the true enterprise value of plant floor visibility is realized when those furthest from the plant floor have such visibility, i.e. the executive decision maker. The following recommendations will provide a road map for manufacturers performing at every level; offering actionable insights on how best to capitalize on the previous success of Best in Class manufacturers. These actionable insights will allow manufacturers to drive the most value possible out of plant floor visibility initiatives.

Industry Laggard Steps to Success

1. *Utilize automated data collection and data analytics to increase the effectiveness of performance improvement programs such as Lean and Six Sigma.*

Consider adopting additional technology if utilizing ERP alone results in a lack of access to plant floor data collection and visibility for performance improvement teams. Both MES and MI implementations offer improved real time plant floor data collection, visualization, and analytics versus ERP alone.

2. *Integrate plant floor data with ERP.*

Consider adopting technology or utilizing current technology to integrate plant floor data with ERP. This integration is both a first step and necessary condition for presenting plant floor data to the proper decision makers at the proper time and in the proper context.

Industry Average Steps to Success

1. *Transition from plant level to corporate management of plant floor data initiatives.*

Best in Class manufacturers are more likely to provide plant floor visibility to executive decision makers. In order to capitalize on ERP integration and provide enter-



prise wide, relevant plant floor data to executive decision makers a coordinated standardized approach to data collection and utilization is needed. To accomplish this, consider implementing an enterprise wide versus multiple point solutions for collecting and displaying plant floor data.

2. *Follow through on intentions: move to real time data collection.*

Collecting and presenting data in real time allows decision makers to address and correct operational shortcomings in a substantive and timely manner. This is one of the driving forces behind adding value to the enterprise through plant floor data initiatives.

Best in Class Next Steps

1. *Adopt and integrate Manufacturing Intelligence.*

The adoption rates of MI/MPM and real time data collection capabilities are still woefully low. There is a wealth of opportunity for Best in Class manufacturers to further embrace technology and continue improving operational performance. Adopting the aforementioned technology is a corner stone of Best in Class performance.

2. *Continue the roll up of plant floor data.*

Best in Class manufacturers must continue to solidify the business processes and adopt the technologies that facilitate the enterprise wide management of plant floor data management. The corporate management of plant floor data is the foundation for providing plant floor data to executive decision makers, one of the key differentiators for Best in Class manufacturers.

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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.



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Appendix A: Research Methodology

Between January and February 2007, Aberdeen Group surveyed more than 150 enterprises and supplemented this online survey effort with telephone interviews of select survey respondents.

Responding enterprises included the following:

- **Job title/function:** The research sample has the following breakdown by job titles: 12% Staff, 32% Manager, 10% Director, 4% Vice President, 11% CxO, 19% Consultant, and 13% Other.
- **Industry:** The research sample has the following breakdown by industry: 13% Automotive, 10% Chemicals, 11% Food and Beverage, 15% Industrial Equipment, 15% Metals, and 14% Pharmaceuticals among others.
- **Geography:** The research sample has the following breakdown by geography: 65% North America, 18% Asia/Pacific, and 16% EMEA
- **Company size:** The research sample has the following breakdown by company size: 37% small (less than 50 million), 37% medium (between 50 million and 1 billion), and 26% large (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 Enterprise Value of Plant Floor Visibility* benchmark.

Table 2: 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: [AberdeenGroup](#), February 2007



Table 3: Relationship between PACE and Competitive Framework

PACE and Competitive Framework How They Interact

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.

Source: [AberdeenGroup](#), February 2007

Table 4: Competitive Framework

Competitive Framework Key

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

Laggards (30%) — FIELD SERVICES practices that are significantly behind the average of the industry, and result in below average performance

Industry norm (50%) — FIELD SERVICES practices that represent the average or norm, and result in average industry performance.

Best in class (20%) — FIELD SERVICES practices that are the best currently being employed and significantly superior to the industry norm, and result in the top industry performance.

Source: [AberdeenGroup](#), February 2007

Appendix B: **Related Aberdeen Research & Tools**

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

- [The Manufacturing Intelligence Benchmark Report: Bridging the ERP and Shop Floor Divide](#)
- [Roadmap to Lean Success: Measurement and Control Benchmark Study](#)
- [The ERP in Manufacturing Benchmark Report](#)
- [Global Manufacturing: MES and Beyond](#)

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