

# Improving Business Intelligence: The Six Sigma Way

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This article describes a business intelligence continuing improvement program that is based on Six Sigma concepts and methods. It includes a discussion of the Six Sigma breakthrough formula and how it is used.

## The Continuing Improvement Model (BI-CIM)

Six Sigma, in many organizations, means a measure of quality that is near perfection. Six Sigma is also a shorthand term for the disciplined, data-driven approach and methodology for eliminating defects in any process or product. The Six Sigma way for business intelligence improvement is focused on the following principles and components:

1. **The Customer.** The quality of business intelligence is determined by the perceptions of the product by the customer. A key part of the program, then, is to identify the customers and define their requirements for business intelligence quality.
2. **Six Sigma Business Intelligence.** There are two parts to this term. The first is *business intelligence*. Understanding and defining business intelligence is difficult. The business intelligence assets are a complex set of infrastructures and components that overlay and are embedded in the organization like a living spiderweb of tangible and intangible parts. The second part is *Six Sigma*. Deciding the level of quality for the business intelligence product may also prove somewhat elusive. The Six Sigma term refers to near perfection. However, one of the major issues for an organization is to decide just how much should be spent on the perfect business intelligence product versus the risk and costs to get to that level of quality.
3. **The Six Sigma Process.** The Six Sigma process is rigorous, structured and metrics-based. For Six Sigma business intelligence, we have added another crucial descriptor. The Six Sigma business intelligence continuing improvement process is iterative. With Six Sigma for general business products and processes, one of the major expectations is for breakthrough improvements. Although there may be dramatic improvements for business intelligence quality, we expect that much of our success will come through an iterative improvement process. We will take a stepwise approach, learn, make incremental improvements and evolve toward Six Sigma quality.

## The Six Sigma Breakthrough Formula

The formula that we use as a foundation for the continuing improvement program is known as the breakthrough formula and it is used as a foundation for Six Sigma improvement programs.

$$Y = f(X) + E$$

This formula defines the relationships between business intelligence quality and the factors that cause or impact quality. The formula may be called *breakthrough* because the improvements that are made can often be dramatic. The formula, as we apply it to business intelligence, means that quality (Y) is a result of, and dependent on, all the impacting factors (X). Y is the quality of the business intelligence product. The X factors are all those components that cause or impact product quality. E is the uncertainty factor.

We build our continuing improvement program around this formula. So we will need to define:

1. **The business intelligence customer.**
2. **The Y factors.** These are those characteristics of the business intelligence product that are perceived as critical to quality by the customer.
3. **The X factors.** These are all those components, constructs, infrastructures (i.e., anything we can identify) that may cause or impact the quality of business intelligence.

4. **Metrics.** We need to be specific regarding how we will measure the Y and the X factors.

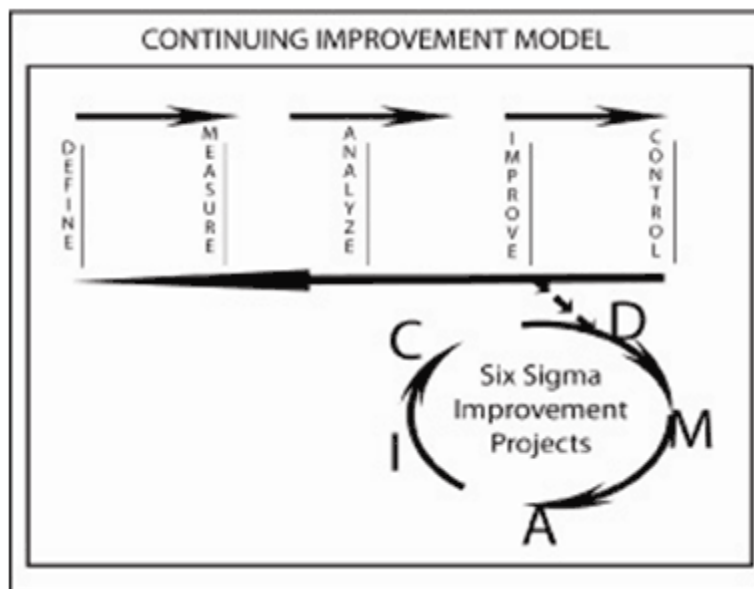
## The Six Sigma Continuing Improvement Process

**Six Sigma DMAIC process.** There are two Six Sigma methodologies. The DMADV process (define, measure, analyze, design, verify) is an improvement system used to develop new processes or products at Six Sigma quality levels. We will concentrate, however, on the DMAIC process. The Six Sigma DMAIC process (define, measure, analyze, improve, control) is an improvement system for existing products or processes. This is a rigorous, metrics based, structured set of process steps which have proven highly effective. We add the term iterative to complete the description for the improvement process for business intelligence.

**Program Goals.** The goals of a continuing improvement program for business intelligence are:

1. To improve the business intelligence product;
2. To eliminate defects and variability; and
3. To streamline the underlying business intelligence infrastructures and other components of the asset base.

(Of course, the second two goals reinforce and cause the improved quality of the business intelligence product.)



**Figure 1:** Continuing Improvement Program

Such a program can be overwhelming in the intensity and complexity of the subject matter and the pervasive nature of business intelligence across the organization. Six Sigma concepts and methods have been chosen to provide what should be the most effective and practical program to accomplish the goals. The iterative nature of the process is also stressed since we need to take one "bite" at a time if we are not to be overwhelmed.

**The Umbrella Program.** The business intelligence continuing improvement program is initiated with an umbrella program that is essentially a foundation layer for the full process. A primary objective of this umbrella program is to identify and define the elements of the program as they relate to the organization and organization goals. This includes:

- The breakthrough equation
- The program strategy
- The customers

- The product
- Product quality and the Y critical-to-quality factors
- Causal and impacting (X) factors
- The Six Sigma iterative improvement process
- Action response planning
- The project portfolio

The initial set of process steps includes:

1. Define the elements of the program
2. Begin a monitoring program for business intelligence quality (Y factors)
3. Design an audit program for the causal (X) factors
4. Implement the designed audit program
5. Develop an action response plan for improvement
6. Develop a portfolio of Six Sigma projects for improvement
7. Spin off the improvement projects
8. Iterate through the improvement processes for each project

## The Business Intelligence Customer

The quality of the business intelligence product must be defined in terms of the customer perceptions. Who is the customer? What are the product characteristics that define product quality for them? We need to identify and clearly describe the customer, locate that customer in his/her working environment, and build a picture of his/her requirements for business intelligence.

There are three primary sets of customers that are crucial to the quality improvement process:

1. *The end users of the business intelligence.* These are the people and systems within the organization that create, use or in some way interface with business intelligence in doing their jobs.
2. *The organization.* The organization is also an important customer with very specific and crucial requirements. There are many factors that are critical to quality for the organization that cannot and will not be addressed at the parochial level of the business intelligence end user. These requirements include, for example, alignment of business intelligence assets to the organization strategic and tactical goals. We will create a virtual organization customer by forming a team of business and IT specialists and managers.
3. *Special requirements customers.* There may also be groups of customers who have important special needs. These customers may perceive product quality in a different manner than the general business end user. For example, there may be analysts and forecasters who will be using different data and have special analytical goals.

## Critical to Quality (Y) Factors

Locating and describing the customers will allow us to define the factors that represent quality for them in their business intelligence product. What are the factors that are perceived to make up quality in the view of the end user (i.e., the business

intelligence customer)? Following is a tentative list of those factors that are critical to quality (CTQ) for business intelligence for the end user:

- Performance
- Reliability
- Quality of information
- Meets business requirements
- Format
- Velocity
- Availability and comprehension
- Support and training

## The Causal (X) Factors

In addition to defining business intelligence quality, we must identify, define and be able to measure those factors that impact business intelligence quality. A primary difficulty here is the sheer complexity and volume of the organization elements, infrastructures and relationships that impact business intelligence. Those factors that are involved with and drive the creation, management and state of the business intelligence assets are myriad and complex. A proposed list of X factors is presented in Figure 2.



Figure 2: The Causal (X) Factors

## Measuring the Y and the X Factors

Metrics are important in creating an effective and successful program for improving business intelligence quality. First, we need to understand and define business intelligence quality. We define quality by using metrics. It is not sufficient to say the

quality is good or bad. If we make changes that seem likely to impact business intelligence quality, we need to be able to measure the impact of those changes. That means that we must be able to measure quality before and after such a change.

In addition to defining business intelligence quality, we must identify and define those factors that impact business intelligence quality and then be able to measure them. If we make changes in an impacting (X) factor, what kind of a change and how much of a change are we making? We may determine that in order to meet industry standards, we should be using different software for special analytics. We use metrics in making such a change. We audit the development process, measure our results against some scale of standards for the industry and then identify, measure and document the incremental differences that we make in the process.

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