

Win in the flat world

Business Intelligence

Delivering Business Value
through Supply Chain Analytics

– Sandeep Kumar, Sourabh Deshmukh

Are my cost reduction programs through value engineering delivering on their promise?

How do I use predictive modeling techniques to forecast the probabilities for success in my new product line?

Can I identify dead or obsolete stock and manage it through product aging strategies?

What is the best strategy for managing returns and does it make the best economic sense to recycle or refurbish defective products?

Managers in the rapidly evolving high tech and discrete manufacturing (HTDM) industry face tough questions like these every day. Business intelligence technology can help them find the answers—assuming the software technology can be deployed to the right people in the right parts of the organization, in a form that is easy for them to use and understand. According to management guru Peter Drucker, business decisions should be made at the lowest possible level in an organization—ideally, as close as possible to where the outcome will be executed. That's why astute companies in the HTDM industry are deploying supply chain analytics solution. When properly deployed, these solutions can extend high-quality, actionable business information to many different types of employees throughout the enterprise—as well as to external partners and customers.

Information is the driving force behind effective decisions, making it the single most strategic asset an organization can possess. By extending business intelligence to employees throughout the enterprise—as well as to constituents up and down the supply chain—HTDM companies can enhance communication and gain a competitive edge.



What is Supply Chain Analytics?

Supply Chain analytics combines technology with human effort to identify trends, perform comparisons and highlight opportunities in supply chain functions, even when large amounts of data are involved. The technology helps decision-makers in supply chain areas such as sourcing, inventory management, manufacturing, quality, sales and logistics. Supply chain analytics solutions leverage investments made in enterprise applications, web technologies, data warehouses and information obtained from external sources to locate patterns among transactional, demographic and behavioral data.

The typical approach to business analytics involves creating data-marts organized by function such as customer, procurement, finance, planning and quality. Business intelligence tools are used to extract the data through standard queries, ad-hoc reports and online analytical processing (OLAP) tools—sometimes via a managed reporting environment or executive dashboard interface.

Managing Cost and Profitability Expectations

Cost and profitability drivers are of the utmost importance in high tech industries. With wafer-thin margins of two to three percent, managing costs is an ongoing challenge. Supply chain analytics solutions can help managers in sales, marketing, customer support, supply chain planning and financials understand and respond to key issues, such as:

- Correctly analyzing barriers to market-entry, which vary widely with each product
- Responding to competition within a well defined supply tier structure
- Dealing with the high threat of product substitutes
- Continually driving product innovation
- Managing product lifecycles to maximize returns

Global competition and the continual rise of new technologies result in short product life cycles and the commoditization of products, exerting downward pressure on revenue. At the same time, managers have shorter time windows in which to generate revenue and profitability. Customer demand is pushing supply chain cost reductions upstream even as suppliers feel the squeeze in their own balance sheets. Investing capital into R&D is critical for creating and maintaining differentiated products, yet managers must place the right bets on their product development investments.

Dimensions of Supply Chain Analytics

All of these business dynamics must be met with accurate, timely information. There are many ways to deliver it with supply chain analytics solutions:

Executive Information Systems (EIS) – Executive dashboards with drilldown analysis capabilities that support decision-making at an executive level.

Online Analytical Processing (OLAP) – OLAP tools are mainly used by analysts. They apply relatively simple techniques such as deduction, induction, and pattern recognition to data in order to derive new information and insights.

Standard reports are designed and built centrally and then published for general use. There are three types of standard reports:

- *Static reports or canned reports* – Fixed-format reports that can be generated on demand
- *Parameterized reports* – Fixed layout reports that allow users to specify which data are to be included, such as date ranges and geographic regions
- *Interactive reports* – These reports give users the flexibility to manipulate the structure, layout and content of a generic report via buttons, drop-down menus and other interactive devices

Ad-hoc reports – generated by users as a “one-off” exercise. The only limitations are the capabilities of the reporting tool and the available data.

Advanced Analytics – Advanced statistical and analytical processing such as correlations, regressions, sensitivity analysis and hypothesis testing.

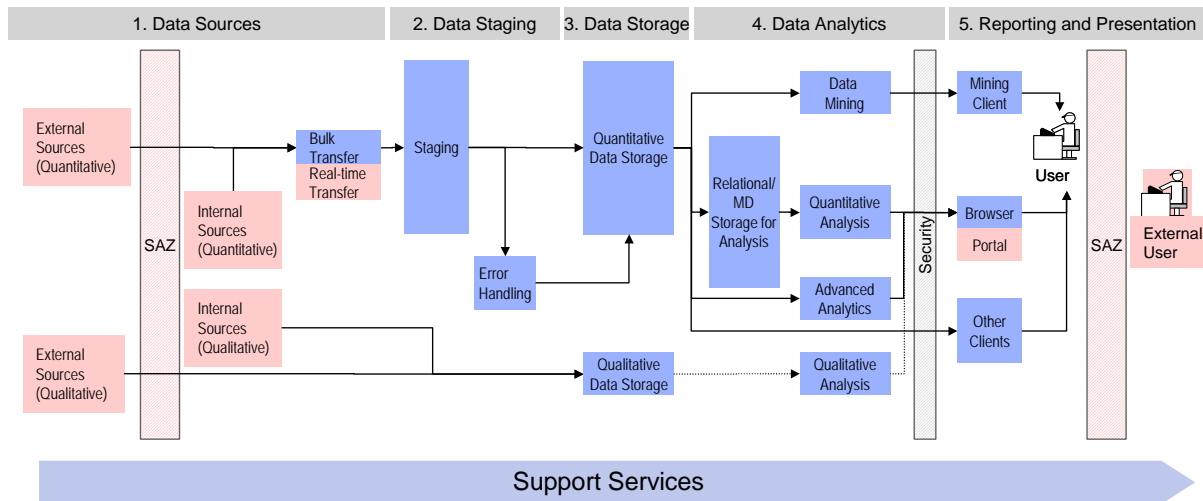


Figure 1: Supply Chain Analytics – A Staged Representation

Figure 1 depicts the various stages in a data warehouse and supply chain analytics initiative. While data analytics comprise the service layer for the applications, the other stages are equally important. Analytical services have varying applicability across the high tech value chain. For example, a semiconductor manufacturer might choose to use services such as predictive modeling for quality analysis and control to ensure high in-process and product yield. Alternatively, a consumer electronics retailer might depend on OLAP and data mining services for assortment planning and selling.

Implementing a Successful Supply Chain Analytics Strategy

Supply chain analytics can be applied to diverse areas such as sales, marketing, sourcing, fraud management and inventory management. Rather than attempting to create a comprehensive strategy for all these areas, successful implementations typically have a tight focus. We recommend a seven-step approach:

Step 1: Identify High Impact Control Areas

The first step is to identify the high impact areas such as:

- Customer Experience.
- Cost control and operational efficiencies.
- Working capital efficiencies.
- Compliance and regulatory needs.

Managing costs is one of the most critical elements of profitability in the High Tech and Discrete Manufacturing industry. However, a closer look at the elements of supply chain management might reveal that procurement and materials management elements most significantly impact costs. For example:

- Breakdowns in the procurement and materials management process can have a costly ripple effect throughout the supply chain (manufacturing, sales and logistics)
- Procurement and Materials Management processes are a high contributor to the product cost structure, opening opportunities for cost management
- HTDM companies have a high degree of control over managing suppliers
- Shorter product life cycles require changes to the supplier base, as well as to sourcing strategies

A closer look at the procurement and materials management function reveals several cost areas that need to be closely monitored and controlled, as illustrated in Figure 2.

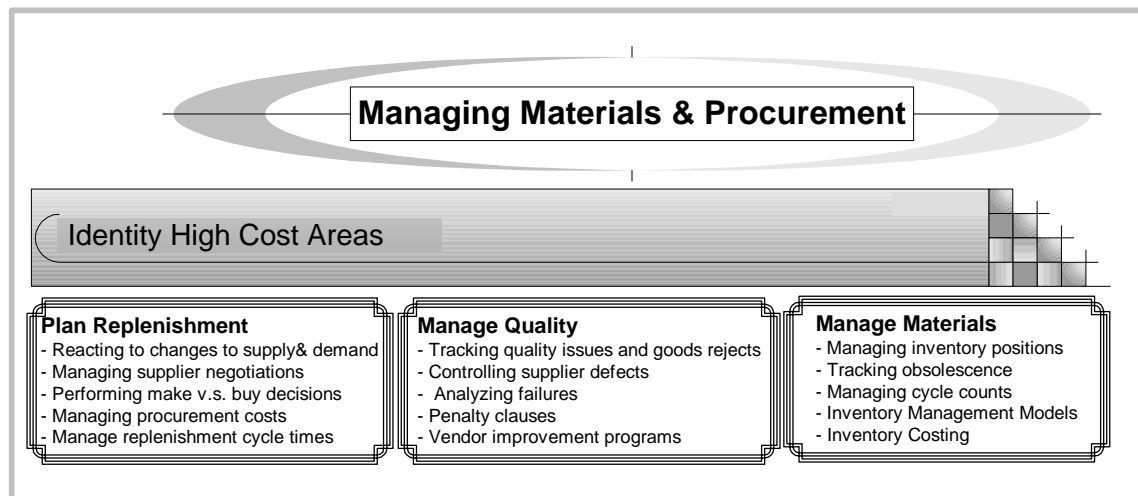


Figure 2: Managing Procurement & Materials Management

Step 2: Develop Strategic Supply Chain Analytics

An illustrative sample of supply chain analytics is shown below in the area of cost control. These factors will help control supply chain costs and meet strategic imperatives in the HTDM industry.

Planning Replenishment

- Review historical performance of supply and demand plans
- Continually monitor actual against plan
- Evaluate forecast changes over time
- Compare alternate plans to ensure maximum profitability
- Analyze spending by supplier, BOM, etc.
- Score, rank and rationalize the supplier base
- Monitor key procurement performance indications and cycle times
- Control expense processes, costs and violations

Managing Quality

- Trace quality issues
- Identify the true cost of warranty programs
- Analyze failures and rejections by product, plant or source

Managing Materials

- Analyze spending by commodity
- Develop material classification schema based on a variety of parameters such as criticality, demand profile and value
- Measure historical inventory fluctuations, stock outs, and allocation situations
- Isolate obsolete or slow-moving inventories

Step 3: Solidify the Approach

Solidifying the approach begins with developing a scalable architecture that can accommodate change. There are several inhibitors to supply chain analytics implementations that can result in meager returns:

- Business analytics is essentially a dynamic application that sits on top of an application portfolio. As the underlying information systems change, so must the analytical applications
- Frequently, the data gets disconnected from the business context. This could be a danger due to improper use or improper set-up
- Over time, data volumes and transactional history may become too extensive to manage
- Without proper planning, process and business limitations can potentially constrain the use and exploitation of business analytics capabilities

There are two approaches to implementing business analytics: A comprehensive or “big bang” approach and an “incremental” approach. Selecting the right one in each instance depends on a variety of factors such as:

- Enterprise readiness and the state of production applications
- Business needs, as prioritized by function
- Costs of implementation – incremental versus comprehensive
- Enterprise optimization versus functional optimization
- Environmental constraints such as user sophistication
- Technological constraints, metrics and measures that are functionally distinct, versus those that are cross-functional or enterprise in scope

A conscious evaluation of these factors can help solidify the approach and mitigate the risks.

Step 4: Build a Business Case for the Implementation

Supply chain analytics provides an effective solution to managing supply chain metrics, programs and initiatives—and has a major impact on overall profitability. Some of the illustrative benefits include:

- Optimizing sourcing and increasing supplier reliability (for example, providing details on supplier performance with regard to quality, delivery and cost)
- Improving inventory levels (such as tracking obsolescence, optimizing stock on hand, utilizing various safety stock models, inventory movement patterns and order policies)
- Monitoring spending by item category, supplier type and product bill
- Reducing markdowns and scrap
- Reducing material outages
- Improving quality/analyzing failures

Quantifying the expected benefits and carefully analyzing the costs will help build a business case as well as set objective metrics for post implementation value delivery analysis.

Step 5: Conceptualize the Solution

A supply chain analytics initiative has many dimensions:

- Choosing the right consulting and implementation partner
- Determining the technology architecture and high-level business requirements
- Selecting the optimal tools and technologies
- Adopting the correct solution approach

Ultimately, the success of the project is a function of these key considerations. Infosys recommends a three-phased approach to building supply chain analytics solutions that involves conceptualizing, building and operating the solution, as shown in Figure 3.

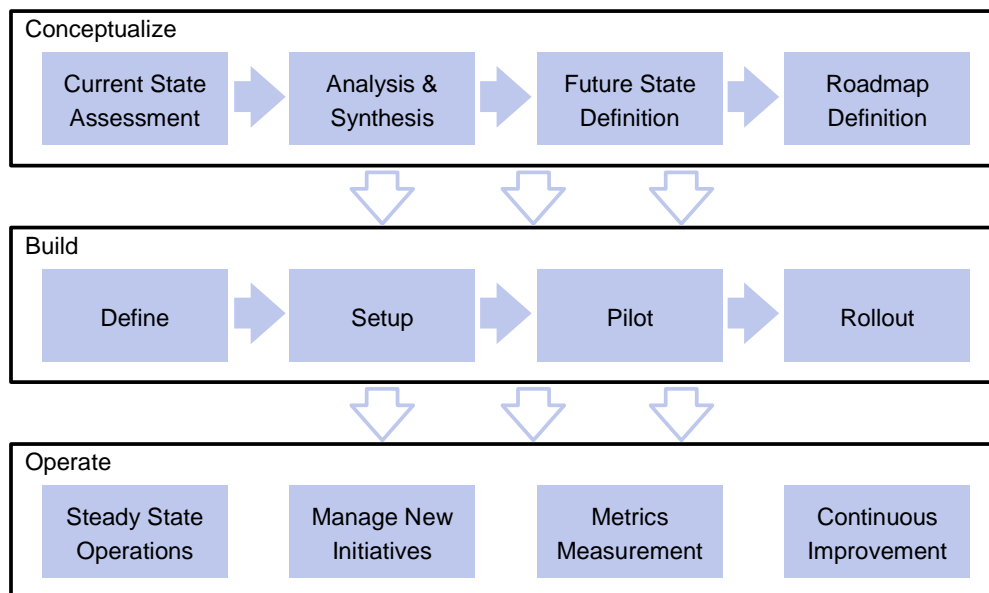


Figure 3: A Three-Phase Approach to Success for Supply Chain Analytics Solutions

The conceptualization phase involves understanding the current state of the business with respect to supply chain strategies. This phase would involve a current state assessment through a inventory of processes and applications, documenting the gaps and issues in the current state, evolving the future requirements of the enterprise and looking at constraining those by organizational constraints such as technology or budget.

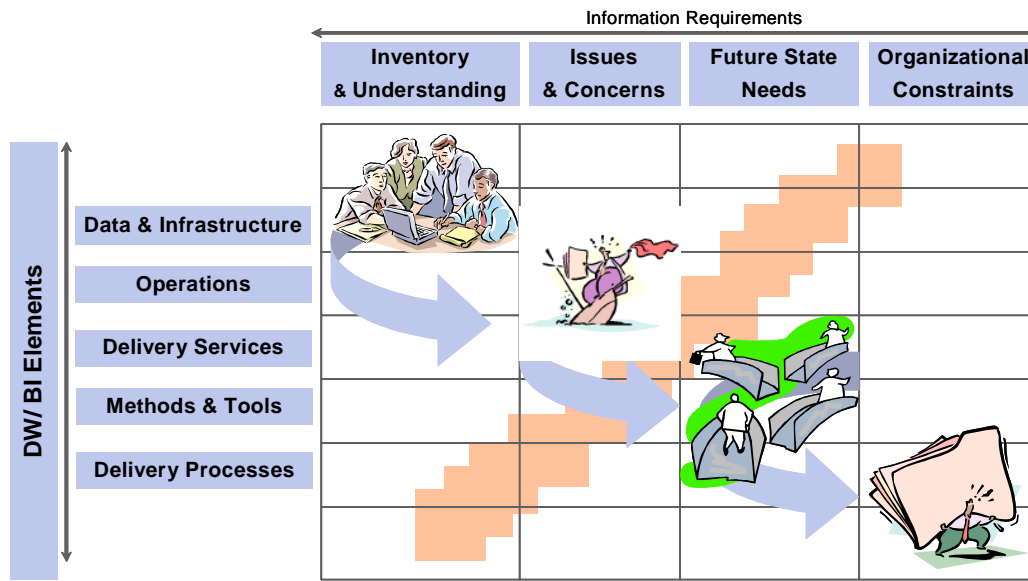


Figure 4: Conceptualizing the Supply Chain Analytics Solution

Step 6: Implement the Solution

Implementation involves two sub phases: development and deployment. It is advisable to begin with a pilot application, then validate the chosen approach before rolling it out across the organization. Conducting a readiness assessment and obtaining organizational buy-in helps ensure a successful implementation by validating the business case. Once all pertinent users are on board, you can rollout the solution to all pertinent areas.

Step 7: Operationalize the Solution

Most supply chain analytics solutions need to be occasionally enhanced or upgraded to meet changing business requirements. Project stakeholders must ensure they are providing the right reports and analytic routines, and they should integrate these deliverables with workflows that help the organization manage business and operational needs.

Given the dynamic requirements of reporting and analytics in the rapidly evolving supply chain environment, it is essential to stay abreast of new initiatives that could possibly impact data models, data extraction/analysis routines, and report formats.

Given the importance of agility and responsiveness in this industry, it is essential to have a performance management framework that measures the effectiveness of the supply chain analytics solution and strives for continuous improvement.

A Case Example – Actualizing Supply Chain Analytics

As a case in point, consider a high-technology company that manufactures a broad range of products, including personal computers, peripherals, software, and networking connectivity solutions. Infosys worked with this company to develop a supply chain analytics solution that delivers targeted business information to managers in charge of tracking the reseller and retail sales channels, which contribute up to 30 percent of gross revenue for the firm.

The **business drivers** for the project were straightforward:

- Meeting the reporting requirements of a large, geographically dispersed user base
- Tracking customer orders through reseller channels
- Replacing multiple, nonintegrated legacy applications with a centralized global system

The base parameters for reporting included sell-through, inventory, transfers and billing.

Challenges

With conflicting business rules for reporting and analysis across regions, the company needed to devise a standard format to improve data quality and resolve conflicting terminology. A large data volume and inconsistent data quality complicated the extract, transform and load (ETL) processes. There was little or no documentation for the existing reporting solutions, leading to complexities in gathering requirements for the derived measures and KPIs. Developers also had to perform complex calculations to transform the data to meet user requirements.

Recommended Approach

After studying the existing systems and documenting the features, issues and scope of the project, Infosys recommended a reporting architecture that could accommodate various types of users from different regions. The team evaluated several different options to arrive at an optimal application framework. This consists of a global data warehouse, which serves as a central repository of reseller data, along with a global data mart to store historical and summary data at different levels. They also established a flexible reporting interface and accompanying security architecture that delivers reports and refreshes data hourly in various time zones. This new supply chain analytics solution fulfills the client's goal to move to real-time reporting using OLAP solutions, and enables users from various regions to validate data across old and new systems.

Business and Technology Benefits

Thanks to the new supply chain analytics solution, managers at the computer company now have a consolidated, 360-degree view of the entire reseller business. They have gained the ability to plan and forecast based on product distribution, and they can optimize sales distribution by analyzing key inventory measures. Finally, managers have the metrics they need to calculate and compare billings against different product costs.

Meanwhile, IT professionals enjoy a centralized database of reporting data, which dramatically simplifies maintenance of the BI infrastructure. They have a flexible BI architecture (compared to the legacy systems) that can accommodate rapid delivery of solution enhancements. Most importantly, users benefit from improved analytical flexibility and better performance for creating, delivering and viewing supply chain analytics and related reports.

In the Final Analysis

Supply chain analytics solutions help organizations control, measure and improve their business strategies, plans and operations. Success depends on a combination of factors:

1. Identifying the right set of supply chain analytics to deliver maximum business value
2. Obtaining clear buy-in from business users through a business case endorsement
3. Creating a flexible and scalable technology solution that is comprehensive enough to meet current and future needs
4. Maintaining and upgrading the solution as part of a cycle of continuous improvement

About the Authors:

Sandeep Kumar (sandeep_kumar@infosys.com) is a principal consultant and group leader of the manufacturing and supply chain group, Domain Competency Group, Infosys Technologies Ltd. He has nearly 10 years of industry and consulting experience and has helped several Fortune 500 customers re-design their supply chain processes. Kumar has an MBA from the Indian Institute of Management in Bangalore, India.

Sourabh Deshmukh (sourabh_deshmukh@infosys.com) is a consultant in the Manufacturing and Supply Chain Group, Domain Competency Group, Infosys Technologies Ltd. He has more than five years of experience in procurement, vendor management, and manufacturing process audits. Deshmukh holds a Masters Degree in Industrial Engineering from Texas A&M University.

About Infosys Technologies Ltd. (NASDAQ: INFY)

Infosys (NASDAQ:INFY) defines, designs and delivers IT enabled business solutions. These provide you with strategic differentiation and operational superiority, thereby increasing your competitiveness. Each solution is delivered with the industry-benchmark Infosys Predictability that gives you peace of mind.

With Infosys, you are assured of a transparent business partner, business-IT alignment with flexibility, world-class processes, speed of execution and the power to stretch your IT budget by leveraging the Global Delivery Model that Infosys pioneered.

Infosys Hi-Tech and Discrete Manufacturing (HTDM) Practice

The Infosys HTDM Practice delivers business solutions to Fortune 500 clients representing all parts of the Hi-tech and manufacturing value chain, spanning from semi-conductor manufacturers to OEMs, value-added resellers and distributors, software products and service companies and other discrete manufacturing companies. Infosys provides services that cover business process conceptualization, process engineering, package selection and implementation, application development, maintenance and support, infrastructure management, product engineering and business process outsourcing. To meet customer needs, Infosys leverages strategic alliances with our partners including IBM, Informatica, MatrixOne, Microsoft, Oracle, Sun Microsystems, TIBCO and Yantra.

© 2005 Infosys Technologies Limited.

ALL RIGHTS RESERVED

Copyright in the whole and part of this **Business Intelligence** belongs to Infosys Technologies Limited. This work may not be used, sold, transferred, adapted, abridged, copied or reproduced in whole or in part in any manner or form or in any media without the prior written consent of Infosys Technologies Limited.