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Demand Visibility

A Necessity for Six Sigma Process Improvement

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Executive Summary

Embedding and maintaining Six Sigma levels of quality into an e-commerce framework is the Holy Grail being pursued by industry leaders hoping to duplicate General Electric's model for success.

General Electric (GE) is often held up as the benchmark for corporate excellence, with its growth in market capitalization from $15 billion in 1981 to nearly $500 billion in May 2001. A key factor in its growth has been business process optimization using Six Sigma, which takes the tools of Total Quality Management and applies them from a Return on Investment (ROI) perspective. For GE and others, Six Sigma is a critical enabler for Value-Based Management.

The opportunity to benefit from applying Six Sigma to Demand Management is considerable, by monitoring and adjusting marketing campaigns as they progress rather than after the fact. This requires the ability to track current demand – Demand Visibility.

Until now, however, organizations were limited to monitoring "what was." To gain true insight and effectively collaborate requires the ability to see "what is" and predict "what-if" type scenarios. This predictive intelligence enables organizations to optimize organizational performance and ensure company goals are met, by improving communication between departments internally and throughout the demand chain.

Corporations have a source of data optimized in a manner that enables Six Sigma initiatives for Demand Visibility – the Data Warehouse. Its data has already been cleansed and designed to be consistent in its structure and definitions.

The e.Intelligence Suite is a powerful software product that enhances both internal and business-to-business (B2B) collaboration. It provides statistical analysis, exception reporting, and proactive broadcast and alerts. These are critical enablers for predictive intelligence, providing business managers with forward-looking views of business management.

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Lessons of the Past Decade

The past year has seen the Internet continue to grow as a platform for commerce, even while the dot-com business model has lost relevance. Major corporations are rapidly adapting these technologies to communicate internally (intranets) and externally (with suppliers, customers and partners). What have leading corporations learned about effectively using information technology and the Internet?

- Technology magnifies the quality of your processes, good or bad. It has the impact of a racecar – a skilled driver will speed around the track; a mediocre driver will hit the wall that much faster.

- Competition is now between entire supply chains (suppliers, customers and partners) rather than individual companies. Simultaneously, these alliances are fluid, with companies ultimately seeking to optimize their own profitability.

- To keep their value proposition high, companies are capturing and analyzing the information that is the by-product of their interactions with their value chain.

- Success at external collaboration is an extension of success at internal collaboration. Intranets and business-to-business e-commerce systems are similar in form and function, shifting primarily in their label as one passes outside the formal boundaries of a company.

- Market makers are competing by embedding their business workflow rules in their own and their supplier's, customer's and partner's e-commerce systems, leveraging cross industry collaboration for their own strategic advantage.

"We're at the beginning of one of the most important revolutions in business. The Internet will forever change the way business is done. It will change every relationship, between our businesses, between our customers, between our suppliers. Distribution channels will change. Buying practices will change. Everything will be tipped upside down."
– Jack Welch, Chairman, General Electric.

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"Most industries have already undertaken numerous efforts to extract supply chain efficiencies. Additional gains require a paradigm shift…(without which) collaborative planning efforts will degenerate, with each company working to achieve its own objectives and motivated to withhold valuable information that could be applied to gain an advantageous position in the market, just as they have always done."
– Beyond Utopia: The Realist's Guide to Internet-Enabled Supply Chain Management [1]

The Advent of Demand Visibility

General Electric (GE) is seen as the benchmark for corporate excellence, with its growth in market capitalization from $15 billion in 1981 to nearly $500 billion in May 2001.[2] A key factor in its growth has been aggressiveness applied to all aspects of running a corporation: market focus (insisting on being one of the top two companies in each market or leaving it); collaboration (reengineering to make the organization flatter and more responsive); "Workouts" (allowing any employee to call a meeting to propose improvements); and process optimization using Six Sigma, which takes the tools of Total Quality Management and applies them from a Return on Investment (ROI) perspective.

GE's strategy is grounded in the understanding that the next step in the industrial revolution is the embedding of continuous process improvement into Business Internet networks. E-commerce efficiencies will be achieved only when workflow and collaborative bottlenecks are identified, optimized and embedded in software.

navigate looking out the rearview mirror

Until recently, companies navigated by looking at what happened last quarter, or last month, the equivalent of steering a car by looking out the back window (the past). The front window (the future) and side window (the present) were blacked out.

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Three Categories of Corporate Visibility

Type of Visibility	Measures	Description
Financial	Revenue goals of business unit	Most organizations have systems that deliver financial performance visibility. The financial planning process, a combination of top-down directives and bottom up budgeting, establishes the business goals, against which the performance is monitored.
Operational	Product forecasts for business unit	Focus on manufacturing, logistics, procurement and inventories, with the goal of optimizing performance.
Demand	Sales targets for marketing programs aimed at individual customers	Focus on the execution of sales and marketing programs, ultimately at the point of sale. Improvement in execution of demand building programs require a baseline against which to measure, access and improve programs.

Historically, Marketing and Finance had the first access to visibility, with Marketing seeing profitability by product and region, and finance by Business Unit. More recently, Business Intelligence has been applied to operations on the Supply Chain. However, collaboration to modify near-term demand forecasts is done at most through spreadsheets, rather than in an organized manner.

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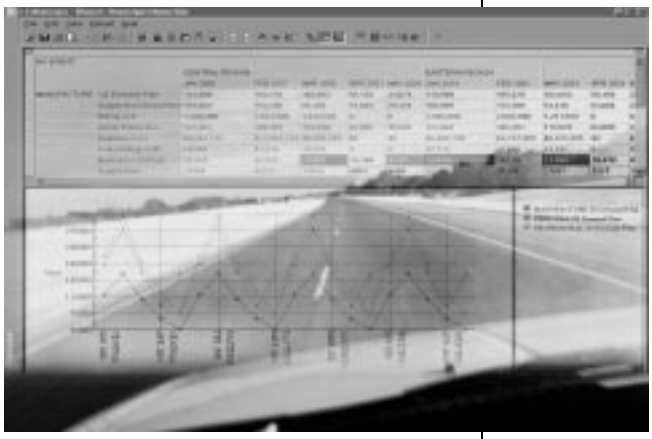
Rewards of Demand Visibility

Enabling Demand Visibility while a campaign is ongoing presents the opportunity to significantly raise the return on the sales and marketing investment by improving the execution of programs that increase demand, such as pricing, promotion, merchandising and advertising.

Additionally, improving Demand Visibility has important implications for improving the accuracy of the operational forecast, and provides an early warning system to calibrate spending in order to reach financial goals.



navigate looking out the front window

In order to accomplish this goal, organizations need to better understand the factors that influence demand and immediately react to changes in demand at every point in the demand chain. This requires Demand Visibility.

The issues that make Demand Visibility difficult are the amount of data that must be reported and the large number of users that are involved in the process. Targets should be updated frequently, perhaps daily, to reflect near real-time changes in demand.

Demand Visibility has the added characteristic of having strategic as well as tactical value. Tactically, the ability to see upstream and downstream at vendor and client relationships allows for cost reduction and higher return on assets. Strategically, the ability to share that information with customers and vendors can raise an organization's value proposition, and increase leverage with clients and vendors in the face of commodification.

The ultimate goal is to "navigate looking out the front window." True insight comes not just from knowing what is happening currently on the demand chain, but what we should expect or desire to happen in the days, weeks and months ahead. Predictive intelligence provides both forward-looking projections based on statistical analysis of trends and causal factors as well as modeling "what-if" analysis to evaluate various scenarios.

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Six Sigma - Quality Driven by ROI

The quality initiatives pursued by Fortune 1000 corporations the past fifteen years changed the manufacturing paradigm from mass production to flexible, lean production. They applied Statistical Process Control to optimize processes and resolve product imperfections in the design phase, rather than afterwards in a quality inspection. Companies became devout (with varying success) in their pursuit of Deming's Total Quality Management, or Eli Goldratt's Theory of Constraints (as made popular in his business novel "The Goal"), focused on identifying and resolving the shifting bottlenecks which arise in dynamic real world environments.

What is Six Sigma?

> *"The best Six Sigma projects begin not inside the business but outside it, focused on answering the question – how can we make the customer more competitive"*
> – Jack Welch, GE 1997 Annual Meeting

Six Sigma is dedicated to eliminating defects in all processes. To achieve Six Sigma quality, a process must produce no more than 3.4 defects per million opportunities. This requires being nearly flawless in executing key processes. Like Total Quality Management, Six Sigma intertwines Statistical Process Control with a corporate philosophy of Continuous Improvement and Collaboration, with the end goal of higher customer satisfaction.

In 1995, GE's defect rate for all its businesses was approximately 35,000 per million opportunities, between three and four Sigma. While this matched industry averages, the gap between current quality and Six Sigma levels was estimated to cost GE between $7 and $10 billion annually in reworking of parts, correcting transactional errors and lowered Return on Assets.[3]

How is Six Sigma different from other process improvement methodologies? *Six Sigma is a business initiative rather than quality initiative, driven by financial metrics as well as process metrics.* Six Sigma projects are chosen based on ROI – all participants begin Six Sigma training with an approved project that would return a significant amount of money to the bottom line.

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Six Sigma has four key phases, known as ***MAIC***:

- **Measure** the processes and their defects
- **Analyze** the root cause of defects
- **Improve** by redesigning processes using Design for Six Sigma
- **Control** by embedding changes into existing workflow and maintaining them

Key Concepts of Six Sigma

- ***Critical to Quality***: Determining the specific attributes most important to the customer, measured in the same way as the customer does. These are the foundation of the redesigned processes.

- ***Customers Feel the Variance, Not the Mean***: Customers value consistent, predictable business processes. Six Sigma focuses first on reducing process variation and then on improving the process capability.

- ***Defect per Opportunity***: Six Sigma measures not how many defects each finished product or service has, but how many defects there are in each step of the process.

- ***Design for Six Sigma***: Designing to meet customer needs and process capability.

Six Sigma and Value-Based Management

Six Sigma is a critical enabler for Value-Based Management, the discipline of planning, managing and allocating capital to raise the value of shareholder equity. Six Sigma's detailed metrics about operations, driven by ROI, enable Value-Based Management in a manner that traditional financial or process data alone do not. Six Sigma can be particularly useful in improving service functions, which often have not been mapped or measured in the past.

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Information Technology and Six Sigma

Collecting and delivering data in a way it can be easily used is a frequent Critical-to-Quality factor for customers in Six Sigma environments.[4]

The reality in the e-commerce age is that applications are easier than ever to build, become obsolete more quickly, and are only as useful as the quality and consistency of the corporate data they access. It follows that enhancing and maintaining that information should draw at least as much resources as building the applications themselves.

Applying process optimization to software has often been problematic. Attempts to create automated "software factories" have not been successful. In the virtual world of software, it is difficult to define and quantify input and output, let alone to optimize the manufacturing of these objects.

Nevertheless, some progress has been made in improving software engineering and data management as engineering disciplines. Enterprise Application Integration (EAI) has become a critical enabler for e-commerce, with its focus on integrating multiple data sources at both the messaging *and* business process definition level.

Demand Visibility and Six Sigma

The opportunity to benefit from applying Six Sigma to Demand Visibility is considerable. Until now, however, organizations were limited to monitoring "what was" rather than "what is." This has particularly been so in Marketing and Sales operations.

Hidden Process Factories

According to Six Sigma: The Breakthrough Management Strategy Revolutionizing the World's Top Corporations, companies that have not optimized their processes are prone to creating "hidden factories" of rework to fix defects. These hidden process factories are the outgrowth of

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"The ability to see market demand in real time and the state of the entire supply chain creates an unprecedented opportunity for efficiency and optimization."
- The B2B Internet Report, Morgan Stanley Dean Witter Equity Research, 4/00

years of quick fixes rather than systemic improvements, and do not show up on management radar. The result is longer cycle times, and vastly lowered Return on Assets.[5]

A successful demand forecast improves customer service and reduces operating costs. To be useful, however, the demand forecast must be accurate. High forecast error results in problems in meeting the needs of customers due to operational inefficiencies.

Identifying and optimizing hidden process factories on the demand chain would allow firms to monitor and adjust Marketing campaigns as they progress rather than after the fact. This ability is predicated on robust, near real-time Demand Visibility.

Critical to Quality (CTQ) Attributes for Demand Management

Six Sigma Cost Group[6]	Demand Management Application
Cost of quality in the field	Warranties
Internal failure costs	Additional inventory carried due to longer cycle time
Appraisal and inspection	Monitoring outside vendors and their quality problems
Opportunity cost of producing more product with the same assets	Increasing Return on Assets

Look in the Data Warehouse

Marketing departments have a source of data optimized in a manner that lends itself to Six Sigma – the *Data Warehouse*. In the past five years, Data Warehousing has gone from a niche to one of the core areas of a Fortune 1000 IT department. The corporate data warehouse is the most complete record of corporate performance, designed to be consistent in its structure and definitions.

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e.Intelligence

A promising tool to enable robust Demand Visibility is e.Intelligence. Founded in 1999 by Rick Tanler, the founder of Information Advantage, e.Intelligence has acquired data warehousing and forecasting software developed at Information Advantage, and licensed sophisticated forecasting algorithms from SPSS.

Information Advantage (now part of Computer Associates) was notable for building a systemic, enterprise-wide Data Warehousing suite on a thin client, web-based platform. In doing so, it struggled with and solved many of the issues that enable applying Six Sigma process optimization to Demand Visibility.

e.Intelligence application software is focused on improving the execution of Sales and Marketing programs throughout the demand chain. e.Intelligence delivers the power of predictive intelligence for Demand Visibility, allowing management to answer the forward-looking, "what-if" questions that are essential to implementing decisions.

e.Intelligence Value Propositions for Demand Visibility

- **Demand Dashboards** – A valuable tool for collaboration in Six Sigma environments is the "Customer Dashboard," software that graphically tracks a business' progress in meeting specific Critical to Quality factors of individual customers.

  e.Intelligence enables the building of "Demand Dashboards," tailored to monitor demand in near real time by facilitating alerts, analysis and collaboration. By enabling visibility on both profitability and process at the store and campaign levels, e.Intelligence dynamically enhances the ability to reallocate resources quickly and accurately.

- **Increase Demand Planning Cycle** – The more frequently a forecast is updated, the better it reflects current market conditions. e.Intelligence supports a simple, web-optimized tool to revise the demand forecast as often as required to reflect fast changing market conditions.

- **Decentralize Demand Planning Responsibility** – Improve the quality of forecast by involving field sales offices, retailers, and suppliers with knowledge of factors that are impacting demand. The e.Intelligence user application is easy to access through a company intranet, and the user interface, modeled after a spreadsheet, makes it simple for anyone to use.

- **Automating Demand Planning Processing** – Efficiently raising the number of forecast cycles and involving more people in the forecasting process requires automating statistical forecasting techniques and agents to monitor forecast accuracy. e.Intelligence embeds statistical forecasting applications that encourage iterative modeling and forecast allocation.

ROI of e.Intelligence for Demand Visibility

- Reduce planning cycles from monthly, to weekly, to daily, to near real time
- Improve the accuracy and integrity of bottom up sales forecast
- Raise Return on Assets by modeling and preparing for multiple demand scenarios
- Manage end of life and new product introductions with minimal inventory levels
- Improve customer service by shortening lead times and reducing "surprise" orders
- Supporting CPFR initiatives for industry collaboration
- Optimize Make-To-Order (MTO), Make-To-Stock (MTS), and Just-In-Time (JIT) programs

Information reaches its maximum value when it is shared with others. The price for being slow to recognize changes in customer demand is operating inefficiencies and poor customer service.

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Robustness of e.Intelligence Solution

The e.Intelligence Suite is notable as a complete solution set for companies seeking to ambitiously pursue Six Sigma optimization for supply chain demand management. It provides a seamless path to implementation, with an Executive ROI Seminar, Prototyping Boot Camp, and ASP Hosting to enable customers to gain rapid competitive advantage.

Several other software companies provide the ability to do near real-time event planning, integrating marketing with logistics and distribution planning. However, these applications are ultimately static representations of reality, as they are unable to take the feedback from field managers and reincorporate them ("write back") to the central data source.

The e.Intelligence write back capability allows two-way communications between users by creating a dynamic read-write environment for modeling and exchanging information.

Conclusion

Ultimately, the promise of the Business Internet is to allow data to be utilized for transactions and analysis regardless of the platform or its origin. The critical enabler for this is increased sophistication in defining business processes in a consisten t, robust, yet flexible framework, to remove doubt from the meaning and context of data.

The e.Intelligence Suite facilitates the sharing of information about demand, which is the first step in establishing a basis for collaboration and communication for many types of time-critical decisions. It offers a comprehensive array of predictive intelligence capabilities necessary for effective Demand Visibility.

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Open Technologies Consulting

Isaac Cheifetz consults on corporate strategy to early stage Business to Business e-commerce ventures. Services include evaluating business plans, new market/product business case development, writing strategic white papers targeted to investors/analysts, and acting as a connective agent/catalyst for joint ventures, mergers and acquisitions, and start-up venture funding.

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Footnotes

[1] Keith Oliver, Anne Chung, and Nick Samanich ,"Beyond Utopia: The Realist's Guide to Internet-Enabled Supply Chain Management," *Strategy+Business*, (April 2001).

[2] *GE Corporate Factsheet*, 4 June 2001.

[3] Mikel J. Harry and Richard Schroeder, *Six Sigma, The Breakthrough Management Strategy Revolutionizing The World's Top Corporations*, (New York: Doubleday Press, 2000): 41-42.

[4] Ibid. 96.

[5] Ibid. 79-80.

[6] Ibid. 33.

