Adding MRO analytics to your ERP system

Unleash the full potential of your MRO data

Situation:

The ERP data deluge

Most companies are squandering the potential of their enterprise data to maximize asset productivity and maintenance, repair and operations (MRO) efficiency. An enterprise system captures oceans of data about a company's assets, inventory and suppliers – and most of it is never used. Organizations are swimming in data but exploiting a mere fraction of available information – information that could inform smarter decisions and drive business results.

Challenge:

Balancing cost and risk

To enterprises running complex equipment 24 hours a day, seven days a week, asset uptime is critically important. Any interruption due to plant or equipment failure typically results in costly lost production. The challenge is to leverage transactional data about assets and equipment in a way that allows the MRO professional to maximize asset performance at the best possible cost. The problem is, ERP systems alone are simply not up to the task – the data is there, but ERP systems lack the capabilities to optimize MRO functions and guide decision making. Even business intelligence (BI) falls short in this area: BI is limited by its reliance on purely historical data and focus on what happened in the past.

Solution: **Adding analytics**

For MRO professionals, adding enterprise analytics to ERP improves the ability to effectively manage large numbers of assets, inventory items, suppliers and transaction parameters, and opens the door to optimizing MRO functions and processes. With the right analytics tools, you can evaluate the impact of alternative MRO decisions before you execute them. An analytics capability is particularly critical when facing multiple, competing strategic objectives. Today's analytics tools easily bolt on to modern ERP systems. In fact, the growing availability of cloud based analytics solutions makes the technology simple, accessible and even more cost effective.

Results: **MRO savings, efficiencies, performance**

Asset optimization analytics give asset-intensive businesses a powerful tool to manage risk, meet MRO performance goals and help drive corporate objectives. The value of business improvements driven by new insights and continuous improvement far outweigh the costs of adding analytics to ERP. At a strategic level, MRO analytics help executives and managers make more informed decisions by providing actionable answers to fundamental and critical business questions. Analytics help you transform raw data into improved MRO inventory performance – and that means better business performance.

Introduction

Is your ERP holding your MRO data hostage?

Companies in asset-intensive industries – like oil and gas, utilities, mining, transportation, process manufacturing and others – invest tens of millions of dollars in ERP systems every year. And they have a lot of good business reasons for spending all that money.

A successful ERP implementation delivers operational efficiencies and return on investment (ROI). ERP helps organizations improve transaction processing across functional silos, streamline operations, enable better processes and best practices, and standardize the corporate IT environment. All these benefits add up to bottom line performance.

ERP is a workhorse that can collect, organize and transact immense volumes of financial and operational data. Ironically, it is this sheer volume that makes it difficult for companies to manage and use their data effectively. And that's a problem.

Asset-intensive enterprises typically use their ERP and enterprise asset management (EAM) systems to automate and streamline key MRO business processes. Although these systems capture large amounts of data about a company's assets, inventory and suppliers, the data is not being used to full capacity.

Most companies never fully unlock useful information from the data collected and stored in their ERP systems – information that could help them make smarter business decisions faster. These companies are squandering the potential of their data to help them maximize MRO productivity and efficiency, minimize MRO costs, deliver positive ROI and boost the bottom line.

"ERP and EAM systems that are built around material resource planning or other manufacturing processes are not sufficient to handle these MRO problems and are only good at performing transactions and reporting. Existing systems typically do not perform tasks such as prescriptive analytics, inventory forecasting, and exceptions management.

For such circumstances (the use of ERP and EAM systems), companies that can provide an asset performance management solution with advanced analytics to optimize MRO spares and materials are expected to secure a leadership position in the market."

– Sankara Narayanan, Senior Analyst, Frost & Sullivan

Mixed priorities

Maximize performance, minimize cost

Asset-intensive companies need to focus as much on the assets and equipment they use as the outputs they produce with those assets. For enterprises running complex equipment 24 hours a day, seven days a week, asset uptime is critically important. Any interruption due to plant or equipment failure can result in lost production that is generally costly and may be unrecoverable.

It's a business challenge that requires significant amounts of money and resources – not only to maintain critical productive assets and equipment, but also to manage MRO inventory, maintenance and supply chain costs.

With all this cash at stake, and asset productivity on the line, how are you supposed to balance the conflicting requirements of maximizing service levels while minimizing costs?

In fact, asset-intensive businesses face significant obstacles to getting it right:

Multiple and conflicting business objectives – Companies typically have multiple stakeholders with conflicting objectives and different approaches to managing MRO inventory, assets and suppliers.

Sheer scale of assets, spares, suppliers and transactions – Companies typically have to manage very large numbers of assets, inventory items, suppliers and transactions – with limited resources.

Dynamic business environment – Companies are faced with constantly-changing business conditions with respect to item usage, price, lead time, asset operations, and more.

Complex multidimensional management decisions – Stock vs. non-stock, optimal reorder point/reorder quantity (ROP/ROQ), supplier contract vs. no contract, vendor managed vs. self managed inventory – the list goes on. And each one of these requires multiple pieces of information: usage, price, criticality, lead time, supplier performance and more.

Inability to apply a statistical approach – Two major variables – item usage and supplier lead time – encapsulate significant components that necessitate a statistical, probabilistic approach to inventory management. The expertise capabilities to do this are not always readily available.

Lack of analytics capability – Achieving an effective balance between service levels and cost requires the appropriate combination of data and analytics to optimize inventory stocking levels and MRO supply chain performance. ERP systems typically do not possess the analytic capability optimization requires.

MRO professionals within asset-intensive enterprises need the right capabilities to ensure they can leverage enterprise data about productive assets and equipment in a way that maximizes asset performance at the best cost.

The problem is, ERP systems alone are simply not equal to the task. The data is there, but ERP systems lack the capabilities to optimize MRO functions and guide decision making. Reporting tools alone can't answer these questions. Even BI falls short in this area – it is limited by its reliance on purely historical data. BI reports and dashboards are very helpful for understanding where you are today – but offer little to guide future decisions. While BI can provide compelling visual feedback, it can only paint a picture of what has already happened.

Balance risk and cost

Add analytics to your ERP

Adding analytics to your ERP system gives you the ability to extract useful insights from the raw data in your ERP system. And that means getting more value from your ERP or EAM. In fact, if you think of ERP as the engine in a high-performance vehicle, MRO analytics act as the engine management system, constantly and dynamically adjusting engine parameters to current driving and road conditions. Today's analytics tools easily bolt on to modern enterprise systems. And, the growing availability of cloud based analytics solutions makes the technology even more accessible and cost effective.

For MRO professionals, enterprise analytics improve the ability to effectively manage large numbers of assets, inventory items, suppliers and transaction parameters. With the right analytics tools, you can liberate the terabytes of MRO data held in your ERP or EAM systems to forecast and evaluate the impact of alternative business decisions before you execute them.

Three analytics types: what you get

Each type of analytics helps you use your data for better decision making. Only prescriptive analytics provide capabilities that help you truly balance constraints and facilitate optimization.

An analytics capability is particularly important for managing multiple, competing strategic objectives. Often, complex or interrelated business processes raise the risk of unintended consequences of a decision. MRO analytics provide the key to understanding and optimizing the entire MRO operation across inventory, procurement and maintenance.

Descriptive analytics can help you make better decisions, manually, over time. Predictive analytics can be used to forecast future conditions based on historical and current data. For example, this could help a company evolve from break-fix or scheduled maintenance practices to predictive maintenance. Both descriptive and predictive analytics should be coupled with clear business processes of action, feedback, review, adjustment and then back to action. Otherwise, business improvement will be slow, haphazard or simply unlikely.

Advanced prescriptive analytics tools sift enterprise data to uncover patterns and relationships that might not be immediately apparent with simple query and reporting or less sophisticated analytics tools. These analyses highlight opportunities to reconcile risks and constraints, supporting the ability to optimize inventory levels, maintenance schedules and inbound supply chain logistics. Prescriptive analytics can automate business improvements and process changes.

	VISIBILITY What happened?	DECISION What will happen?	ACTION What should I do?
1 DESCRIPTIVE Prepare and analyze historical data, identify patterns from samples to report trends	✓		
2 PREDICTIVE Predict future probabilities and trends, find relationships in data that may not be readily apparent with descriptive analysis	✓	✓	
3 PRESCRIPTIVE Evaluate and determine new ways to operate, target business objectives; balance all constraints	✓	✓	✓

How 3 different analytics tools support decision making

1 DESCRIPTIVE

Business Intelligence (BI) relies on descriptive analytics – BI dashboards tell you "What happened?" in the past.
Example – Trend of inventory cost and service level over the past 24 months.
Action – Decide if the inventory cost and service levels are satisfactory; if they are not, investigate why.
Value to decision maker – You can see what's not working and fix it.

2 PREDICTIVE

Forecasting tools make use of predictive analytics, allowing you to evaluate "What will happen?" if a certain decision path is followed.
Example – Forecasted usage of an item over the next 12 months.
Action – Use the forecasted usage to plan inventory stocking levels. Share the forecast with suppliers to improve their service levels.
Value to decision maker – You can make a more informed decision for the future.

3 PRESCRIPTIVE

Prescriptive analytics answers the question "What is the best outcome?" of a decision.
Example – Calculated stocking levels that will minimize the total of purchasing cost, holding cost and stockout cost.
Action – Set the stocking levels to achieve minimum cost.
Value to decision maker – You can begin to balance cost and risk; prescriptive analytics support optimization.

Simple "what if" scenario: What will happen to inventory cost and service levels over the next 12 months if we change stocking levels today?

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Transform raw data into business performance

At a strategic level, MRO analytics help executives and managers make more informed decisions by providing actionable answers to business questions, like:
- Do recent purchasing patterns represent a trend of unplanned breakdowns, duplicate purchases, human error or just a blip?
- How would changing vendors, lead times or service level agreements influence inventory and supply chain performance?
- How will optimizing MRO impact profitability?

Advanced analytics tools extract relevant data from the ERP system to automate low value or high volume MRO decisions and optimize the MRO supply chain, and then automatically update the ERP database.

These solutions provide various analytics capabilities to enable business improvement. For example, descriptive analytics can be applied to configured business rules to deliberately target business process functionality, which drives visibility and enables direct action to improve

business outcomes. Predictive, forecasting tools help you make informed decisions for the future. Prescriptive analytics enable optimization – and that's where you start to truly balance risk and cost.

MRO analytics help executives, managers and users balance risk and cost by making more informed decisions. Leveraging analytics to optimize MRO means maintaining assets and. equipment at top performance, delivering high service levels, and keeping expenses in line with corporate budgets and goals.

While the time and effort needed to implement an analytics solution and achieve ROI varies between organizations, analytics solutions for asset performance management generally require less investment than a typical ERP or EAM system, and can be implemented much faster.

The costs of adding analytics to ERP are well outweighed by the value of business improvements driven by new insights and continuous learning. For many, the gains come close to making the analytic effort self-funding. In fact, businesses that invest in analytics rapidly find they have a new business imperative: working with analytics to drive continuous improvement.

__What is MRO Optimization?__ The best practices, information, and software tools that enable organizations to manage MRO parts at minimum total cost while fully supporting the organization's goals for maintenance effectiveness and asset performance.

– ARC Advisory Group MRO Optimization Benefits and Challenges

Six ways adding analytics to ERP helps balance MRO risk and cost

Configurable automation of management decisions

1   Alleviate the burden of managing large numbers of inventory items and allow users to focus on important items. "Stock this item if it costs more than X, has a lead time greater than Y and is of criticality A".

Visualization and reporting capabilities

2   Enable users to view metrics partitioned across multiple dimensions with descriptive analytics; support accurate, timely, in-depth reporting.

"What if" scenario analyses

3   Determine optimal stocking levels – ROP/ROQ – to minimize total cost – with prescriptive analytics.

Customized work queues

4   Improve efficiency by prioritizing work to be done; consolidate items that have common characteristics and management policies for review.

Advanced forecasting algorithms

5   Provide accurate forecasts of future usage to improve inventory planning and supplier service with predictive analytics.

Advanced statistical and optimization algorithms

6   Determine optimal stocking levels – ROP/ROQ – to minimize total cost – with prescriptive analytics.

INVENTORY ITEM PARAMETERS:	
$500	Cost per order ($/order)
300	Annual demand (units/yr)
128	Order size (units)
$10,000	Item cost ($/unit)
0.1	Holding cost ($/$/yr)
$50,000	Stockout cost ($/occurrence)
40	Std dev lead-time demand (units)
150	Mean lead-time demand (units)

Calculating optimal reorder point (ROP) and reorder quantity (ROQ) to minimize cost.

Conclusion:
Maximum performance, minimum cost, improve bottom line results

Adding analytics to your ERP system gives you the ability to extract useful insights from the raw data in the system. The right analytics tools can help you forecast business outcomes and evaluate the impact of alternative business decisions before you execute them. Today's analytics tools easily bolt on to modern enterprise systems, and cloud based analytics solutions make the technology even more simple, accessible and cost effective.

For MRO professionals, enterprise analytics improve the ability to effectively manage large numbers of assets, inventory items, suppliers and transaction parameters. MRO analytics provide the key to understanding and optimizing the entire MRO operation across inventory, procurement and maintenance. An analytics capability is particularly important for managing multiple, competing strategic objectives, especially when complex business processes raise the risk of unintended consequences of a decision.

Any company that has already laid the foundation of collecting asset data by implementing an ERP or EAM system should explore adding analytics. If an organization is struggling to both minimize costs and maximize asset performance, that's further justification.

In fact, IBM customers around the world are already leveraging analytics to extend the value of their ERP, optimize their MRO operations and drive results:

- **15-50** percent reduction in inventory holdings
- **20-35** percent decrease in replenishment costs
- **30-50** percent reduction in stock-out risk
- **15-40** percent savings within maintenance budgets
- **20-25** percent increase in supplier performance
- Overall improvement in MRO efficiencies and operational performance

IBM® Maximo MRO Inventory Optimization facilitates the dynamic optimization of operations across all MRO functions, including inventory, procurement and maintenance.
MRO Inventory Optimization's analytics solution extracts and analyzes transactional data from corporate ERP systems, optimizes it within an inventory, procurement or maintenance context, and then updates the ERP with optimized parameters. MRO Inventory Optimization's cloud based MRO analytics application works easily with IBM® Maximo, SAP, Ventyx Ellipse, JD Edwards, Oracle and others.

The results speak for themselves. Visit www.ibm.com/services/process/mro-inventory and see what our customers have to say about working with IBM to optimize their MRO operations – and how you can too.

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