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# Improving Business Intelligence: The Six Sigma Way

*A New Perspective: Focus on the Customer, Strive for Near Perfection and Evolve Toward Six Sigma Business Intelligence*



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**This article describes a rigorous, audit-based approach to achieving business intelligence excellence.**

Six Sigma business intelligence (BI) is a customer-focused, measurement-based approach to improving business intelligence. Six Sigma refers to a better and smarter way of managing business. Six Sigma means putting the customer first and striving for a product that is near perfection. Six Sigma principles have been used in the business world for years and have produced significant and frequently amazing results. In the late 1990s, Jack Welch at GE demonstrated just how successful Six Sigma can be. From 1996 to 1998, GE went from costs of \$200 million and returns of \$150 million to costs of \$400 million and returns of more than \$1 billion. Jack Welch was a Six Sigma convert who led his company in changing the way they did business. From his unique position, he transformed his company by focusing on customer needs and working smarter using Six Sigma principles and processes.

Despite continued success in the business arena, Six Sigma principles and methods have not been freely translated over into information technology. Business intelligence is an excellent place to begin and the time is now. A rigorous program that focuses on the customer, measures and uncovers hidden costs and problems, and uses the Six Sigma business intelligence approach to auditing and improving current BI assets can provide more value to an organization than any number of new business intelligence applications.

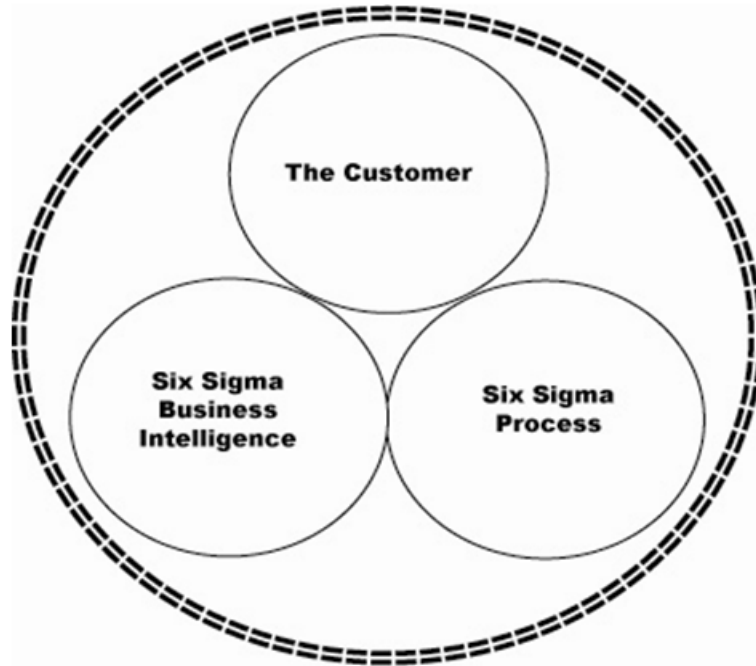
## The Three Aspects of Six Sigma Business Intelligence

Applying Six Sigma to the business intelligence world requires a new approach to the creation and management of business intelligence assets. Understanding the business intelligence customer, the goals for business intelligence, and the Six Sigma principles are keys to success. Customer needs are top of the list. Near perfection is the goal. Data, measurement, analysis, and control is the process blueprint for achieving Six Sigma level business intelligence.

The three aspects of a Six Sigma business intelligence initiative are:

1. Strive for a Six Sigma business intelligence product.
2. Identify the customers for business intelligence and define their *critical to quality* (CTQ) needs.
3. Define and follow a Six Sigma improvement process that:
  - Has strong management support,
  - Focuses on the customer's needs,

- Is based on Six Sigma principles, including data, measurement, analysis and control,
- Is iterative and evolutionary, and
- Is pervasive across the business intelligence arena.



**Figure 1:** The Three Aspects of Six Sigma Business Intelligence

## The Business Intelligence Customer and CTQ Goals

**The Business Intelligence Customer.** Identifying the customers for operational business intelligence within the organization is an important first step in any Six Sigma initiative. Who are they? The direct customer for the business intelligence product is the end user. These are the people within the organization who operate and manage the business to meet the needs of their external customers (i.e., those who buy the organization's products and/or services). If we focus only on this end user, though, the organization does not get the full value of business intelligence. Special umbrella requirements, such as the alignment of business intelligence to business goals, may be neglected. So, there are two categories of customer for business intelligence:

### 1. The End Users of Operational Business Intelligence

The people and systems that use operational business intelligence are most often called the "end users." These customers may be internal to the organization. They use the business intelligence in the operations and management of the business. These are the people (and, sometimes, systems) who are responsible for managing the organization to meet the needs of the external customers. There may also be direct users of business intelligence who are external to the organization. These customers use the business intelligence in ways that have been designated by the organization. For example, they may check their account information, pay bills, etc.

### 2. The Organization

There are many factors that are *critical to quality* for the organization, which will not be addressed at the parochial level of the individual business intelligence end user. The organization must also be recognized

and treated as a customer for business intelligence. Only at this level can we begin to envision, define and achieve those overall organization goals that will translate into success in a competitive, global marketplace.

**Critical to Quality Goals.** For each category of customer, we need to identify and describe business intelligence goals and objectives that can be monitored. These should be specific, measurable, and *critical to quality* (CTQ) for the business intelligence product for that customer. These CTQ factors should be documented, and there should be a signed, formal agreement between the information technology (IT) department and the business intelligence customer. In most cases, there are already some clear best practices and industry standards that support a service level agreement (SLA) for individual business intelligence applications between IT and customers. In the Six Sigma business intelligence initiative, the CTQ factors within these SLAs will be rigorously monitored. The *critical to quality* goals (along with specific measurements) for these customers should include, for example, topics such as:

- Performance (e.g., response time)
- Quality of the information, (e.g., accuracy, timeliness, clarity)
- Availability and comprehension of the data
- Satisfaction of business requirements

Aiming for Six Sigma business intelligence means redefining and expanding these service level agreements to include the organization customer. The organization-level customer will have to be transformed into a tangible entity by creating a management team with Six Sigma business intelligence responsibilities.

Relevant CTQ factors should be identified with the help and agreement of the customers. Service level agreements should be written. There are two major criteria for the CTQ factors:

1. They must, in fact, be critical to a quality product, and
2. Each must be measurable, and the measurement data to be used must be clearly described.

## The Six Sigma Business Intelligence Product

Six Sigma is a statistical term that, in effect, translates as “near perfection.” A Six Sigma goal means the product is 99.9997% defect free (68% = 2 Sigma; 93% = 3 Sigma, 99.4%= 4 Sigma; 99.5%= 5 Sigma). Sigma means “standard deviation.” Standard deviation is a statistical term that describes how much variation exists in a set of data. Thus, we may set a goal of 3-second response time for a certain category of query. Striving for Six Sigma quality would mean that if we measure response time for 10,000 queries, we want to find that 9,997 of those queries would meet the goal of a response time of 3 seconds or less. (There are other aspects to the measurement process – i.e., short-term versus long-term variations in the data, etc. However, the basic principle is to strive for a near perfect product.)

There are a number of reasons to set a goal of near perfection for the business Intelligence product:

1. Setting the goal high means striving to achieve excellence.
2. The business intelligence end product is created from and comprised of a spiderweb of parts. The business intelligence product is only the end result that is seen by the customer. There are infrastructures, processes, and a myriad of “under the hood” systems that allow for the creation, management and presentation of that business intelligence product. Each of these underlying components may have defects that impact the final product. The quality of each of these parts and the resulting combination impact the quality of the business intelligence end product. Setting a Six Sigma goal of near perfection for each means that there can be a reasonable expectation for the highest quality of the end product.
3. Business intelligence is of critical importance to the organization. The inherent quality of the business intelligence product can dramatically impact the success of the organization.

## The Six Sigma Process

The Six Sigma process is based on the application of rigorous rules and the measurement and monitoring of carefully identified data. One of the most relevant Six Sigma methods for business intelligence may be simply designated as the DMAIC process. The name is derived from the steps of the process.

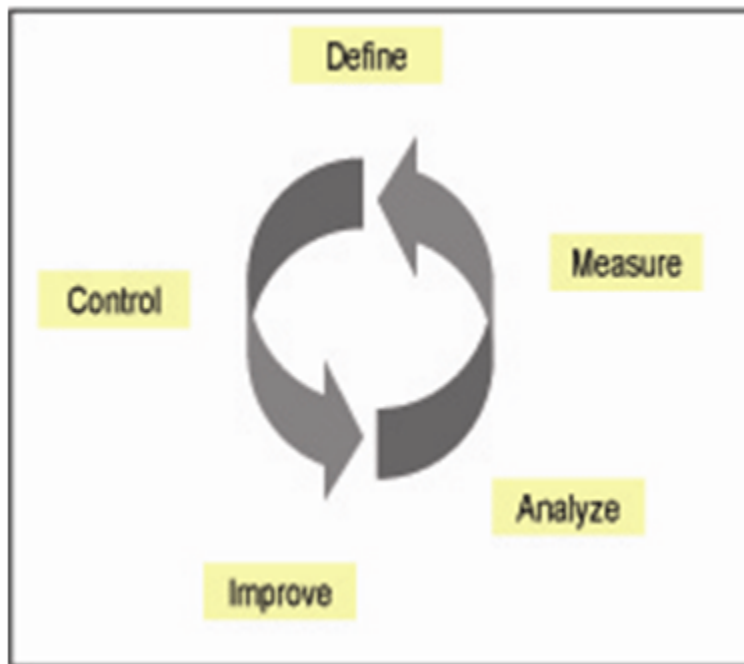


Figure 2: The DMAIC Process

## The DMAIC Process

1. **Define** the goals. These should be based on the factors that have been identified as *critical to quality* (CTQ) for the customer. They must be specific and measurable.
2. **Measure** the identified factors, i.e., collect the data. For example, *performance* may be one of the *critical to quality* factors for customer satisfaction.

We might define a measurement for performance as response time (i.e., the time from the point where a request for information – e.g., a query – is made to the time the information is returned to the requestor). By describing expectations in specifics, the performance goal becomes tangible and measurable. Next, we will need to monitor and measure the CTQ factors to determine whether the defined customer needs are being met.



In order to determine what is causing any fluctuation in these CTQ measurements, we need another set of measurements. This second set of measurements is defined and collected using an audit of business intelligence assets at a detailed level for all components. The TBIA Business Intelligence Capability Maturity Model, which is a blueprint for the business intelligence audit, may be used to perform the detailed audit of the business intelligence asset base.

3. **Analyze.** Determine what the CTQ measurements tell us about how the customer needs are being met. What do those CTQ measurements tell us about the response times? How well are we performing and are the customer quality needs being met? Then, we have to identify all the factors within the business intelligence asset base that can and have impacted those response time numbers. Thus, we review the results from the business intelligence audit and correlate each to the *critical to quality* (CTQ) needs of the customer. What has been identified during the business intelligence audit that is relevant to and/or impacts the customer CTQ needs? What exactly are the reasons for performance that is anything less than our Six Sigma goals? That might translate, for example, into any number of items, from some infrastructure malfunction to the wrong analytical software. The audit will help identify specific “pain points” and impacting factors.

Then, we need to plan for improvement. What can we do to make things better? What should we do? Identify the actions required for improvement based on the business intelligence audit. Prioritize the improvement action plan based on the impact and relevancy of each identified issue to the *critical to quality* factors for the customer. We can rate the customer CTQ factors. Then we can build a prioritized plan to improve business intelligence based on resolving the underlying issues in order of their importance to the customer.

4. **Improve.** The improvement process includes taking all the actions necessary to make the business intelligence product meet the quality expectations necessary to the customer.
5. **Control.** We need to make sure that the business intelligence continues to meet the highest quality standards. Performance levels could decline again unless there is a program for regular monitoring of quality goals. There should be a standard action response program in place for response and correction of any further problems.

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