

Using the Baldrige Criteria for Observatory Strategic and Operations Planning

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ABSTRACT

In 1987, the U.S. Congress created the Malcolm Baldrige National Quality Award (MBNQA), a program that rewards businesses and nonprofits that demonstrate effective, efficient operations. Underlying the MBNQA are criteria to help organizations integrate seven key areas of operations, including: leadership, strategic planning, customer focus, information management, workforce planning, process management, and results. Independent of the award process, the Baldrige Criteria can be used to guide strategic and operations planning. This presentation includes an example of how the Baldrige Criteria were used to quickly develop a Workforce Management Plan for the National Radio Astronomy Observatory (NRAO), responding to funding agency requests.

Keywords: strategic plan, strategic planning, operations plan, operations planning, metrics, best practices

1. INTRODUCTION

The Baldrige Criteria [1] define the performance excellence framework that has been defined and continuously improved by the Baldrige National Quality Program (BNQP) for over two decades. The best-practice based Baldrige Criteria can be used to guide internal discussions within observatories on aspects of strategic and operations planning, or can be used directly to stimulate the development of critical planning documents. The purpose of this paper is to describe the history and current status of the Baldrige Criteria, explain how they can be used for observatory planning, and present a case study illustrating how the Baldrige Criteria were successfully applied to rapidly deliver the Workforce Management Plan from the NRAO to the U.S. National Science Foundation.

1.1 Historical Context

The Baldrige National Quality Program (BNQP) started in 1987, when the U.S. Congress signed Public Law 100-107 into effect, creating a public-private partnership to stimulate performance excellence and quality improvement in American organizations. The Malcolm Baldrige National Quality Improvement Act of 1987 also established that the partnership was intended to help these organizations increase productivity and challenge foreign competition, while providing a comprehensive guidebook of best practices for any organization that wants to become more effective and efficient. [2]

Each year, over 400 consultants, senior leaders, and executive managers from the business, nonprofit, government, education, and healthcare industry sectors apply the Criteria to in-depth evaluations of organizations who submit their applications to the BNQP. As an integral part of this process, the Examiners critically inspect the Baldrige Criteria in the context of the current and emerging political, economic, social, and technological environments, and recommend changes to ensure that the guidance provided by the Criteria remains relevant and up to date.

Organizations that choose to use the Baldrige Criteria to guide their strategic planning and operations planning exercises can thus benefit from the collective knowledge of thousands of experts, which has been incrementally developed and continuously improved for over 20 years.

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1.2 Current Program

The BNQP operates on an annual cycle. Applications are submitted by organizations in May. Fees are charged to applicants to supplement the funding that the program receives for its administration, ranging from \$1,500 to \$10,000 depending upon industry sector and whether the organization is nonprofit or for-profit. Applicants chosen for site visits are assessed an additional fee to support Examiner travel to conduct in-person reviews.

Applications are evaluated by teams of strategy and process improvement experts in June, July and August. These teams prepare feedback reports using a highly structured consensus process that ensures objectivity in analysis and reporting. Feedback reports include analysis of strengths, and identification of opportunities for improvement, based on the requirements of the Baldrige Criteria and the conceptual foundations that guide expert analysis.

Next, the feedback reports are reviewed by a panel of judges who recommend the highest performers for site visits, which are held in October. During the site visit, the team of Examiners who initially reviewed the application spends a week with members of the applying organization, verifying findings by conducting interviews and reviewing any supplemental data that is required. After the site visit, judges once again review the findings and recommend MBNQA recipients. The awards are presented in a ceremony in the spring by either the President or Vice President of the United States.

Applying for the MBNQA can be a beneficial exercise. Much like design reviews and operations reviews which are routinely conducted in the observatory environment, the process of writing an application can help an organization understand its own processes and well as its strengths and opportunities for improvement. In addition, each application is reviewed by a team of six experts who contribute hundreds of hours of analysis, meaning that applicants can also benefit from in-depth expert review at a fraction of the cost of hiring a team of consultants.

2. CONCEPTUAL FOUNDATIONS FOR THE CRITERIA

The Baldrige Criteria requires that an applicant describe its Organizational Profile in addition to seven categories that describe organizational performance: 1) Leadership, 2) Strategic Planning, 3) Customer Focus, 4) Measurement, Analysis and Knowledge Management, 5) Workforce Focus, 6) Process Management, and 7) Results. Key factors, practice assessment using ADLI (Approach, Deployment, Learning and Integration), results assessment using LeTCI (Levels, Trends, Comparisons and Integration) and the Organizational Profile are considered conceptual foundations for the evaluation of an organization according to the Baldrige Criteria. These foundations will be described in advance of the seven categories that define the Baldrige Criteria.

2.1 Key Factors

Every organization has a unique culture, mission, approach to achieving its objectives, and constraints that influence how and how well strategic challenges can be addressed. These unique aspects of an organization are its key factors. It is through understanding the key factors that it is possible to apply the very general Baldrige Criteria to any organization to identify strengths and opportunities for improvement. Examples of key factors are shown in Table 1.

Examples of Key Factors	
<i>Mission, Vision & Values</i>	<i>Core Competencies</i>
<i>Strategic Challenges</i>	<i>Strategic Advantages</i>
<i>Strategic Objectives</i>	<i>Workforce Segments</i>
<i>Key Products/Data Products</i>	<i>Customer and User Segments</i>
<i>Funding Environment/Challenges</i>	<i>Competitors</i>
<i>Critical Success Factors</i>	<i>Strategic Planning Process</i>
<i>Important Partnerships</i>	<i>Budget Limitations</i>

Table 1. Examples of key factors that may distinguish one organization from another.

2.2 Assessing Practices Using ADLI: Approach, Deployment, Learning and Integration

When an organization such as an observatory responds to any of the *process* sections of the Baldrige Criteria (that is, the first six categories that preface the seventh section which describes results), there are four factors that must be considered. Using the Baldrige performance improvement framework, a solid work process is one that has a systematic approach, is deployed broadly and uniformly, promotes learning from issues and conflicts that arise, and contributes to the organization meeting its specific, unique goals.

These characteristics of a solid work process can be summarized by ADLI (Approach, Deployment, Learning and Integration):

- **Approach:** A systematic approach is documented, repeatable, and understood by all participants in the process. In contrast, an ad hoc approach may not be reliably or consistently applied across an organization. A systematic approach is essential to ensure that lessons learned from all participants and stakeholders in the work process can be identified and used to improve the process.
- **Deployment:** A well-designed approach must be uniformly and consistently deployed across the organization for it to be effective. An excellent process is worth nothing if all of the people who are responsible for carrying out its activities are unaware of the process, or are executing its activities in a manner that opposes the goals and intents of the process.
- **Learning:** Organizations constantly change due to priority shifts, changes in the external environment or competitive pressures, process improvements, or people leaving or joining the organization (or even assuming different roles or activities).
- **Integration:** Whereas alignment means that work processes are coordinated, when processes are *integrated* the functional boundaries between people and work units are blurred. When this happens, the participants in a work process are focused more on their shared goals than on the details of their handoffs and other interactions.

2.3 Evaluating Results Using LeTCI: Levels, Trends, Comparisons and Integration

When any organization analyzes its results, there are four different considerations that come into play. In addition to reporting levels for key performance metrics, it is also important to track the changes in those levels over an appropriate period of time, to compare those levels and trends to comparative data, and to ensure that what is being measured and tracked is relevant and can help the organization meet its goals.

These characteristics of comprehensive metrics and business results can be summarized by LeTCI (Levels, Trends, Comparisons, and Integration):

- **Levels:** A level is a report of the value of a metric, with an indication of the scale of that measure. What is a “good” level? This must also be considered when reporting levels. For example, although 95% may be an excellent level for assessing telescope uptime, it is not a good measure for a hospital reporting the proportion of patients that died in response to a particular practice.
- **Trends:** Processes cannot be systematically improved without knowledge of how key results are changing over time. It is important to collect levels over a time horizon that is significant to an organization, and over which insights about key work processes can be gleaned.
- **Comparisons:** Benchmarking and comparative data is important because for any organization to become world-class in its operations, it must understand how other similar organizations perform. However, there are many cases where finding competitive data can be difficult. This does not minimize the importance of attempting to gather and use comparative data as results are interpreted.
- **Integration:** Unlike the integration of processes in ADLI, integration for business results refers to the degree to which a reported metric (and its trends and comparisons) support the organization’s strategic goals. Is the metric appropriate, and can it be used to examine progress towards one of the observatory’s overall objectives?

2.4 P.1a: Organizational Environment

Each organization has a unique operating environment that helps to define its opportunities, constraints on those opportunities, and strategic advantages that it can leverage to accomplish its goals. There are five main aspects that characterize the organizational environment as defined by Section P.1a of the Baldrige Criteria:

- **Key Products or Services:** For most observatories, the products are the raw data produced by the telescopes and the derived data products that are produced by automated pipelines and stored in archives. Key services may include helpdesks, providing expert collaborators to help prepare observations or analyze data, or providing archive support to help researchers find and retrieve previously observed data.
- **Cultural Characteristics, Mission and Vision:** Each observatory has a unique culture, and although all observatory environments can be considered academic, some are more focused on the research aspects and others are more focused on telescope operations. These cultural differences can impact how an observatory carries out its mission and vision.
- **Workforce Segments:** Observatories typically have administrative staff, engineers, technicians, software engineers, and sometimes a research staff. The types of workforce segments that are in place, and their relative sizes, will dictate what an observatory will accomplish and will also affect how it grows its workforce to maintain and expand its core competencies.
- **Major Facilities:** The telescopes that an observatory has built and operates, as well as the sites that are maintained to support those facilities, are a critical part of the operating environment. The facilities impact what products or services can be offered.
- **Regulatory Environment:** Every organization is responsible for adhering to rules governing its financial management, whether those regulations are federal in nature or the requirements of the funding agency. In addition, most observatories must be cognizant of health and safety regulations as they build and operate their unique major facilities.

When the organizational environment is defined and understood, an observatory will have a better sense of how to shape its leadership, strategy, and work processes to accomplish its unique goals.

2.5 P.1b: Organizational Relationships

An observatory will also have relationships with other organizations that will substantially impact its ability to carry out its mission and conduct operations. Awareness of these relationships and how they influence the organization's decisions can help an observatory identify appropriate opportunities for growth and new development. Not being aware of the subtleties of these relationships can result in an observatory pursuing opportunities that are not supported by the wider context of its relationships.

Understanding these relationships can include identifying the following as part of satisfying Section P.1b of the Baldrige Criteria:

- Organizational structure and internal reporting relationships
- Relationships between the governing/parent organization and the funding agency
- Relationships between the senior and executive managers and the governing/parent organization
- Relationships directly between the senior and executive managers and the funding agency
- Key customer and user groups
- Other stakeholder groups (e.g. local communities where sites and facilities are operated)
- Key partners and suppliers
- Key individual and organizational collaborators
- Differences in expectations between all of the above groups

2.6 P.2a: Competitive Environment

Section P2.a of the Baldrige Criteria encourages an organization to examine who their competitors are, and what it means in the pursuit realizing that organization's mission and vision. In the observatory environment, the notion of competition itself is unique. Because the telescopes that an observatory builds and operates are such specialized instruments, it can be rare to even have direct competitors. However, all observatories will compete against one another in terms of reputation and the quality of the user experience that each provides, and it is on this basis that the notion of competition should be examined.

2.7 P.2b: Strategic Context

The strategic context of an organization, according to Section P.2b of the Baldrige Criteria, consists of three elements: strategic challenges ("the pressures that exert a decisive influence on an organization's likelihood of future success"), strategic advantages ("the benefits that exert a decisive influence on an organization's likelihood of future success"), and sustainability (the "organization's ability to address current... needs and have the agility and strategic management to prepare successfully for the future operating environment"). When an observatory considers the elements of its strategic context together, it can better understand how to leverage its unique strengths to address relevant challenges over the long time horizons that typically characterize observatory operations.

2.8 P.2c: Performance Improvement System

Systematic processes for evaluating performance and identifying opportunities to improve performance are important not only to the observatory as a whole, but to help raise the awareness of individuals and work teams routinely as they build and operate telescopes. Section P.2c of the Baldrige Criteria encourages organizations to identify what their processes are for performance improvement, and also to systematically identify how opportunities for learning and innovation are operationalized.

3. THE CRITERIA

3.1 Overview

The Baldrige Criteria consists of six process categories (labeled 1-6 in Figure 1 below), one results category (labeled 7), and an organizational profile that establishes the key factors that make the organization unique. Together, these comprise the Baldrige Performance Excellence Framework. Leadership, Section 1, asks how the senior leaders communicate their vision and engage the workforce as they guide and sustain the organization in pursuit of its mission and strategic objectives. Section 2 on Strategic Planning asks how these leadership structures are used to develop a deploy a strategy throughout the organization. Section 3, Customer Focus, asks how the needs of the user community are satisfied through that strategy. The Measurement, Analysis and Knowledge Management section inquires about the systems and data repositories that are required to identify and act on the customer focus in the context of the strategy. Section 5, Workforce Focus, seeks to identify the personnel that are required to sustain the strategy over the long term, and develop the careers that will ensure the right mix of people. Process Management, Section 6, asks questions related to the work processes that are consistently deployed throughout the organization, and Section 7 relates measurable results that are critical to the organization's mission to the structures defined by answering the questions in the previous sections.

3.2 Workforce Focus

Section 5 asks an organization to identify its workforce segments and how each contributes to the observatory's mission. In addition, there are two key questions posed: How does your observatory plan for sudden decreases in workforce capacity, such as when funding is reduced without much advance notice? How does your observatory plan for sudden increases in workforce capacity that are required when new projects are funded that will further increase the capabilities of an instrument? Both changes can impact an observatory's ability to maintain continued operations at a level of service that will provide a consistent and desirable user experience. Table 2 provides a summary of the key Section 5 questions.

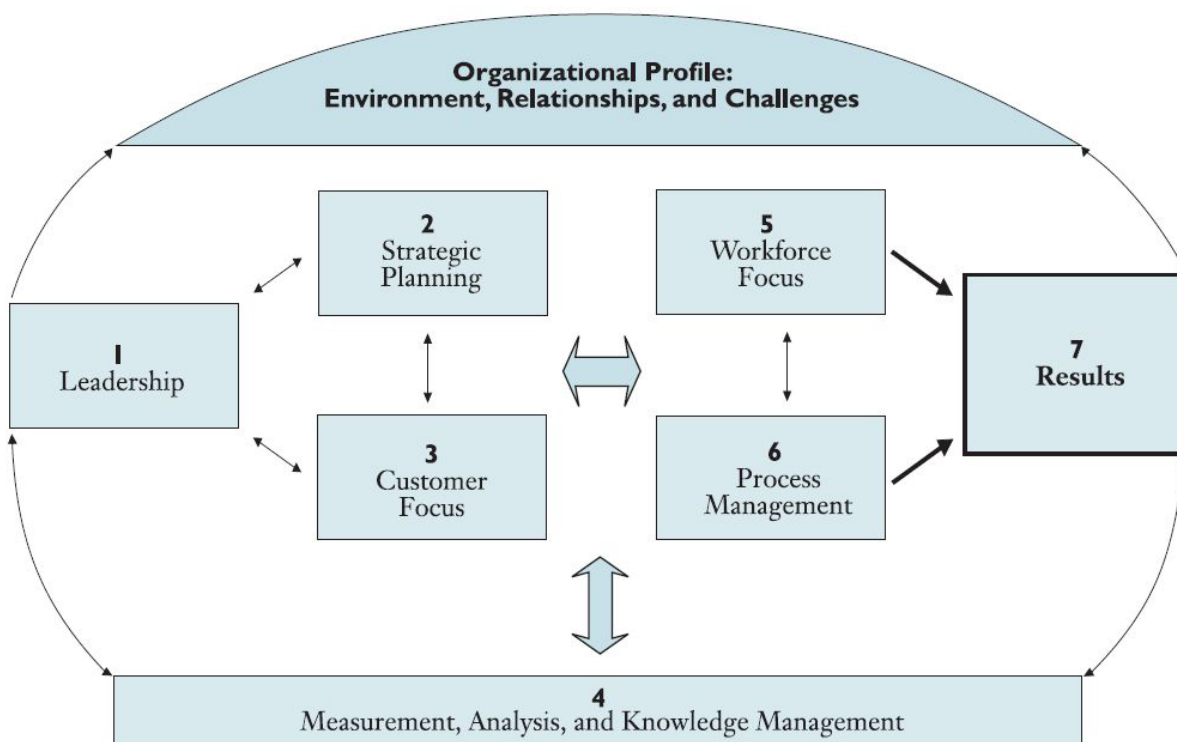


Figure 2. Figure captions are indented 5 spaces and justified. If you are familiar with Word styles, you can insert a field code called Seq figure which automatically numbers your figures.

Section 5: Workforce Focus	
<p><i>Workforce Engagement</i></p> <p>How do you engage your workforce to achieve organizational and personal success?</p> <p><i>Describe how your organization engages, compensates, and rewards your workforce to achieve high performance. describe how members of your workforce, including leaders, are developed to achieve high performance. Describe how you assess workforce engagement and use the results to achieve higher performance.</i></p>	<p><i>Workforce Environment</i></p> <p>How do you build an effective and supportive workforce environment?</p> <p><i>Describe how your organization manages workforce capability and capacity to accomplish the work of the organization. Describe how your organization maintains a safe, secure, and supportive work climate.</i></p>

Table 2. The summary questions from Section 5 of the Baldrige Criteria.

4. EXAMPLE: THE NRAO WORKFORCE MANAGEMENT PLAN (WMP)

In August 2009, the U.S. National Science Foundation asked the National Radio Astronomy Observatory (NRAO) for its Workforce Management Plan (WMP). Despite having mature and robust human resources practices, the concept of workforce management and planning for workforce management had never been addressed in a cross-disciplinary way. The Baldrige Criteria were applied to rapidly define and deliver the WMP for the NRAO to NSF.

The Table of Contents shown in the Appendix illustrates how the unique needs of the observatory were interpreted in the context of Section 5 of the Baldrige Criteria (“Workforce Management”). Although each of the questions in Section 5 of the Criteria were answered in the NRAO WMP, the organization of the plan itself reflects some of the unique ways in which the Criteria were applied to the organizational profile of NRAO.

5. CONCLUSIONS

The Baldrige Criteria helped provide the National Radio Astronomy Observatory with a template to rapidly launch the development of a Workforce Management Plan (WMP). Whereas such an effort may have taken months without guidance from best practices, the initial draft was written in a week, and multiple cycles of revision were managed to produce a final document in less than a month. The WMP will be managed and continually improved using the assessment methods outlined within.

The major benefit provided by the Baldrige Criteria was that NRAO was able to quickly understand the requirements for a Workforce Management Plan. From this knowledge, senior leaders were able to formulate the right questions to ask staff and other senior leaders, and from these results pull together existing and new material into a cohesive approach and document that satisfied the needs of the funding agency.

In summary, the purpose of this paper and session was to introduce the observatory community to the Baldrige Criteria, and illustrate how it can be a useful tool to promote productivity as an observatory conducts various components of its strategic planning exercises.

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