EVIDENCE-BASED MANAGEMENT: a practical management approach for the energy industry

The rapid growth over the last five years of natural gas, gas liquids and crude oil activity in shale basins has single-handedly changed the global nature of energy production. The impact on companies in the upstream, midstream and downstream sectors is seen in increased competition for supply and markets as well as human and financial capital. Complicating ongoing business management is the large amount of data from sprawling assets that needs to be analyzed and acted upon in a narrow real-time window through a compelling format. In this article, Eric Scheller discusses the challenges and options facing business directors as they try to fully disseminate and leverage data in the management and growth of their businesses.

TRENDS DRIVING INCREASED COMPLEXITY
When Mitchell Energy completed its first economic shale fracture in 1998, no one thought it would lead to the unprecedented shifts in energy markets that we are experiencing today. In fact, there were many experts who did not see the development of these unconventional plays and now believe that North American shale development is still in its early stages. Consider how much shale plays have moved the North American energy landscape over the last five years:

• Record production increases in natural gas and oil
• Prolific NGL production from liquid-rich gas processing
• Historical build out of midstream infrastructure
• Revitalized North American petrochemical industry

It’s clear that upstream producers, midstream and downstream companies have had their share of growing pains in dealing with the increase in interconnected assets to handle the technological advances and growing production volumes. This growth has spurred business management complexity as well as the amount of data to be analyzed to assess performance, which ultimately reduced available time to examine and seize opportunities. Throughout this growth, companies recognized the need to collect, validate, compartmentalize and digitize data into electronic data management systems, asset management data warehouses and commercial systems to assess and monitor their investments. In spite of these investments and efforts, companies found themselves with portfolios of assets generating marginal returns. Performance reviews by business managers found that one of the underlying contributors of poor performance was that market signals went unidentified as a result of marginal data analytics.

BASE DATA REQUIREMENTS TO CAPTURE OPPORTUNITIES
The struggle for many companies is determining how to fully disseminate and leverage data and analytics in support of corporate goals tied to safety, environment, health, customer, service and profit and expense targets. Energy firms share many of the same goals, for example:

• Be recognized by the public and industry as a safe and responsible operator of assets as demonstrated through a track record supported by audit history of a reliability-centered asset management practice that fully complies with industry regulations
• Minimize the total cost of asset ownership through the efficient use of personnel and a shared services support model
• Maximize the utilization of assets under management to increase top-line and bottom-line growth
• Maximize optionality and flexibility through asset interconnectivity
• Maximize earnings from integration of newly acquired assets or flexibility in operating the asset
• Capitalize on low-risk market opportunities by leveraging assets to flow hydrocarbon to premium markets
• Leverage returns through volatility in commodity differentials supporting arbitrage strategy development

Companies trying to achieve wide-ranging goals as shown above will have to create a data and workflow framework with the following characteristics:

Accurate and Timely—Data sourced across the organization is the driver of solid analytics. Without accurate, up-to-the-minute data, companies are unable to discern and communicate possible market signals to decision makers. Data must be error free, undisputed and freely available before any meaningful insights can be gleaned through analytics.
Cross Functionally Available—Companies that extend quality data and analytics to remote locations and employees across functional silos create an open, collaborative working environment that encourages data cross-flows. These new flow-paths improve the quality of information-driven analytics and systems.

Organizationally Actionable—Decision makers receive a continuous position of actions to improve asset performance and enhance business expansion investments from the roll-up of organizationally available data and analytics, including up-to-date information on customers, products, product availability and operations status.

AN EVIDENCE-BASED APPROACH
Business directors in the energy space have long faced the challenge of directing complex systems with limited resources and disparate data systems to achieve a laundry list of goals and objectives. Many ambitious over-arching initiatives to fully disseminate and leverage data fall short of achieving any meaningful, actionable output because they fail to make managing the business faster, more efficient and more profitable. Any plan that fails to take into account these three drivers hampers its chances of success from the moment it is proposed.

In order to maximize their chances for success, business directors are embracing Evidence-based Management (EBM) to employ actual evidence in management and decision-making. Leveraging well-developed methods long used in the medical field, directors in the energy sector are applying scientific methods to managerial decisions and organizational practices informed by the best available business environment evidence. EBM practices are unique and organization specific and include the systematic accumulation and analysis of data and problem-based research and discussion by managers and staff. This leads to decisions informed by both best available research and organizational information.

A practical approach to EBM begins with the reality that a business can be parsed into four unique functional activities, namely Control, Operate, Optimize and Extend, as shown in Figure 1, and further described as follows:

**Figure 1: Parsing the Business into its Core Functional Activities Focuses Attention on Key Business Elements**

<table>
<thead>
<tr>
<th>CONTROL</th>
<th>OPERATE</th>
<th>OPTIMIZE</th>
<th>EXTEND</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Safety &amp; Environment</td>
<td>• Ongoing Operations</td>
<td>• Assets</td>
<td>• Supply Chain</td>
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<td>• Regulatory</td>
<td>• Turnarounds</td>
<td>• Capacity</td>
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<td>• Commercial</td>
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<td>• Operating Assets</td>
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**CONTROL** – Activities tied to the control aspect for the base drivers of the business.
- **Focus:** Safety and environment compliance, regulatory standards and compliance, commercial and legal agreement management
- **Goal:** All the processes necessary to operate the business assets are in place and are valid to invoice and report against

**OPERATE** – Activities related to the physical operation of assets under management.
- **Focus:** Ongoing operations, business-in-distress turnarounds, customer management
- **Goal:** Business assets are operated safely, prudently and efficiently

**OPTIMIZE** – Portfolios of assets are optimized to realize the highest returns.
- **Focus:** Assets, capacity and portfolio management
- **Goal:** Achieve the highest returns possible at the commensurate level of risk

**EXTEND** – Leveraging strategies and positions to grow business results into new areas.
- **Focus:** Organic business growth, business and operating asset acquisition, supply chain extension
- **Goal:** Achieve business development and growth goals to achieve a competitive advantage
Having timely, accurately aligned data in each parsed function, combined with a focus on faster, more efficient and more profitable results, is the key to achieving the goals of a business director at each level. Ultimately, inefficiency and waste is minimized and limited resource utilization and productivity is maximized. Using this approach, firms can:

- Streamline data management and workflow processes
- Focus line staff on research and analysis within their functional area
- Disseminate data throughout the organization
- Generate new insights into previously unidentified signals
- Trigger decision-making response and new actions by business directors

**SCORECARDS**

The framework described above is designed to move a company toward an evidence-based mindset within each functional activity. Business managers that take the initiative to drive organizational decisions based on the best available information need an intuitive tool that:

- Provides immediate and clear feedback
- Ties performance to goals and objectives
- Aligns operational activity with strategic activity
- Summarizes the right set of metrics decision makers can control
- Allows for problem identification within the business
- Shows how decisions affect business success
- Compels decision making based on analytics, not instinct

One of the most effective tools to achieve these results is the visualized scorecard. Central to the success of scorecard use is its design rationale and an actionable purpose that furthers the insights into the business. A user-centered design for the scorecard will maximize the value of the user experience (UX). A well-designed scorecard with an appealing user experience will enhance the overall quality of decisions through the deliberative use of relevant and best available analytics. Figures 2 through 5 are examples of energy company scorecards by functional activity. They are shown with a corresponding example visualization.
GOAL: OPTIMIZE RETURN ON ASSETS

Requirement: Grow revenue in multi-mode services supported by trading activities

Actionable Output:
- Improve forward visibility on asset balances, in-transit inventory and shipper destination terminal rundown
- Maximize revenue and volumes related to multi-mode transporting (truck, rail and pipe) and blending under bundled transport agreements
- Capture trading and logistics solutions to enable storage optimization and grade/location differential-based transactions

Figure 4: Optimization Interactions from Asset and Commodity Data Sets

SUCCESS FACTORS

To successfully build a culture of evidence-based management, firms must:

- Demand that all data be validated and that a process is in place to ensure continuous validation
- Demand that an open, data-sharing environment exists for all employees
- Create and enforce appropriate workflows that underpin the culture
- Resist the urge to take an ad hoc approach to scorecard design as it invariably results in views that are “nice to have” and may have little redeeming value
- Scrupulously monitor and manage the use of visual scorecards to achieve actionable, decision-based views

Companies employing visual scorecards supported with accurate analytics and timely information dissemination are already gaining an advantage against their competitors through decision-making responses and actions that achieve faster, more efficient and profitable results.

Eric Scheller

is subject matter expert within Sapient Global Markets’ Midstream practice. He has over 25 years of experience in oil, gas, NGLs and chemicals. His practice areas include business and asset operations strategy, development and business in distress and corporate restructurings as well as commodity marketing and trading. He has served in a variety of business development, consulting, commercial, operations and technical roles for several major companies.

escheller@sapient.com

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