RR

FACILITIES MANAGEMENT: SMART BUILDINGS COMBINE IOT AND ANALYTICS FOR OPERATIONAL EXCELLENCE

ABERDEEN

Facilities management has risen to the top of the operational hierarchy, moving beyond cost control, as users combine it with IoT sensors and analytics to enable the era of the "smart building." Based on Aberdeen's Asset Performance Management / Facilities Management / Operational Risk Management benchmarking study, this report explores how Best-in-Class organizations deploy facilities management today and the performance boost they receive for doing so.

The New Role of Facilities Management

Facilities management (FM) is changing for the better. This important function has risen to the top of the operational hierarchy, as companies move away from the notion that facilities are a set of back-office, day-to-day activities. They are beginning to see this function as a value driver for specific areas within the organization. Today, facilities managers are building on their gains by combining analytics with IoT sensors and equipment. This combination of technology has allowed companies to optimize FM operations, improve the occupancy experience, and more accurately predict future needs.

Today's facilities are major generators — and consumers — of data. Through the capture and analysis of this data, organizations can gain a better understanding of their operational effectiveness, accelerate their ability to react to change, and increase returns from real facilities-related decisions.

Pressures Driving Firms to Facilities Management

Numerous pressures drive manufacturing organizations to focus resources on FM in Figure 1 (see next page). These include the pressing need to maximize return on assets (ROA) in the face of delayed capital expenditures and the need to drive down operating costs. This takes place in an environment of increasing regulatory compliance concerns and an aging asset base where facilities managers must optimize FM operations (productivity, services, maintenance, sustainability), consumers, improve the occupancy experience, and more accurately predict future needs.

**Definition:
Return on Assets**

Return on Assets (ROA) shows the percentage of how profitable a company's assets are in generating revenue. It's a useful number for comparing competing companies in the same industry.

Figure 1: Top Pressures Driving Facilities Management

% of Respondents n = 173, Source: Aberdeen 2017
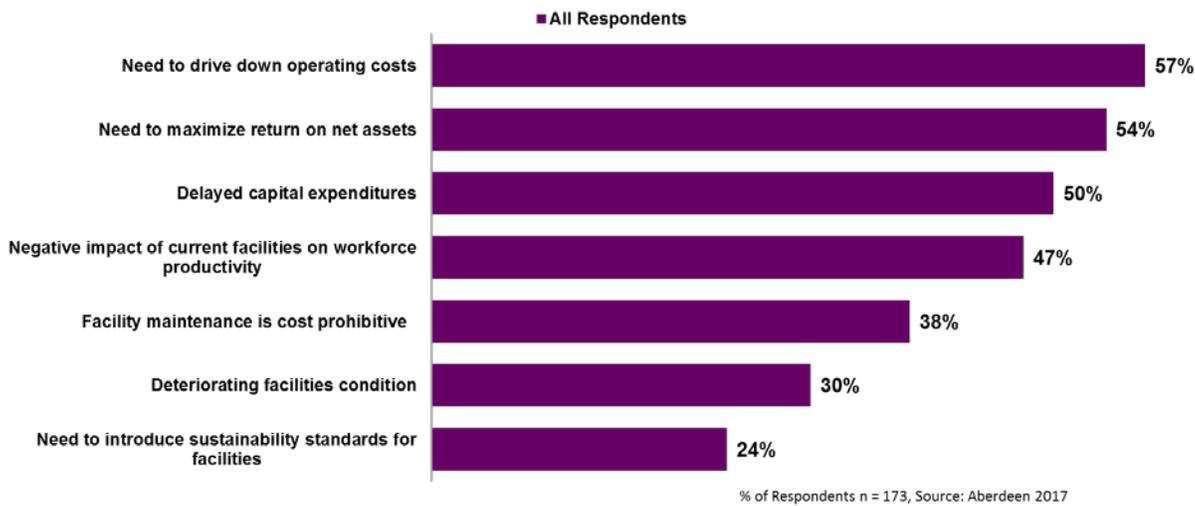
FM today occurs in an increasingly challenging general business environment, where external business model disrupters are displacing elements of the past. Employee attrition is a major issue: U.S. baby boom generation employees are now retiring at a rate of ten thousand a day. As always, facilities maintenance remains critical, but it must not interfere with capacity expansion or production targets.

Defining the Best-in-Class

To identify best practices in FM, and asset performance management for manufacturers, Aberdeen used three key performance indicators (KPIs) to distinguish the Best-in-Class from Industry Average and Laggard organizations: maintenance cost reduction, operating margin, and overall equipment effectiveness (OEE).

Respondents were divided among three categories based on their aggregate performances in these three metrics: the top 20% of performers (Best-in-Class), the middle 50% (Industry Average), and the bottom 30% of performers (Laggards). Table 1 (page 4) summarizes the aggregate performance of Best-in-Class, Industry Average, and Laggard organizations.

The Aberdeen maturity class framework identifies three groups of survey respondents. The data determines overall company performance, based on self-reported performance across several key metrics. Each respondent falls into one of three categories:

▶ Best-in-Class: Top 20% of respondents based on performance

▶ Industry Average: Middle 50% of respondents based on performance

▶ Laggard: Bottom 30% of respondents based on performance

Sometimes we use a fourth category, All Others. This is a combination of Industry Average, and Laggard.

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

Definition of Maturity Class	Mean Class Performance	
Best-in-Class: Top 20% of aggregate performance scorers	11%	maintenance cost reduction, year-over-year
	14%	operating margin outperformance against plan
	90%	overall equipment effectiveness (OEE)
Industry Average: Middle 50% of aggregate performance scorers	5%	maintenance cost reduction, year-over-year
	6%	operating margin outperformance against plan
	84%	overall equipment effectiveness (OEE)
Laggard: Bottom 30% of aggregate performance scorers	0%	Maintenance Cost Reduction, year-over-year
	4%	operating margin outperformance against plan
	70%	overall equipment effectiveness (OEE)

Source: Aberdeen 2017

Best-in-Class manufacturers achieve superior results, garnering an 11% reduction in maintenance costs over the past year. They also realize higher performance results in financial metrics by outperforming operating margin plans by 14%. Finally, they do very well in internal plant metrics by effectively utilizing assets (90% OEE).

Looking at it another way, Best-in-Class firms do much better than Laggards, earning higher performance results in all three metrics by delivering more than 11 times better year-over-year maintenance cost reduction, 3.5 times better operating margin outperformance against plan, and 29% better OEE.

Clearly, the Best-in-Class are enjoying significantly better performance through facilities management best practices. However, the key to better understanding this benchmark report is to determine just how the Best-in-Class achieve these results, as well as the detailed outcomes that result.

How They Do It: Competencies, Enablers, and Capabilities

Best-in-Class FM organizations succeed by provisioning solid competencies and enablers supporting the full spectrum of facilities management activities. This is noted below and in Figure 3 on the next page.

Figure 2: Best-in-Class Facilities Management Competencies

% of Respondents n = 173, Source: Aberdeen 2017
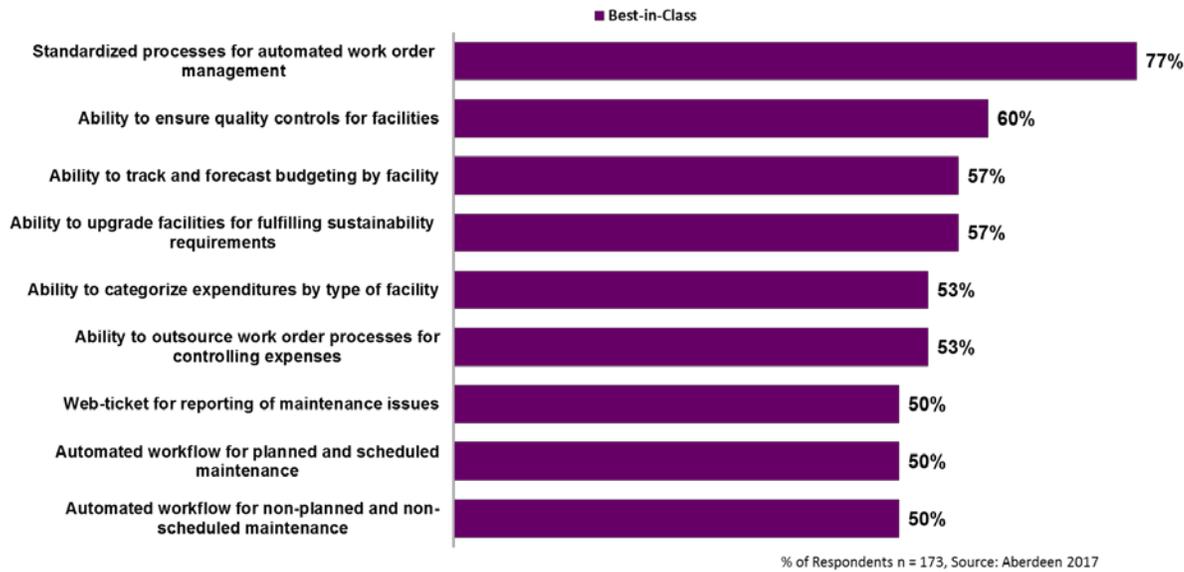
Historically, FM was pegged as a cost control function. But the long-term value of looking beyond facilities spending as sunk costs, or a drag on ROA, is clear. Doing so pays dividends to those enterprises willing to believe that their competitive position can be affected by how they manage their locations.
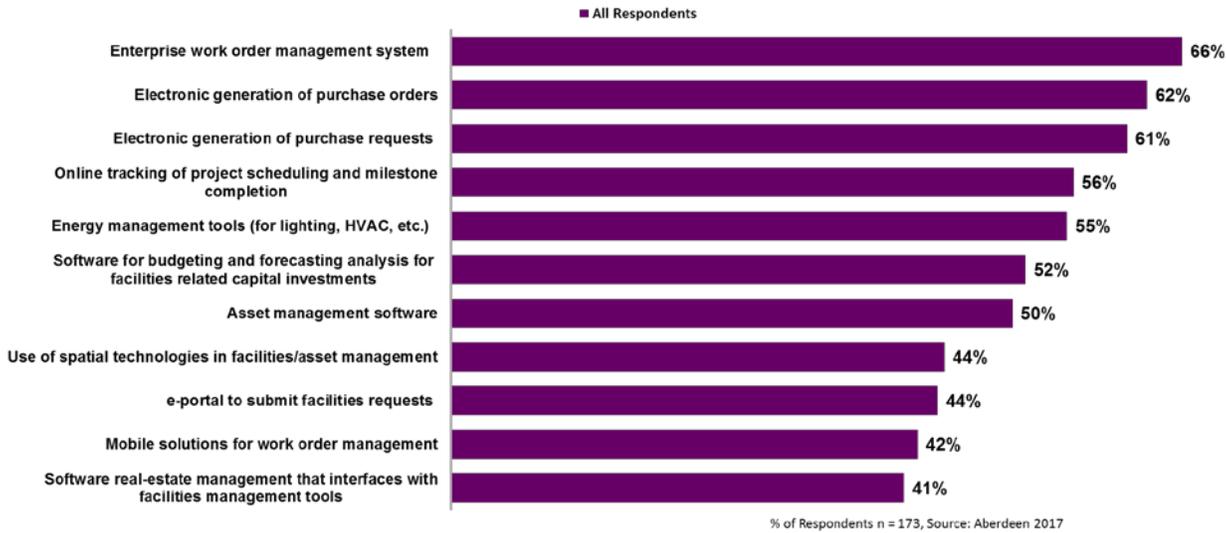
It is this realization that led to the creation of the Integrated Workplace Management System (IWMS), an integrated software platform that supports these competencies, combining analytics and IoT sensors to help organizations optimize workplace resources in the five key areas of facilities management, maximizing interdisciplinary synergy (see sidebar). The IWMS, often cloud-based, provides a single system for end-to-end facilities management, increasing the operational, financial, and environmental performance of facilities.

The Five Key Areas of Facilities Management

- Real Estate / Property Management
- Capital Project Management
- Facilities and Space Management
- Building Maintenance Management
- Sustainability / Energy Management

To enable these FM competencies, Best-in-Class organizations are implementing software- and / or SaaS-based IWMS modules that deliver more value via IoT, analytics, artificial intelligence (AI), and cognitive computing. This allows managers to utilize collected facilities data more intelligently through analysis, insights, and recommendations (Figure 3).

Figure 3: Best-in-Class Facilities Management Enablers

■ All Respondents

Enabler	%
Enterprise work order management system	66%
Electronic generation of purchase orders	62%
Electronic generation of purchase requests	61%
Online tracking of project scheduling and milestone completion	56%
Energy management tools (for lighting, HVAC, etc.)	55%
Software for budgeting and forecasting analysis for facilities related capital investments	52%
Asset management software	50%
Use of spatial technologies in facilities/asset management	44%
e-portal to submit facilities requests	44%
Mobile solutions for work order management	42%
Software real-estate management that interfaces with facilities management tools	41%

% of Respondents n = 173, Source: Aberdeen 2017

To prosper from next-level FM, managers and executives should seek out an IWMS provider with a strong partner ecosystem including analytical integrations, connectors, and APIs for the items listed in Figures 2 and 3. Each of these items is spawning a myriad of analytics- and IoT-centric FM use cases, such as increased insight into facilities performance, development of new services, improved resource tracking, better space management, better maintenance, better service (operations, scheduling, mobility), better energy usage and sustainability, and a more proactive service model.

Best-in-Class organizations are acting quickly to gain a first-mover advantage, based on synchronizing asset performance with corporate performance objectives, and by deploying advanced analytics and the IoT, to ensure property asset visibility and health. Aberdeen research finds that Best-in-Class firms are 33% more likely than All Others to improve visibility and decision making through analytics.

The Best-in-Class first-mover advantages start with organizational capabilities (Figure 4).
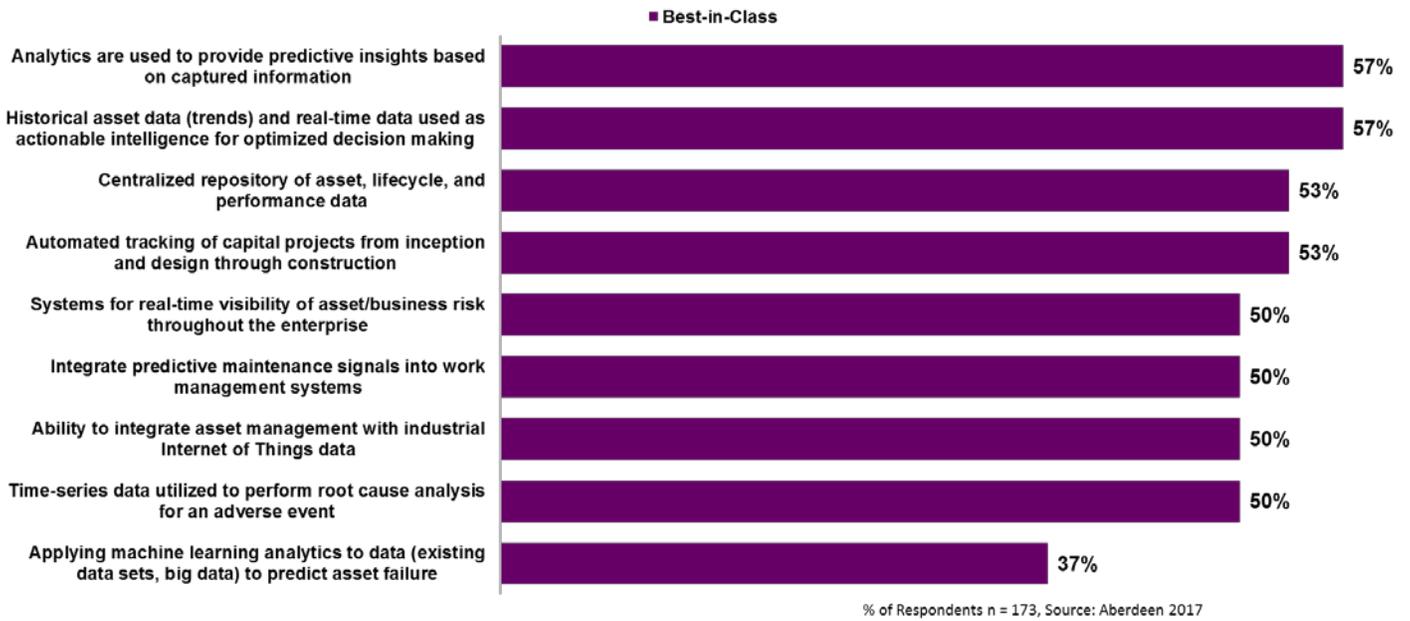
Figure 4: Organizational Capabilities of the Best-in-Class

% of Respondents n = 173, Source: Aberdeen 2017
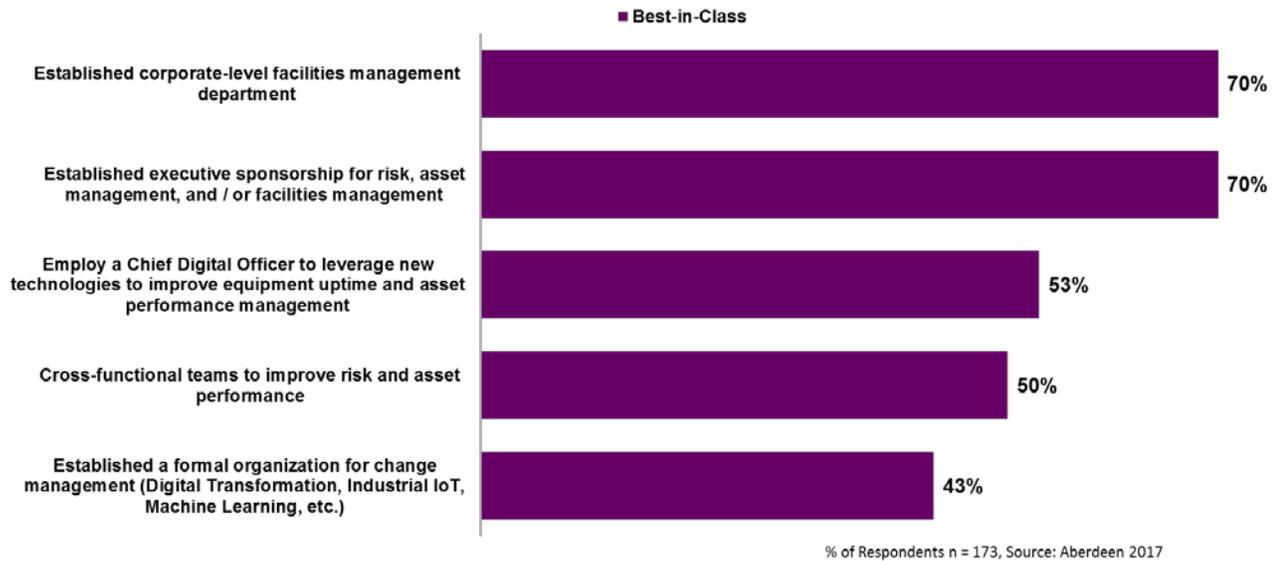
The Best-in-Class begin by establishing a corporate-level facilities management department with executive sponsorship for their facilities management goals. To improve facilities' asset visibility and decision making through analytics, leading manufacturers also employ a chief digital officer to leverage new technologies to improve asset performance. Asset visibility should be organization-wide, so Best-in-Class manufacturers set up cross-functional teams to improve risk and asset performance. Recognizing that it's not just about new technology, forward-thinking manufacturers also establish a formal organization for change management. In doing so, they smooth out possible bumps in the road to digital transformation, industrial IoT (IIoT), and harness technologies, such as machine learning.

After ensuring the right organizational environment for success, the Best-in-Class provision the right analytics capabilities to achieve their goals, deploying IIoT and advanced analytical capabilities to facilitate excellent FM (see Figure 3 on previous page).

Figure 5: Analytics Capabilities of the Best-in-Class

■ Best-in-Class

Capability	Best-in-Class
Analytics are used to provide predictive insights based on captured information	57%
Historical asset data (trends) and real-time data used as actionable intelligence for optimized decision making	57%
Centralized repository of asset, lifecycle, and performance data	53%
Automated tracking of capital projects from inception and design through construction	53%
Systems for real-time visibility of asset/business risk throughout the enterprise	50%
Integrate predictive maintenance signals into work management systems	50%
Ability to integrate asset management with industrial Internet of Things data	50%
Time-series data utilized to perform root cause analysis for an adverse event	50%
Applying machine learning analytics to data (existing data sets, big data) to predict asset failure	37%

% of Respondents n = 173, Source: Aberdeen 2017

Even as FM as a discipline climbs the maturity curve to the era of the "smart building," the fundamentals are still important, such as automated tracking of capital projects from inception and design through construction. Aberdeen research finds that up to 34% of Best-in-Class organizations are automating the planning, budgeting, and forecasting of capital projects, 3.8 times the rate of All Others.

Improved insights, automation, and control have a positive impact on all aspects of real estate performance, from lease accounting and capital projects, to facility maintenance, space utilization, and energy consumption. Especially important in lease accounting are changes that will require operating leases to be included in the balance sheet as liabilities, thus impacting asset ratios like ROA. At the same time, the shift to predictive FM is becoming real, as users provision and / or integrate IIoT and advanced analytical capabilities into their IWMS.

Analytics are used to provide predictive insights based on information automatically captured via IIoT. When asked where IIoT is delivering the most **actual value** today in asset management, the top two user answers are "reduced maintenance costs" and "improved customer value." Thus, it's no surprise that the Best-in-Class are 2.6 times more likely than All Others to deploy IIoT platforms to enable industrial scale analytics for asset and facilities management. Through the capture and analysis of

IIoT data, organizations gain a better understanding of their operational effectiveness, accelerate their ability to react to change, and increase returns from real estate-related decisions.

Real-time visibility into property assets is a cornerstone of smart building. Enterprise-wide systems for real-time visibility of facility assets are key. A centralized repository of asset, lifecycle, and performance data provides historical and real-time facilities data used as actionable intelligence for optimized decision making.

Organizations are also beginning to employ cognitive and AI-based technology for smart buildings. Data captured by buildings is augmented by machine learning to help make decisions, alert management on issues, and predict asset failure, before it occurs, to prevent adverse events. Thirty-seven percent are applying machine learning to big data to predict asset failure.

We've looked at why firms pursue FM (to respond to pressures) and how they do it (via competencies, enablers, and capabilities). However, what are the detailed outcomes that result from best practices in FM?

Best-in-Class Outcomes in Facilities Management

Best-in-Class companies are pursuing a better strategic path than All Others, and have achieved superior FM results compared to All Others (Figure 6).

Figure 6: Facilities Management Metrics, Year-Over-Year Change

n = 173   Source: Aberdeen 2017
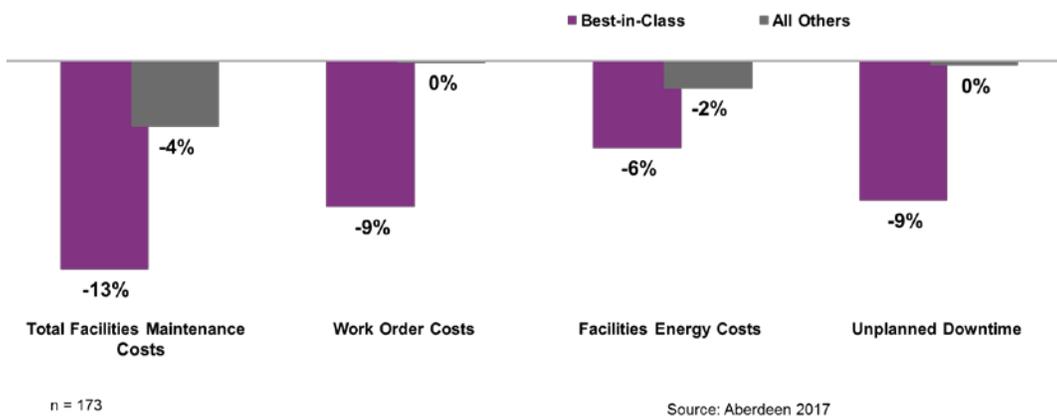
The Best-in-Class's outstanding YoY cost reduction for total facilities maintenance costs, work order costs, facilities energy costs, and unplanned downtime speaks for itself.

Examining the outcomes at a broader level, the Best-in-Class achieved superior results for their efforts in four areas: maintenance; downtime; operational performance; and environmental, health, and safety (Table 2).

Table 2: Best-in-Class Firms Achieve Superior Results

	Key Performance Indicator	Best-in-Class	All Others	Best-in-Class Edge
Maintenance	Maintenance Cost Reductions, YoY	11% less	3% less	3.7 times better
	Total Facilities Maintenance Cost Change, YoY	13% less	4% less	3.5 times better
Downtime	Plant Unscheduled Downtime	2%	8%	4 times better
	Unplanned Downtime Change, YoY	9% less	No change	>9 times better
	Asset Downtime Due to Spare Part Stockouts	2%	5%	7% better
	Asset Downtime Due to Safety/Env. Incidents	4%	6%	50% better
Performance	Operating Margins, Performance Against Plan	+14%	+5%	2.8 times better
	Net Income/Total Assets, Perf. Again Plan	+12%	+5%	2.4 times better
	Overall Equipment Effectiveness (OEE)	90%	79%	14% better
EH&S	Total Energy Consumption Change, YoY	6% less	2% less	3 times better
	Recordable Injury Frequency Rate	.86	1.87	2.2 times better
	Compliance-related Costs, Change Over 2 Yrs	6% less	1% less	6 times better

n=173   Source: Aberdeen 2017

Better Maintenance. The Best-in-Class report total facilities maintenance cost change, at a rate 3.5 times better than All Others. Because poor maintenance strategies can reduce a plant's overall productive capacity between 5 and 20 percent, the Best-in-Class maintenance edge is particularly compelling.

Leading firms are also progressing farther along the facilities maintenance continuum (see sidebar), evolving to predictive and prescriptive maintenance. Measured by percentage of assets tracked, the Best-in-Class have pulled ahead of All Others in prescriptive maintenance. With 27% of assets tracked by prescriptive maintenance, the Best-in-Class are 13% ahead of All Others. Predictive maintenance is popular across the board, with 24% of assets tracked via this method in all companies.

Lower Downtime. Plant unscheduled downtime of the Best-in-Class is four times better than that of All Others. Best-in-Class manufacturers also report a YoY unplanned downtime decrease of 9% while All Others reported no decrease at all. This contributes to increased asset reliability and availability.

The Maintenance Continuum

1. Break / Fix. A reactive strategy: fix asset when broken.

2. Preventative. A time-based strategy: scheduled maintenance activities based on average asset life.

3. Predictive. A strategy to predict machine reliability via advanced analytics and sensing data.

4. Prescriptive. A strategy that recommends one or more courses of action. It attempts to quantify the effect of future decisions, in order to advise on possible outcomes before the decisions are actually made.

The impact of lower downtime is material. Recent studies indicate that unplanned downtime costs industrial manufacturers an estimated $50 billion each year. The cost of unplanned downtime can be devastating, ranging from an estimated $10,000 to $250,000 per hour for industrial plants.

Higher Operational Performance. The Best-in-Class have reached optimal profitability via efficient, effective, and reliable operations. Having progressed further along the asset maintenance continuum, they post an OEE of 90%, which is 14% greater than All Others and 29% greater than Laggards. Operating margin outperformance is 2.8 times better than All Others.

Better EH&S. FM significantly reduces risk associated with asset failures and improves safety. This is important to the Best-in-Class; 67% of this maturity class have adopted a risk-based approach that considers the safety of the employee, equipment, and environment. Best-in-Class organizations lower recordable injury frequency rates, and decreased their two-year compliance cost decrease rates six times better than All Others. Lastly, Best-in-Class manufacturers are three times better at reducing their YoY energy consumption than All Others.

Summary

Organizations seeking the means to improved operational efficiency have found the answer in facilities management. Companies have seen the early benefits from investing in FM, and are now experiencing even greater operational and financial success through the use of industrial IoT to achieve asset / risk visibility as well investing in advanced analytics and AI technologies (such as cognitive and machine learning) to improve asset reliability, availability, and health via predictive and prescriptive maintenance.

For all their efforts, the Best-in-Class have achieved superior cost and downtime reductions results from facilities management, which pays off in improved property asset health in four areas: better asset maintenance; lower asset downtime; higher operational performance; and better environment, health, and safety performance.

As the need for better operational efficiency in facilities management accelerates, manufacturers are pressed by higher expectations and shorter decision windows. This requires real-time, critical decision-making capability across operations — based on actual asset condition, not hunches, heuristics, or the way it was done in the past.

The demands on manufacturers are significant, but so are the rewards. Best-in-Class organizations are responding to pressures they face, and meeting these challenges, by pursuing operational excellence through FM best practices. In short, they are seizing on the FM advantage and reaping the rich benefits.

Related Research

Asset Performance Management: Blazing A Better Path to Operational Excellence; November 2017

Smart Buildings: Combining IoT and Analytics to Improve Facilities Management Operations, July 2015

Maintaining the Health of Your Most Critical Assets with EAM and IoT; July 2017

IoT and Analytics: Better Manufacturing Decisions in the Era of Industry 4.0; August 2017

About Aberdeen Group

Since 1988, Aberdeen Group has published research that helps businesses worldwide to improve their performance. Our analysts derive fact-based, vendor-neutral insights from a proprietary analytical framework, which identifies Best-in-Class organizations from primary research conducted with industry practitioners. The resulting research content is used by hundreds of thousands of business professionals to drive smarter decision-making and improve business strategies. Aberdeen Group is headquartered in Waltham, Massachusetts, USA.

17111