Asset Visibility: Seeing the Opportunity in Asset Management

WHITE PAPER
Sponsored by: SAP

Bob Parker
June 2008

The Importance of Asset Management

Based on the Manufacturing Insights Global Performance Index, no corporate performance measure correlates more closely to increases in market capitalization than return on assets (ROA). This tried-and-true measure evaluates executive management on making profitable use of the capital employed by the firm and rewards high performers with greater earnings multiples.

Harnessing robust global growth and industry consolidation via both public and private equity funding has set the strategy to drive higher asset returns in recent years. As growth steadies and financial resources become more scarce (and therefore more expensive), the emphasis for management will be to make the assets in its portfolio perform consistently and incrementally stronger. Maximizing asset performance will become a key corporate strategy.

Despite the shifting emphasis to wringing more performance out of existing assets, a recent benchmarking study conducted by the Americas’ SAP Users’ Group (ASUG) reveals some disturbing data (see Figure 1). Seventy-five percent (75%) of respondents said that none of the metrics that govern asset performance were available in real time, 77% said that the measures were of low or mixed reliability, and an astonishing 90% said that the metrics were only somewhat effectively (or not at all) linked to overall business measures.
These data points indicate that companies are managing assets with late (non-real-time), inaccurate (unreliable), and incomplete (not linked) data, which is like trying to drive a boat by looking at the wake — if you get to your destination, it will be due only to sheer luck!

This white paper examines the importance of improving a company's capabilities in creating visibility into asset performance so that management can streamline processes and make better decisions that will ultimately deliver superior corporate results.

**The Business Case for Asset Visibility**

Linking corporate objectives (intended to produce a return on capital employed that is greater than the cost of capital) to what goes on at an operational level is central to effective asset management. A brilliant corporate strategy is toothless without operational execution, and operational excellence is lost without an effective strategy to guide it. Bridging the strategy/operations chasm is the aggregate optimization of assets at the plant level, with further optimization of the network of assets across facilities. Visibility creates the opportunity to make better judgments about individual assets, a specific facility, or the whole network of locations.
**Breaking Down Return on Assets**

A review of the ROA performance of companies reveals a wide range of results (see Figure 2). The figure represents a 95% confidence level or two standard deviations. If a company with average performance (4.88%) can reach the 85th percentile, it can improve its return by 7.3%. Assuming a 5% increase in stock price for each percentage improvement in ROA, this represents more than 35% in additional market capitalization.

**FIGURE 2**

*Breaking Down Return on Assets*

- **ROA**
  - 95% Interval: 4.88% to 12.14%
  - 1.14

- **Asset Turns**
  - 2.12

- **Net Income Margin**
  - 20.4%
  - 4.7%
  - 11.0%

- **Times**
  - Revenue/Assets

- Asset management, enabled by visibility, delivers more revenue, lower costs, and asset optimization.

Source: Manufacturing Insights' Global Performance Index of 715 publicly traded manufacturing and retail companies, 2008
Return on assets is an effective measure of the impact of corporate strategy, but a company must still link its goals to operational activity. A key first step is to decompose the ROA metric into its component parts — net profit margin percent times asset turns, which further decomposes into revenue, profit amount, and asset levels. As shown in Figure 2, each of these three essential elements can be improved by better asset management:

- **Revenue.** For companies that are at capacity, information regarding operating performance can support decisions that improve utilization and productivity, which means more product available for sale. Even for companies that are not at capacity, information can be critical to making informed decisions about costs, lead times, and customer service.

- **Profit.** Higher productivity generally means lower costs through more efficient resource consumption (people, materials, energy), but a number of shadow costs — safety, compliance, adverse quality, and maintenance — also can be significantly improved with better visibility.

- **Assets.** If a company is using information to optimize utilization, new asset investment can be avoided or underperforming (based on visibility into data) assets can be decommissioned. Visibility into work in process, quality yields, emissions, production rates, and so forth contributes to making good utilization choices.

The business case for better asset management through visibility should flow from the executive suite to the field. Safer, more productive assets at an operational level are essential to optimized revenue, profit, and capital use across the network of assets, which, in turn, translates to better ROA performance enterprisewide.

**How Visibility Addresses ROA: The Five Cs**

Visibility contributes to more timely, accurate, and complete information being delivered to asset management decision makers. But what types of decisions are affected? We have grouped them into five categories that we call the five Cs, which are summarized in Table 1.
<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Impact</th>
<th>Asset Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital preservation</td>
<td>Better decisions can drive higher utilization rates and preserve increasingly expensive capital.</td>
<td>Revenue available for other purposes such as sales/marketing</td>
<td>Lower project costs around the deployment of new assets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Profit</td>
<td>Lower investment levels and longer asset lives mean smaller asset bases and higher returns</td>
</tr>
<tr>
<td>Compliance with regulatory and business policy</td>
<td>Visibility into information leads to better decisions regarding conformance to policy.</td>
<td>Brand — buying preference given to companies with better environmental and human safety records</td>
<td>Most of the benefit lies with more streamlined compliance as well as the avoidance of an adverse regulatory event</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Better asset decisions relative to emissions and safety</td>
<td></td>
</tr>
<tr>
<td>Commercial — business growth</td>
<td>Better visibility leads to more output and the ability to respond quickly to market needs.</td>
<td>More revenue from optimized assets</td>
<td>Higher use of assets</td>
</tr>
<tr>
<td>Consumption — better use of resources</td>
<td>Visibility supports better decisions on the allocation of people, raw materials, and energy.</td>
<td>Increased sales volume</td>
<td>Higher use of assets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lower operating costs</td>
<td></td>
</tr>
<tr>
<td>Control — operational oversight</td>
<td>Visibility across the whole network of assets delivers better tactical decisions in trading off risk/reward and service levels/costs.</td>
<td>Optimized revenue mix across network of assets</td>
<td>Elimination of redundant assets, higher network utilization</td>
</tr>
</tbody>
</table>

Source: Manufacturing Insights, 2008

Each of these areas delivers a positive impact on asset return and bridges the gap between strategic initiative and operational imperative. The actual business case that is made will be highly dependent on the industry context but is not limited to asset-intensive segments.
Industry Context: Asset Visibility Has Broad Appeal

It is easy to fall into the trap of thinking that asset-intensive industries — oil and gas, chemicals, metals, pulp/paper — worry about asset management but that other industry segments pay only cursory attention to it. This has been partially true in the past, but current operating environments are such that it is a necessary competency across many segments.

Process Manufacturing: The Productive Asset Network

The process manufacturing industry has been concerned with optimizing asset performance for a long time, and many of the accepted best practices have been initiated by this segment. Companies in this industry have become adept at optimizing the productivity of individual assets. In fact, the measure commonly used in this industry — operating equipment effectiveness — combines the performance rate with utilization and quality to provide a good standard that can be applied to any asset in any industry.

In recent years, companies in the process manufacturing industry have tried to also get a better handle on the performance of a collective set of assets usually associated with an individual manufacturing plant. These companies reached an understanding of capacity constraints in the context of the production mix and maintenance needs through investment in enterprise asset management (EAM) systems, often purchased from their ERP vendor.

Current thinking has evolved a step further to look at how to make a company's network of plants more productive overall. Think about the petrochemical company that has to decide whether to put its plants close to the source of new demand in emerging geographies or close to the source of increasingly scarce feedstock to minimize costs. Another decision might need to be made concerning how to balance production of similar products across a range of plants. The calculus needed to drive better ROA performance dictates that information must be consistent, complete, and timely across this network.

Augmenting existing machine- and plant-level management systems with network asset visibility data is required to take this industry to the next level and drive faster, better decisions. This data will drive decisions that impact revenue realization, cost containment, and asset investment and divestiture.
An aircraft on the ground (not available for service) will cost an airline millions of dollars for every day that it is idle. Engines worth tens of millions of dollars take upwards of 60 days to complete an overhaul, and maintenance represents between 10% and 20% of an airline's operating cost. And the situation is similar in other transportation-related industries — from trains to trucks to boats.

Whereas the process manufacturing industry is geared toward productivity, the transportation industry is geared toward driving higher levels of availability and resulting usage of the equipment. Like the process manufacturing industry, the transportation industry has focused a lot of its effort on the individual asset — largely executing on planned maintenance checks and equipment overhaul — with some effort on location optimization — the flight line in the airline business, for example. The next wave of investment will try to build on these efforts by looking across the fleet and service depot network to enhance overall performance. And with the growing use of outsourcing (e.g., 39% of the maintenance on U.S. airline aircraft is outsourced), this network view is even more important.

A 2003 study and analysis conducted by McKinsey & Company showed that airlines could improve component turnaround times by 30–50% and overall maintenance productivity by 25–50% by applying lean principles to maintenance processes. Lean starts by eliminating waste from processes, but long-term effects come from keeping resources balanced to need. Asset visibility provides the necessary view into both the need (immediate and potential) for activity and the availability of resources to establish and sustain these levels of improvements across the entire transportation industry.

Delta Tech Ops, the maintenance arm of Delta Airlines, is using software from SmartSignal to acquire operating condition data and diagnose its meaning. This diagnostic analysis is integrated with Delta's SAP enterprise asset management software to provide more preemptive maintenance that results in higher availability and lower costs.

Military organizations also operate large fleets and other assets. The difference in this scenario is that challenges come not from steady use but from the surges of demand that are part of the nature of the organizational mission. In fact, the military has begun to aggressively award "performance-based" contracts based not just on the cost of the asset but on its ongoing availability.

To achieve the required system availability, organizations in the defense and security industry must ensure that the related reliability-centered maintenance analyses tasks are carried out continuously over the total life cycle of the platform. For enhancements in the platform
itself or the needed scheduled and unscheduled maintenance activities, it is critical to achieve a high degree of asset visibility through advanced asset management.

The F-35 Joint Strike Fighter provides a glimpse into the future of asset management in the military and security industry. The aircraft is outfitted with low-weight, low-power consumption sensors that continually monitor the health of the platform. Onboard diagnostics can identify an issue and transmit a request for maintenance before the plane lands. On the tarmac, a technician is waiting with the right work instructions, the right replacement part, and the right tools.

The lead systems integrator on the F-35 program, Lockheed Martin, designed in all of this asset monitoring not because it was specified by the military customer but because the aircraft are being sold on a performance basis, and if they are going to meet the project milestones, they will need this kind of capability.

Generals are familiar with the importance of "situational awareness" when conducting a military campaign — having timely information from the field to make informed strategic and tactical decisions. Situational awareness is a good term for asset management in this industry, and asset visibility forms the basis for organizing, analyzing, and integrating information for higher levels of performance when it counts most.

**Utilities: The Smart Asset Network**

There's nothing like a massive power outage, like the blackout of August 2003 in the eastern and central United States, to underscore the importance of the energy network. As a result of the blackout, new regulations for reliability and cybersecurity are now being enforced. The grid — whether for power or gas pipelines — is the delivery mechanism for the industry and also plays a vital role in supporting the economy and the well-being of the population. Reliability standards are high, assets are widely dispersed geographically, and performance is dependent on interconnectivity. This has led the industry to build in a high degree of redundancy relative to other industries. While no one would deny that redundancy is important to maintaining the network, this redundancy does come at a cost.

For utilities, optimized asset utilization involves weighing asset health/availability/reliability and equipment/network performance and at the same time trying to satisfy the customer, reduce operating costs, or defer capital investment. After decades of lack of investment in the infrastructure, the industry in North America is making substantial capital investment in the grid, especially in high-demand growth areas, but even in areas where there is aging infrastructure. Capital investment decisions in the utility industry, unlike those in other industries, are subject to regulatory scrutiny because investment capital comes from
cost recovery through the rate structure. This continues to be true, despite deregulation of energy supply in some areas. The most recent regulatory concepts spawned by concern about climate change are to further decouple the pricing of energy supply from the delivery mechanism (asset network) in order to reward utilities for reliability and also to provide an incentive for energy efficiency.

The future outlook for utilities is an intelligent grid or smart asset network that through the use of information technology is smart enough to predict and adjust to network changes. Typically, this definition conjures up a vision of very quick decisions made in milliseconds by computers and intelligent devices analyzing complex, real-time data. Yet, this intelligent grid vision is a ways off for most utilities — especially in terms of widespread deployment. Some utilities, however, are beginning to test this on a small scale. Intelligence about the grid enables utilities to not only make decisions about urgent conditions but also take action with regard to longer-term grid conditions. Aside from the immediate critical events, the 2003 blackout stemmed primarily from improper tree maintenance. Had the utility noticed these problems before or even acted on the day during the more than two hours between the initial grid event and the widespread outage, it could have made a quick decision to correct the problem. Another example of grid failure is a large investor-owned utility that cut off power to a major international airport when one of its transformers failed. Again, the company reacted only to the grid failure. A very quick decision could have redirected power, but at the same time, a better quick decision based on understanding the operating history and condition of the asset could have stopped a preventable failure.

Implementing Visibility: People, Process, and Technology

Industry Insights research has developed a maturity model for evaluating progress in asset management (see Figure 3). As companies move into levels 2 and 3, asset visibility plays an important role in capturing the data needed for condition-based monitoring. Moving toward setting priorities based on risk and criticality requires creating visibility into the individual asset in the context of the overall system it is operating within, a manufacturing plant, for example. Moving to level 5 (asset life cycle) dictates that the visibility take on a temporal element — that is, the ability to look at performance on a retrospective (how it has performed) basis, a perspective (how it is performing) basis, and a predictive (how it will perform) basis. The final step to best in class builds on this foundation to provide a view across the whole network of assets within the company at all three levels preferably. As an example, one would desire drilldown into or trending of past results, alert-based data to inform of problems with current operations, and a comparison of orders, inventory, and plant capability to determine if changes are needed in current production plans to meet customer orders.
Moving toward best-in-class performance requires a programmatic, deliberate approach that combines the necessary people, process, and technology elements.

**People: Organizing for Network Optimization**

The decentralized multinational business model is losing effectiveness, and companies are moving to more of a globally integrated approach that establishes common management approaches across regions and facilities. Organizing for high-performing assets will follow this trend. Instead of isolated facilities and siloed functional responsibilities, companies will want to identify expertise, standardize approaches, and share knowledge.

This will equate to asset management responsibility being organized networkwide with the ability to monitor a wired set of assets and take corrective action when necessary. Think of the new organization as a mission control or network operating center approach rather than a proximity (people at the facility) approach, although the centralization may be virtual rather than a single physical location. Similarly, metrics and accountability will span the network of assets.
Business Process: Using Common, Accepted Approaches

Another part of being a globally integrated company will be the establishment of common processes across the company. Companies should spend their time not on defining the processes but rather on making them perform consistently. Using a well-established standard industry process definition will be the starting point.

The execution processes will be standard, but a set of processes are ripe for reengineering — the decision processes. Everything from deciding on new asset investment to tuning the performance of specific machines should be reviewed. The reengineering of decision processes must keep in mind the full context of asset management maturity and make sure strategic decisions are linked to tactical decisions and those decisions to operational determinations. By modeling the flow of data up from the operational data and the flow of business policies down from the decision makers, companies can create a continuous asset control loop that delivers optimal performance.

Technology: Acquire Data, Standardize Process, Speed Decisions

Technology can play a substantial role in moving a company up the maturity model. People and process changes must be fully understood before technology investment is started. Manufacturing Insights sees four key areas of investment in technology to support the efforts:

- **Machine-to-machine (M2M) technology.** This involves the use of sensors, actuators, identification, and location technologies to create an asset network that can provide the necessary data for monitoring assets without human intervention. This investment provides individual asset visibility.

- **Process platform.** This is an enterprise asset management application that provides industry-accepted processes and enables companies to focus on making the operational processes more consistent. This investment provides location-level asset visibility.

- **Operational intelligence.** This is the ability to look across all of a company's asset to assess performance on a retrospective (what happened) basis, a perspective (what is happening) basis, and a predictive (what will happen) basis and will come from investment in data warehousing, analytics, and business intelligence. This investment provides networkwide asset visibility.

- **Integration.** The value of investing in the three aforementioned technology areas is magnified if they are well integrated with each other. This not only makes reporting more consistent but also removes the latency that comes with manual integration.
A good starting place when investing in asset visibility is at the process platform level. This investment will facilitate the necessary changes in people and process as well as create the centerpiece of the technology investment. Modern integration capabilities will be critical so that M2M-based data can feed the processes and, in turn, the processes can feed the decision environment built from the operational intelligence investments.

**Recommendations**

This white paper is designed to help the reader understand the substantial business case for improving asset performance, examine various industry scenarios, and frame how people, process, and technology come together to deliver advanced capability. We offer specific guidance for companies that would like to get started on an asset visibility initiative.

**Actions to Consider**

- **Evaluate the business case at a high level.** Assess your company's ROA performance relative to that of industry peers. What are the implications of greater revenue and lower costs from the existing portfolio of investments? From this point, a firm can determine the levels of investment in new asset management capability that can be justified.

- **Determine asset management maturity and identify gaps.** This exercise will assist in understanding the specific capabilities that must be delivered to improve performance. Pay close attention to deficiencies in performance monitoring — it is likely that reporting is late, incomplete, and inaccurate. Some key questions to ask are as follows: Is historical data readily available for trending, modeling, and drill down? Are upper and lower control limits established that drive alerts when limits are exceeded? Is risk assessment built into maintenance strategies?

- **Form a program office to manage overall investment.** With an understanding of the overall goals and existing gaps, progress will come not from a single project but from a series of related investments that will individually produce benefits but collectively move the company toward world-class performance.

- **Make asset visibility a priority.** Creating transparency to operating conditions should be an early investment because it can be leveraged by all of the subsequent transformative activity. Technology tools should include the four key areas discussed in this white paper, but should pivot on a process platform that is proven in enterprise asset management and can be easily extended to connect to individual assets and enterprisewide operational intelligence.
These four activities form the basis for elevating corporate performance in a business environment that will reward getting more out of the assets already in the portfolio and drive better decisions in allocating scarce capital to new asset investments.

**Copyright Notice**

Copyright 2008 Manufacturing Insights, an IDC company. Reproduction without written permission is completely forbidden. External Publication of Manufacturing Insights Information and Data: Any Manufacturing Insights information that is to be used in advertising, press releases, or promotional materials requires prior written approval from the appropriate Manufacturing Insights Vice President. A draft of the proposed document should accompany any such request. Manufacturing Insights reserves the right to deny approval of external usage for any reason.