

A Relationship between Six Sigma and Malcolm Baldrige Quality Award

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Abstract

In this paper, we argue how Six Sigma implementation will benefit firms in achieving Malcolm Baldrige standard. Our approach is focused on integrating Six Sigma implementation within Malcolm Baldrige model. While Malcolm Baldrige constitutes the over-arching perspective of overall quality of a firm, implementing Six Sigma helps firms to achieve the requirements of Baldrige criteria. In that regard, Six Sigma and Malcolm Baldrige are complementary. It is expected that firms need to implement both Malcolm Baldrige and Six Sigma to achieve higher levels of quality.

Key Word: Six Sigma, Baldrige Criteria, Quality Management

1. Introduction

Malcolm Baldrige National Quality Award (MBNQA) has evolved from a means of recognizing the best quality management practices to a comprehensive framework for world class performance, where it is widely used as a model for (process) improvement (Flynn and Saladin, 2001). Companies strive to achieve higher quality of products and/or services and enhance their profitability through implementing the Baldrige criteria. Interestingly, these requirements are well established by the Six Sigma process improvement method.

While the Baldrige criteria and Six Sigma have followed different development paths, they have the same roots. The US Congress established the Malcolm Baldrige National Quality Award (MBNQA) in 1987 to enhance US competitiveness by promoting quality awareness, recognizing the quality and business excellence of US companies, and publicizing the successful performance of these companies. On the other hand, Six Sigma has been developed by Motorola in the late 1980s as an improvement initiative focused on quality (Feld, 2002). However, both have been originated from the quality management philosophy, and attempt to enhance performance, increase profitability, and improve quality. Accordingly, it is worth investigating how the Baldrige criteria and Six Sigma might be related to each other.

The purpose of this paper is to investigate the relationship between Six Sigma and the Baldrige model. We use the Baldrige framework as a generic model for process improvement within an organization. We refer to Six Sigma methodology from a management point of view – as a number of independent projects within a firm- in order to link it to the implementation of the Baldrige model (Lupan *et al.*, 2005). We argue that it is possible to implement Six Sigma philosophies within the Baldrige framework and integrate it with the overall quality system of the organization.

2. The Baldrige Model for Quality

Despite being described as “badge of honor” (Dow *et al.*, 1999), the Malcolm Baldrige National Quality Award (MBNQA) is much more than quality award for an organization. Garvin (1991) described it as “The most important catalyst for transforming American Business.” Furthermore, Juran (1994) argues that the MBNQA is a helpful model for getting into world class quality.

MBNQA has been primarily used as a framework for business improvement rather than as an award for quality. The Baldrige model consists of seven dimensions, as follows:

- 1- Leadership
- 2- Strategic Planning
- 3- Measurement, Analysis and Knowledge Management
- 4- Customer and Market Focus
- 5- Human Resource Focus
- 6- Process Management

7- Business Results

MBNQA is not only used as a model for quality management implementation, but it also could help as a self-assessment tool, providing a framework for continuous business process improvement. Figure 1 shows the framework for Malcolm Baldrige National Quality Award. The frame work has been evolved over time (since 1988) to address the challenges of the dynamic business environment, and has been progressed as a comprehensive, integrated system for overall organizational performance management. It has been used as a guideline for the organizations to achieve high level of quality as well (NIST, 2005).

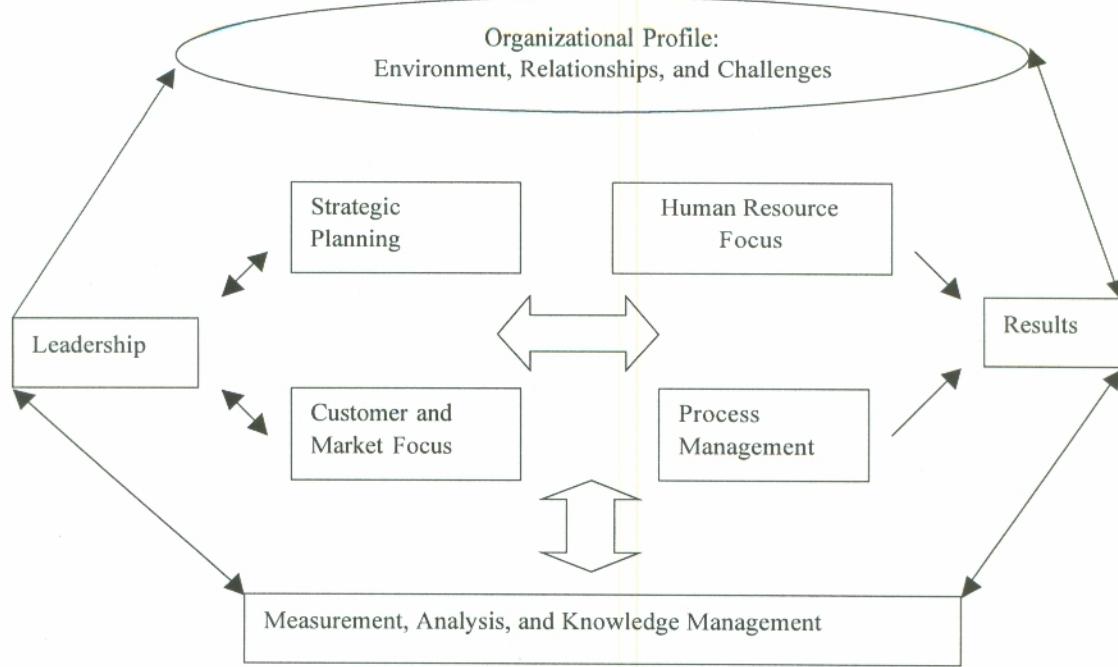


Figure 1. Baldrige Criteria for Performance Excellence Framework: a Systems Perspective (Source: www.quality.nist.gov)

Compared to the ISO 9000 quality system, the Baldrige model has more specific criteria. The criteria for the Baldrige model have been clearly stated and described. On the other hand, in the Baldrige model firms need to achieve business performance as well as customer satisfaction. The ISO 9000 quality system does not emphasize on the overall performance of the organization. Rather, it mainly focuses on the overall quality of the firm with respect to customer satisfaction. The Baldrige model makes a broader view of quality, where it relates quality to customer satisfaction and business results (performance). The ISO 9000 has been concentrated on fixing quality systems defects and product/service nonconformities while the focus of the Baldrige is on performance excellence for the entire organization in an overall management framework (NIST, 2002).

Recently, Lupon *et al.* (2005) addressed the relationship between Six Sigma and the ISO 9000 quality system. They proposed a strategy for the implementation of the Six Sigma methodology as an improvement solution for the ISO 9000. Their approach was focused on the integration of the DMAIC cycle (Define, Measure, Analyze, Improve, and Control) with the PDCA process (Plan, Do, Check, and Action) approach in ISO 9000. Similar to ISO 9000, we suggest that Six Sigma can be effectively integrated into the Malcolm Baldrige framework. We also want to suggest the benefits of integrating Six Sigma to the Bladrigue framework is that it provides a more verifiable cost savings to companies and has the ability to gain greater acceptance due to the popularity among companies from the bottom-line cost reductions.

3. Six Sigma Methodology

According to Feld (2002) Six Sigma is a data-driven philosophy used to drive management decisions and actions across an organization. Caulcutt (2001) indicated that Six Sigma reduces waste, increases customer satisfaction and product liability, and improves processes with a considerable focus on financially measurable results. For the purpose of this paper, Six Sigma is defined as the relentless pursuit of process variation reduction and breakthrough improvements that increases customer satisfaction and impact the bottom line (Rasis *et al.*, 2002).

A popular framework for implementing a Six Sigma methodology is the DMAIC process. DMAIC, or DEFINE, MEASURE, ANALYZE, IMPROVE, and CONTROL are the key processes of a standard framework for a six sigma approach and is shown in below in Figure 2.

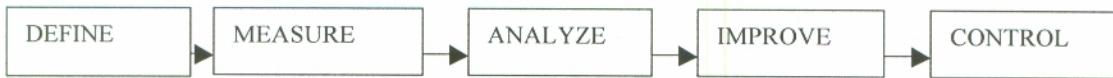


Figure 2. DMAIC Framework

According to Jing and Li (2004) the psychology of this approach is that key process input variables are narrowed down to a vital few with the idea that having control of the vital few will allow for good control of the whole picture. DMAIC is widely used when a product or process is already in existence but performing inadequately. It is management strategy that seeks to make an organization more effective and efficient. DMAIC focuses on eliminating unproductive steps, developing and applying new metrics, and using technology to drive improvement (De Feo and Barnard, 2004). Six Sigma has a strategic component aimed at not only developing commitment to it, but also active involvement of higher management. That strategic component is the responsibility of management to identify the key processes of their organization, measure their effectiveness and efficiency, and initiate improvements of the worst performing processes. We need to recognize that while Baldrige tends to address the system or the enterprise-wide improvement, Six Sigma attempts to produce micro-level or specific improvement. We believe that firms can achieve higher levels of performance in the Baldrige criteria through implementing Six Sigma projects within the company that focuses on the key criteria addressed within the Baldrige model.

4. The Baldrige Model and Six Sigma

We found that the goal of the Six Sigma method is to reduce variation in the product/service/process in dimensions (characteristics) that are essential for customer satisfaction. To do so, firms need to analyze their products, processes and services and determine the variables that affect customer satisfaction. The experience of Motorola with Six Sigma helped the company to win the Baldrige award in 1988. According to Sumberg (2005), the Six Sigma quality laid the foundation for Motorola to be the first company to win the Baldrige award. Such a link between the Six Sigma methodology and the Baldrige model exists in practice.

We can incorporate Six Sigma methodology to the Baldrige model. Byrne and Norris (2003) explain how Six Sigma methodology and the Baldrige model are related. They state that "Baldrige provides the framework, Six Sigma the methodology." Six Sigma proponents argue that winning quality awards, improving quality, and increasing customer satisfaction is achieved through the Six Sigma methodology (Douglas and Erwin, 2000). We need to clarify that while Baldrige is typically applied at the enterprise level, the Six Sigma is deployed as a number of independent projects (throughout the enterprise). Accordingly, by implementing the Six Sigma methodology (as independent projects) within the Baldrige framework, firms can achieve higher operational performance and efficiency (through Six Sigma projects) while operating under the guidelines and the framework of the Baldrige criteria. In that regard, the two approaches are complementary.

The DMAIC cycle of Six Sigma methodology can be employed as a practical tool for addressing the requirement in each category within the Baldrige framework.

4.1. Implementing Six Sigma within the Baldrige Model

Our approach for implementing Six Sigma within the Baldrige model is consistent with the approach Lupon *et al.* (2005) have taken to relate Six Sigma with ISO 9000. According to this approach, the implementation of the Baldrige means:

- Focus on performance excellence for the entire organization in an overall management framework.
- Identify and track all-important organizational results: customer, product/service, financial, human resource, and organizational effectiveness.

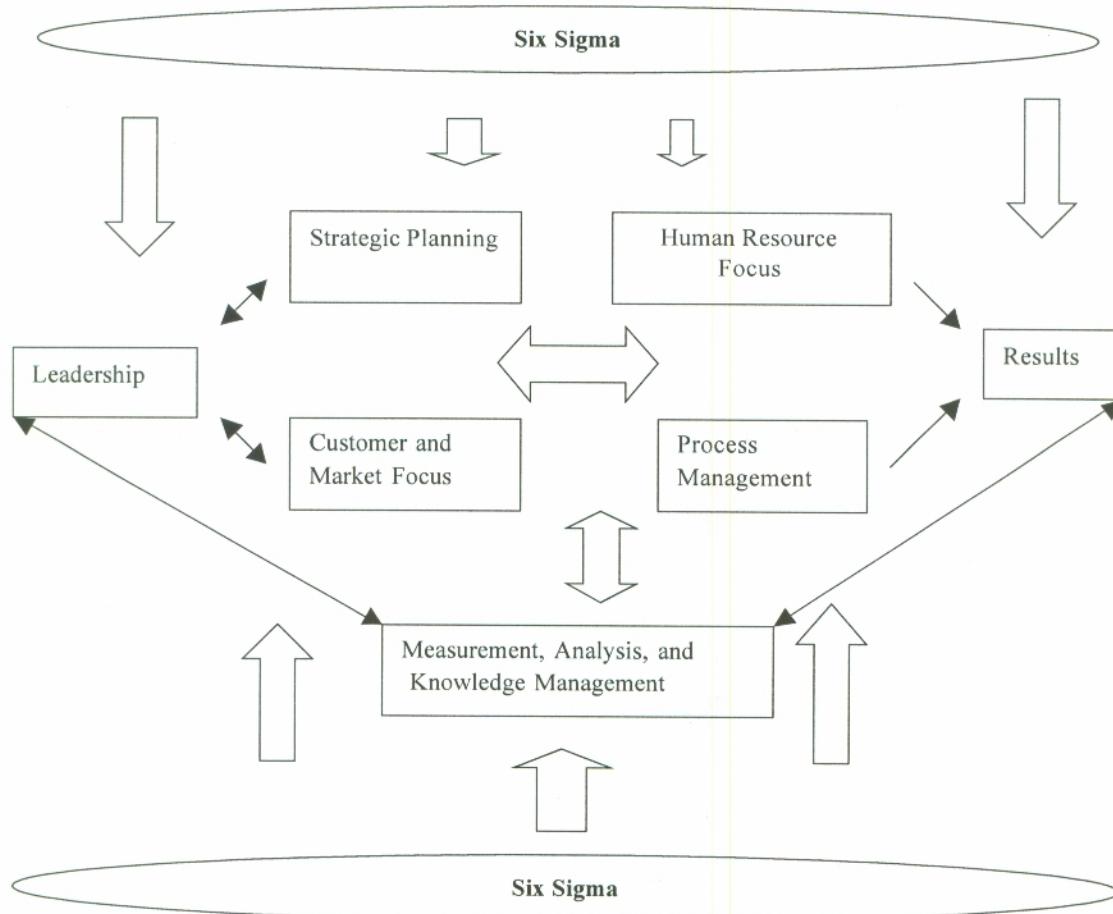


Figure 3. An Integrative Approach to Six Sigma Implementation in the Baldrige Model

We need to recognize that these are general guidelines set by the Baldrige model. The model does not provide any specific methodology, tool, or technique that can be incorporated into the Baldrige framework. As such, we believe that the Six Sigma methodology is a practical, appropriate, and useful tool that can be used to operationalize the Baldrige goals into more operational measures. Accordingly, we may apply Six Sigma methodology on each of the seven Baldrige categories to

evaluate it after the Six Sigma is implemented, compare that with the level of the category before, and assess the improvement we have made in the Baldrige model. In this respect, while companies are using the Baldrige criteria as a self-assessment tool for evaluating the overall quality of the firm (with respect to the requirement of the Baldrige model), improving the enterprise-wide quality level could be achieved through different Six Sigma projects. The major difference is that the Six Sigma projects may not be independent; rather they are all focusing on achieving higher level of quality set by the Baldrige criteria.

Figure 3 shows the integration of Six Sigma into the Baldrige model. In this integrative approach, Six Sigma methodology is used to improve each category of the Baldrige model. Depending upon the constraints or requirement of the organization, Six Sigma can be implemented separately on each category or simultaneously.

5. Applying Six Sigma in the Baldrige Model

We established a link between Six Sigma methodology and the Baldrige model. The proposed integrative Six Sigma and Baldrige model is based on the following principles:

- The Six Sigma methodology is linked with the Baldrige model. In fact, it becomes part of the Baldrige model (and not separate from it) for achieving performance excellence. Such a performance requirement is set by the top management. After the establishment of such goals (which need to be aligned with the requirements of the Baldrige model) Six Sigma methodology is used to improve the processes, and meet quality objectives.
- Six Sigma projects can be applied to all types of the projects, processes, and products. The selection, administration, and control mechanisms are directed by the top management.
- The Baldrige self-assessment includes both the assessment of each seven categories in the Baldrige model as well as the efficiency and effectiveness of the Six Sigma projects. Such an approach toward Six Sigma project ensures that the company is gaining benefit from implementing the Six Sigma methodology.
- The proposed model for the integrative Six Sigma-Baldrige is capable of addressing the core values of the Baldrige model. Areas such as leadership competencies, strategic development and deployment, and human resource management can be addressed by Six Sigma methodology.

6. Conclusion

Organizations try to implement the Baldrige model as a means for achieving business excellence. The seven categories within the Baldrige model is integrated and related with the purpose of addressing business challenges so that companies can be competitive in the dynamic business environment. However, the Baldrige model does not provide any tool or technique that can be used by the firm for achieving desired performance and/or quality objectives.

Six Sigma is a practical methodology for reducing cost, increasing quality and continuous improvement in the product/process. It has been widely used by companies which are looking to achieve higher level of customer satisfaction and profitability. This research suggests that due to Six Sigma previous acceptance by other companies, the ability to produce bottom-line savings, and its foundations in quality, it would be a strong addition to the Baldrige model. Furthermore, we need to notice that one of the requirements of the Baldrige model in business results.

Finally, we need to notice that one of the requirements of the Baldrige model is achieving better performance levels. We believe that integrating Six Sigma methodology into the Baldrige model not only helps the firms to achieve higher level of performance and customer satisfaction in each category of the Baldrige, but it also provides them with a useful methodology for pursuing quality and performance level set by the Baldrige model.

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