Thriving on Fast Manufacturing Decisions

User-driven Business Analytics Transform Operations

for
Qlik

Date: **Q1 2014**

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1 Executive Summary

Volatile market conditions - in both established and emerging markets - mean many companies are not in a position to forecast accurately, respond effectively and feel confident they are in control. To make appropriate changes requires information to come to decision-makers rapidly in a form they can act on quickly. Performance measurement and daily processes for continuous improvement become guiding forces for programs to align day-to-day activities with company strategies.

Companies cannot control external factors, but many do not have good visibility on what they can control - their own operations. With so many fast-changing variables, manufacturing can be particularly challenging to manage. Yet manufacturing is central to product, customer, and financial success, and visibility into this complex area of the business is essential. Fortunately, new technology approaches are improving visibility to ensure manufacturing success, whether performed in house or by contract partners.

The latest analytics technologies can provide a real-time view of production and other areas of the business. A layer of **u**ser-driven **b**usiness **a**nalytics (UBA) can complement existing information systems. A UBA system must present data as needed for different roles and processes in the organization. It must provide rapid response, comprehensiveness of data correlated into useful information, and quick visual summaries.

We interviewed two companies, Euro-Pro and 'SGM' (a sporting goods manufacturer which wishes to remain anonymous), that have deployed UBA technology in their manufacturing operations and throughout their enterprises. Both are thriving leaders in their respective markets and have used this high velocity visibility into the operation as a cornerstone for their success.

Given the high rate of change, companies seeking to transform themselves need to make good, fast decisions. These decisions are not only in the executive offices, but on the production floor and throughout the operation and business. As some manufacturers accomplish that, pressure will rise on others. Fortunately, it is possible to do this without major upheaval or enormous multi-year project investments.

"Integrated scorecards, dashboards and reports help align daily execution with strategic intent at all levels of the organization. Management down to front-line supervisors have a powerful data-driven sixth sense. They gain new insights into drivers behind performance losses as well as understand their impacts on the business and take corrective action which drives desired behaviour up and down the organization."

**VP Operations
SGM**

"Our whole business is being run on QlikView. We have used it to improve our quality dramatically. That system is the foundation of how we moved from having two- or three-star rated products to having five-star rated products. We have also quadrupled in revenue in the past five years."

**Michael Fabrico
Executive VP and CIO
Euro-Pro LLC**

2 Manufacturing's ripple effect

Manufacturing is at the heart of a product company's success, but plant operations are often so interdependent and fast-moving that it can be hard to gain an accurate view of them. In fact, manufacturing is central to the product lifecycle, supply chain, and customer order cycle, as shown in Figure 1. Manufacturing, quality, testing, and supply chain execution are the critical activities by which companies add value, whether performed in house or by contractors.

A problem in manufacturing can cascade throughout the business. If, for example, a product is not meeting specifications during quality testing, then supply chain, product development, and order processes are clearly affected. In addition, engineering might need to design product changes, finance may need to prepare new forecasts, procurement may need to shift to new suppliers, human resources may need to initiate a new training process, sales may need to notify customers of delays, and marketing may need to promote products that are not having problems.

Yet from an IT perspective, manufacturing is often the poor relation. The plant floor market

Figure 1: Manufacturing operations are central to the main process flows of a company.

for integrated software is still less than a fifth the size of that for integrated enterprise applications. Typically, information needed to make decisions that would avoid problems and improve company success is simply not available to operations managers and their staffs. There are many reasons for this a few of which include:

- Production operations vary far more widely than do finance, design engineering, customer service, or other disciplines - so standard applications may not fit well

- Personnel in the operation may not be in a position to enter data on a keyboard and mouse - because the environment is harsh, they are wearing gloves or goggles, or it would disrupt production flow

- Enterprise resources planning (ERP) systems treat operations primarily as a place that incurs costs to report; this limited view means the software does not adequately assist operations personnel in being efficient, productive, and effective

- Manufacturing and operations people often do not want corporate IT's "interference": they know an untimely software patch can result in lost production time and thus lost revenue or missed volume targets or customer shipment dates

- Status in operations changes extremely rapidly, and most IT systems are not designed to cope with the speed and volume of incoming data

The relative lack of information systems is a problem for both the manufacturing teams and for the business overall. Operations data is not always easily visible. As a result, everyone is uncertain about the current state of the business, and can be blindsided. Leading manufacturers know this. As a result, many companies are embarking on business transformation initiatives. One way to do this is by leveraging data from operations effectively throughout the business to support business decision making. We interviewed two companies that are examples of how companies can change the situation to thrive.

One, Euro-Pro Operating LLC, is headquartered in the US and manufactures its vacuums, steamers, and garment care products entirely through contract partners in China. The company has provided
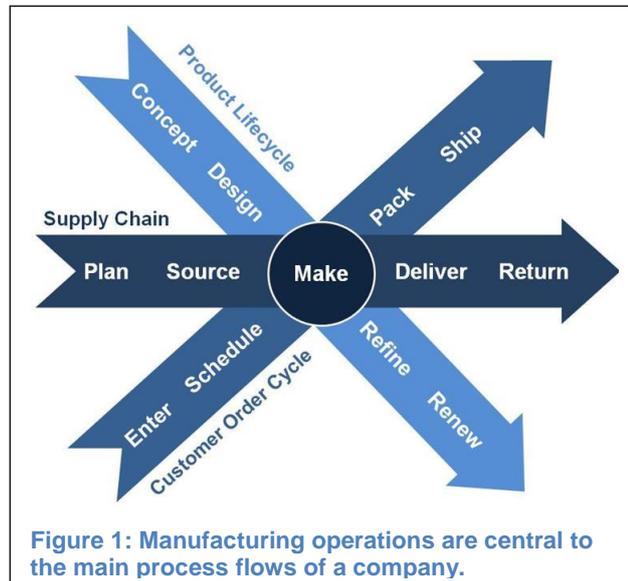
data dashboards for these contractors to allow visibility into performance of the products and the suppliers. The sporting goods manufacturer, which we will refer to as SGM to preserve anonymity, has production in a network of US plants, many of which were acquired.

3 The data distribution dilemma

Empowering team members to make good decisions is not as straightforward as it sounds. The business processes involved and the information systems that support them are highly fragmented, as are the departments and employees involved. Information must flow into and out of production plants quickly, accurately, and completely.

Many companies use Microsoft Excel, Word, PowerPoint and Access as tools of choice to complement monolithic ERP and data warehouses. These Office tools are systemically disconnected from the business data, creating a tremendous burden on the business users to extract, capture, store and analyse information. What's more, all of those information systems are disconnected from the constantly changing status of production and supply chain operations.

As a result, manufacturers are swimming in data, but struggle to understand the situation and make sound decisions quickly. A central problem is data distribution. This challenge is has two major components. (See Figure 2.)

"We have had many eye popping situations. In some plants, we thought we were 80% efficient, but really when we got all the data, it was 50%, 60%, or 70%. Fortunately, this system also allows us to understand how to redirect resources and focus in specific areas to change those outcomes."

VP Operations, SGM

	Common Reality	Ideal Scenario
Data sources	Widely distributed	Aggregated & analyzed to become information
Data distribution to decision points	Not effective and timely to all	Effective and timely insights to all. Clear, complete real-time view

Figure 2: Distribution of data is a problem with two faces: one is that data sources are scattered throughout the extended enterprise, and another is that it is not always distributed it to the people making decisions in a timely and complete fashion.

1. **Data is distributed at the source**: Data about a particular process and its results are typically distributed across many departments, disciplines and applications. Conditions can change in minutes or even seconds, so dedicated local data collection and use makes sense. However, beyond the local view, information is often not aggregated into actionable insight.

2. **Data is not distributed effectively to decision points**: Local, task-based systems create segregated perspectives. The people making decisions often do not have quick access to all of the data and information they need. So distributing usable information out rapidly enough for decisions to change business outcomes is also a common challenge.

Even manufacturers with a global ERP deployment have many other data sources both internal and external. These may be data streams from equipment, specialized applications for product design, quality, and logistics. In outsourced situations such as Euro-Pro's, data from suppliers and contract manufacturers is critical. For any company, data from customers, dealers or distributors also factor into sound decisions.

Even if ERP did include all of the necessary data, ERP is primarily designed for transactions such as processing orders, creating orders with suppliers, and tracking inventory. ERP is a task-based system, not one primarily aimed at making decisions, but at following a business process.

To handle disparate data for decisions, many companies have also invested in data warehousing (DW) and business intelligence (BI) solutions. These systems can effectively take multiple data streams and deliver analysed information. However, they take quite a bit of effort to set up by information systems specialists, and they can really only answer questions that are known in advance and programmed into the intelligence system. With products coming off the line at as many as thousands per minute in the case of consumable products, people in operations need information in near-real time, and typically traditional BI cannot meet the needs.

4 Beyond BI to User-driven Business Analytics

Manufacturers need the ability to understand and visualise the current status of their business in ways that serve the diverse needs of users at different levels and in different disciplines. Some companies have implemented a different type of system they can layer on their existing application and data management structures to accomplish that. We call it **u**ser-driven **b**usiness **a**nalytics (UBA), and it's sometimes also called business discovery or data discovery.
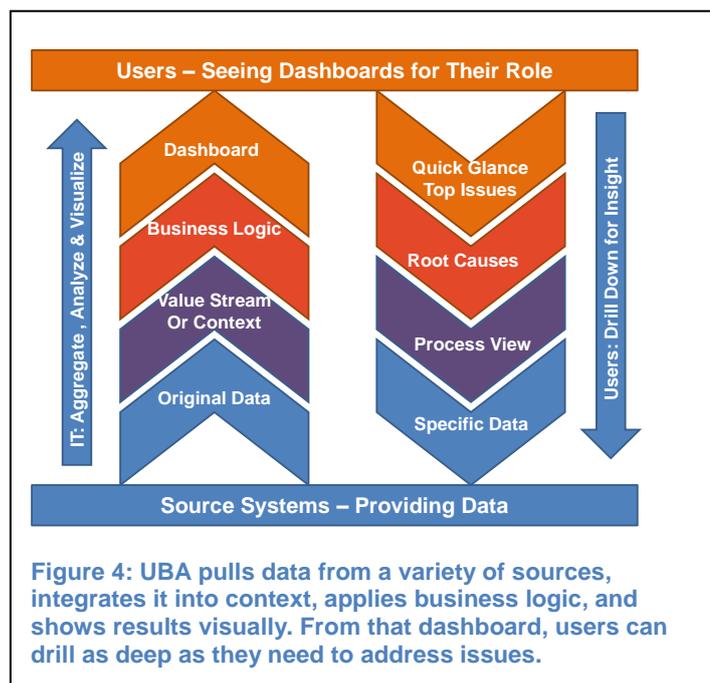
Figure 3 shows some of the differences between BI and UBA. Often, they will be used in tandem. BI is used for reporting results and UBA is used for daily operational decisions that determine the results. UBA can draw from any source systems or the data warehouse to serve the varied stakeholders in manufacturing and other disciplines. UBA typically provides an instant visual view of the business. Many companies using UBA develop dashboards where various performance metrics are constantly updated. These are not static reports, as performance charts constantly change. UBA also allows users to drill down on results to see root causes, correlations, and explore the source data directly, as shown in Figure 4.

UBA can be used with any application environment. It can complement modern ERP, work with a fragmented applications environment, or work with an antiquated ERP. It can pull data from plant-specific or company-wide manufacturing software or provide many of those views by accessing automation data directly.

Relatively low cost of acquisition and ownership for UBA makes it an easy

Characteristic	Traditional Business Intelligence BI	User-driven Business Analytics UBA
Set-up	IT builds cubes, queries, reports; often takes years	IT sets up dashboards; often takes days/weeks; users can vary views
Data sources	Varied - mostly from data warehouses	Pulls any existing data, including real-time data
Users	IT provides to management	Business users at all levels see results
Output	Static reports & pre-set queries	Dashboards, ad hoc drill slice & dice & query
Main use	Periodic reporting of past results	Daily performance view for proactive decisions

Figure 3: BI and UBA serve different purposes and work differently. They can be used together, with the same data sources.

Figure 4: UBA pulls data from a variety of sources, integrates it into context, applies business logic, and shows results visually. From that dashboard, users can drill as deep as they need to address issues.

decision for adding on to an existing IT infrastructure. Setting up UBA is a far less significant endeavour than setting up a data warehouse with BI and reporting.

5 Visibility for fast decisions

Fast decisions mean the decision-maker must get all the relevant information quickly and interpret it quickly. So what can this UBA technology really deliver? In short, it can provide instant, graphical visibility to data, trends, and real issues in manufacturing plants and companies. Figure 5 is an example of a dashboard similar to what SGM uses. This is an example of the common metric overall

Figure 5: Graphical displays help anyone see performance for their area and quickly understand the top issues impacting it.

equipment effectiveness (OEE) in the top three panes, and quality defects in the bottom three. At a glance, you can see current performance, trends, and where problems most commonly occur. Additionally, employees can click on a chart and drill down to see more detail, or switch to a different slice of data.

One tenet of continuous improvement initiatives such as lean manufacturing, total quality and six sigma is that everyone must understand what they need to improve. This type of view provides incredible opportunities for employee empowerment and decision-making. Euro-Pro uses contract manufacturers in China. Corporate, quality and engineering functions reside in the US and Canada. They work closely with suppliers through this data visualisation capability.

Whether performed in-house or by partners, rapid visibility to performance at every level is critical to success. To change outcomes, decisions must keep up with ever-changing production situations. Figure 6 gives a view of operations data reporting cycles at SGM now and previously. Many of these are orders of magnitude faster. Plant floor data from about 750 machines in four plants refreshes every 10 minutes, and plant management data refreshes every hour.

So how does a company decide how to roll out such a system? Both SGM and Euro-Pro chose to focus on where the problems of visibility and speed for decision-making are clearest or have the most impact on customers or business outcomes.

"In a previous company, we had a $3.5M investment in [one of the leading BI tools] and we put QlikView [a UBA] in there to get beyond static reports. This is not static; we can slice and dice and drill in."

Fabrico, Euro-Pro

"Our people did not have the analytical tools to show them the root causes of the issues impacting performance. In its most basic sense, we strive to reduce cost per unit and improve working capital productivity."

Kevin Miniard, COO SGM

Measurement	Frequency: Reported every	
	Before	**Now**
Machine performance	Not Collected	10 minutes
Overall Asset Availability	Week	Hour
Quality	Day	Hour or 15 minutes
Ballistics Testing	Day	15 minutes
Supplier Performance	3 months	Week

Figure 6: At SGM, performance can be measured in short enough timeframes to change the outcomes now. This was not possible before.

6 Business improvement for manufacturers

What are the business drivers? Improvements in business performance improvement, plain and simple, are the result. When people can see and analyse issues, they can take action to improve outcomes. Typical areas of impact that follow are from SGM and Euro-Pro experience, but these may apply to any manufacturer:

Manufacturing: Helping people in production see how they are doing will inevitably help them improve, particularly if you take time to show people information about their scope of action.

Quality: Quality impacts throughput and revenue as well as costs. Identifying top defects and their causes, and correcting those problems, is easier when their impact is visible in analysis and trend lines. Having production teams see results in real-time also means they can often take action based on a trend and prevent quality problems from occurring.

Testing: Final test of products after manufacturing can also benefit from having data ready to slice and dice. Seeing the requirements and being able to drill down by product or facility can greatly improve efficiency, not only from understanding but also in the form of communication between test and production groups.

Supply Chain operations: Understanding status in manufacturing, from materials to jobs against orders, can support supply chain execution as well as keep plans up-to-date.

Customer Service: Warranty and return information can inform operations, and provide a firm foundation for quality and product design analysis. Customer ratings from internet sites can also feed advance notice about what types of customer service calls are likely to emerge.

7 Getting Fast decisions

Many manufacturers have transformation initiatives that aim to create more competitive processes and mindsets. Those that have the information each employee needs at their fingertips are in a much better position to not only create these dramatic changes, but sustain their performance.

Best of all, UBA can be implemented rapidly and extended relatively quickly and painlessly. This is because it truly is driven by the business users and they can clearly see the gains they get from the system. Further, UBA does not set up new data storage structures, but rather pulls from existing sources, which minimizes IT headaches and overhead.

Growth can follow these improvements. UBA can not only feed growth, but help companies keep up with it as the company changes. Euro-Pro and SGM have significant experience, and share their lessons learned and advice in the boxes below. Instant views are needed to understand the changing reality of manufacturing operations. With them, SGM and Euro-Pro are gaining a competitive advantage.

UBA dashboards deliver an ongoing ability to make good decisions quickly and confidently. This is the foundation of continuing to make improvements over the long term. As unpredictable as conditions are, every manufacturer might consider their ability to thrive in an unknown future.

> *"The detailed analysis we do of new products and customer returns with results displayed in QlikView are the things that have transformed this company from poor quality to very good customer ratings. That dramatic increase in quality is what has made the company so successful these past few years."*
>
> **Fabrico, Euro-Pro**

> *"We are improving the linkage from strategy to actions. Corporate goals are translated to plant goals, which become unit and individual objectives. The QlikView infrastructure provides the ability to cascade objectives, and measure performance real-time at all levels, from the individual machine to the entire plant, to enhance the visibility and accountability up and down the organization."*
>
> **Gene Kelly Quality and Ballistics Manager SGM**

8 Words of wisdom

Below are a few comments and pieces of advice that the two companies we interviewed offer.

- *Feed Six Sigma and Engineering programs with data from the UBA*

- *Write SharePoint applications for data collection to feed real-time analysis*

- *IT folks may resist to protect their jobs; no need for programmers to write reports at everyone's beck and call*

- *Using UBA as the interface to information allows employees to answer a wide array of questions quickly*

- *Set up suppliers to feed data into your systems for greater control & quality*

  Euro-Pro

- *Keep it simple*

- *Get users involved early*

- *Get good information in the users' hand as fast as possible*

- *Start small but have an overall vision that encompasses all levels and across the enterprise*

- *Make sure information is actionable for person viewing it*

- *Make use of the information - acting on it - part of daily standard work*

- *Build a culture of fact-based continuous improvement*

  SGM

About the Sponsor, Qlik

Headquartered in Radnor, PA, Qlik (NASDAQ: QLIK) was founded in Sweden in 1993 and now serves more than 30,000 customers, most through a network of 1,500 partners, in more than 100 countries.

Qlik is a leader in Business Discovery—user-driven Business Intelligence (BI).   Its QlikView Business Discovery solution provides a self service environment to explore data with analytical and visualization tools that bridge the gap between traditional BI solutions and inadequate spreadsheet applications. The in-memory associative search technology Qlik pioneered created the self-service BI category, allowing users to explore information freely rather than being confined to a predefined path of questions. Appropriate from SMB to the largest global enterprise, QlikView's self-service analysis can be rapidly deployed. The QlikView Business Discovery platform's app-driven model works with existing BI solutions, offering an immersive mobile and social, collaborative experience which gives significant improvements in usability, flexibility and performance at lower costs compared to traditional BI solutions

Qlik describes its approach to business intelligence as Natural Analytics, something akin to the way our human curiosity searches and processes information, reveals insights, and enables decisions.

About Cambashi

Cambashi, based in Cambridge UK and Boston MA, USA provides independent research and analysis on the business benefits of using IT in value-adding industries. Cambashi delivers the latest global market data, plus perspectives on the changing state of technology and current business issues in manufacturing, process, distribution, energy, utilities and construction industries. Our consulting analysts partner with each client to solve difficult problems, clarify decisions, articulate value, and craft a unique path to market rewards. www.cambashi.com

Cambashi Ltd Paper Thriving on Fast Manufacturing Decisions, Ref: M3171