# Performance Excellence Self-Assessment Tool: A Hospital Case Study

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## Abstract

Malcolm Baldrige National Quality Award (MBNQA) is a well-recognized performance excellence model or program integrated into a seven categories framework: leadership, strategy, customers, measurement, analysis, and knowledge management, workforce, operations, and results. Several studies have been performed about MBNQA such as reliability between evaluators, the difference between the type of industries, and validation of MBNQA model paths. However, there is a lack of publications focused to increase the body of knowledge related to "Are we making progress?" the self-assessment tool that MBNQA created in order to any organization be able to conduct an auto-evaluation at any time. Therefore, this investigation has two purposes: (i) show how an organization could use the self-assessment tool to identify opportunities for improvement and (ii) evaluate the construction of the self-assessment tool. In order to achieve these goals, in 2010 the self-assessment tool was applied in a 500-bed U.S. hospital (single case study).

## Keywords
Performance excellence, business excellence, Malcolm Baldrige, MBNQA, hospital

## 1. Introduction
The Malcolm Baldrige National Quality Award (MBNQA) is a Performance Excellence model conferred to manufacturing and service organizations since 1987. The primary goal of the MBNQA is to increase the competitiveness of U.S. companies. Some of the most relevant changes that MBNQA has undergone (Collier, Goldstein, & Wilson, 2002) are the inclusion of education and healthcare organizations in 1999 and nonprofit or government organizations in 2005. Also, MBNQA criteria have been updated over time. Figure 1 shows the last three MBNQA models.

The application for the MBNQA is three stage processes. First, organizations require writing an extensive report. The leaders in the organization have to describe all the process in the organization according to the MBNQA Model. Second, a group of different external evaluators (2 or more) read the extensive report and assign a score. Third, evaluators visit the organization to clarify some points in the report and elaborate a feedback report. These three stages demand time and financial resources from organizations; however, the probability of receiving the MBNQA is small. Since 1987, more than 1,100 organizations have submitted award applications (Krzykowski, 2010) and only 86 organizations have received the Baldrige award (NIST, 2011). Many organizations applied multiple years before to receive the MBNQA from the hands of the President of the United States of America. For example, Mercy Health Systems applied five times before becoming an award recipient (Thrall, 2008) and AtlantiCare did not qualify for a site visit in its first application (Krzykowski, 2010). Organizations that applied to the MBNQA and did not win will receive evaluators report highlighting opportunities for improvement in some or each of the seven categories that integrate the MBNQA model: leadership, strategy, customers, measurement, analysis, and knowledge management, workforce, operations, and results. This is probably the most important outcome that any organization receives from this process. MBNQA is awarded for the effort that each organization has to do; therefore, this is not a process that all organizations are able to conclude. For this reason, MBNQA create two standardize self-assessment tools "Are we making progress?" and "Are we making progress as leaders?" that organizations could

conduct any time and obtain opportunities for improvement. Both self-assessment tools consist of 40 closed-opened questions distributed in the seven MBNQA categories.

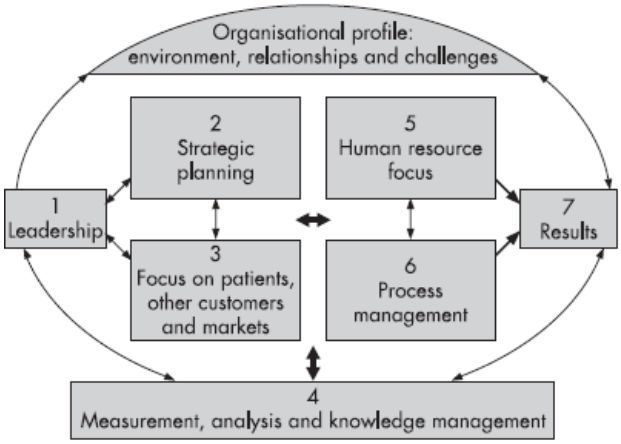


Figure 1a. MBNQA model (Foster et al., 2007)

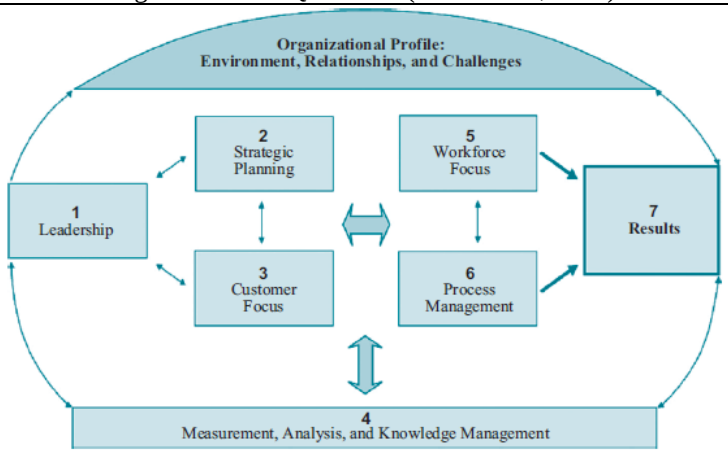


Figure 1b. MBNQA model (Talwar, 2011)

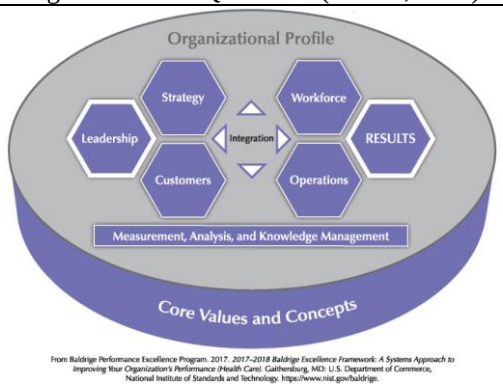


Figure 1c. MBNQA model (NIST, 2017)

Figure 2. Malcolm Baldrige National Quality Award Model

Over time, several studies have been tested the MBNQA model paths in manufacturing, healthcare and education organizations from different countries with different instruments or surveys. Collier et al (2002) contrasted the 1992 MBNQA model paths vs. 1997 MNBA model paths from two different studies, concluded that Leadership and Measurement are the two categories that impact the four other categories (Strategic Planning, Operation Focus, Work Focus, and Customer Focus). Ghosh et al (2003) defined and tested a different MBNQA model path in 313 manufacturing organizations, finding that Workforce Focus and Operational Focus have a key relationship with Results, but there is no relationship between Customer Focus and Measurement. Badri et al (2005) collected 220 surveys from 15 educational organizations in the United Arab Emirates, finding that Leadership influences in all categories of the MBNQA model and Strategic Planning influences in organizational results, contrary to Collier et al (2002). In a recent study, Sun (2011) compared the MBNQA model paths analyzed in seven studies, finding contrary options between authors about the relevance of some paths in the MBNQA model.

However, there is a lack of publications focused to increase the body of knowledge related to "Are we making progress?" the self-assessment tool that MBNQA created in order to any organization be able to conduct an auto-evaluation at any time. Therefore, this investigation has two purposes: (i) show how an organization could use the self-assessment tool to identify opportunities for improvement and (ii) evaluate the construction of the self-assessment tool. In order to achieve these goals, the research team applied the self-assessment tool in a U.S. hospital (single case study).

This paper is structured as follow. First, in the research method section, the author describes the research protocol used to conduct this investigation. Second, descriptive statistics and exploratory factor analysis were analyzed in the result section. Lastly, the conclusion section includes findings, research limitations, and future works.

## 2. Research method

### 2.1 Study design and questionnaire development

Late 2010, a 500-beds U.S. hospital with 1,800 employees offers five service lines (cardiology, maternal, orthopedics, oncology, and behavioral health) to more than 10,000 potential customers. Leader team is interested to participate in the MBNQA; hence, leader team decided to conduct a self-diagnostic using the assessment tool "Are we making progress?" (created based on the MBNQA available in 2010), a 40-items questionnaire grouped in seven categories: leadership (six items), strategic planning (five items), focus on patients, other customers, and markets (five items), measurement, analysis and knowledge management (five items), human resource focus (six items), process management (four items) and results (nine items). Each item is a closed-ended with a 5-point scale: strongly disagree (1), disagree (2), undecided (3), agree (4), and strongly disagree (5).

Table 1. Self-assessment tool items (adapted from "Are we making progress?")

| MBNQA categories | Self-assessment tool items | Code |
|---|---|---|
| Leadership | I know my organization's mission (what it is trying to accomplish) | Leadership_1 |
| | I know my organization's vision (where it is trying to go in the future) | Leadership_2 |
| | My senior (top) leaders use our organization's values to guide us | Leadership_3 |
| | My senior leaders create a work environment that helps me do my job | Leadership_4 |
| | My organization's leaders share information about the organization | Leadership_5 |
| | My organization asks what I think | Leadership_6 |
| Strategic planning | As it plans for the future, my organization asks for my ideas | Strategy_1 |
| | My organization encourages totally new ideas (innovation) | Strategy_2 |
| | I know the parts of my organization's plans that will affect me and my work | Strategy_3 |
| | I know how to tell if we are making progress on my work group's part of the plan | Strategy_4 |
| | My organization is flexible and can make changes quickly when needed | Strategy_5 |
| Focus on patients, other customers, and markets | I know who my most important customers (or patients) are | Customers_1 |
| | I regularly ask my customers (or patients) what they need and want | Customers_2 |
| | I ask if my customers (or patients) are satisfied or dissatisfied with my work | Customers_3 |
| | I am allowed to make decisions to solve problems for my customers (or patients) | Customers_4 |

| | | |
|---|---|---|
| | I also know who my organization's most important customers (or patients) are | Customers_5 |
| Measurement, analysis, and knowledge management | I know how to measure the quality of my work | MAK_1 |
| | I can use this information to make changes that will improve my work | MAK_2 |
| | I know how the measures I use in my work fit into the organization's overall measures of improvement | MAK_3 |
| | I get all the important information I need to do my work | MAK_4 |
| | I know how my organization as a whole is doing | MAK_5 |
| Human resource focus | The people I work with cooperate and work as a team | Workforce_1 |
| | My bosses encourage me to develop my job skills so I can advance in my career | Workforce_2 |
| | I am recognized for my work | Workforce_3 |
| | I have a safe workplace | Workforce_4 |
| | My bosses and my organization care about me | Workforce_5 |
| | I am committed to my organization's success | Workforce_6 |
| Process management | I can get everything I need to do my job | Operations_1 |
| | We have good processes for doing our work | Operations_2 |
| | I have control over my work processes | Operations_3 |
| | We are prepared to handle an emergency | Operations_4 |
| Results | My work products meet all requirements | Results_1 |
| | My customers (or patients) are satisfied with my work | Results_2 |
| | I know how well my organization is doing financially | Results_3 |
| | My organization has the right people and skills to do its work | Results_4 |
| | My organization removes things that get in the way of progress | Results_5 |
| | My organization obeys laws and regulations | Results_6 |
| | My organization practices high standards an ethics | Results_7 |
| | My organization helps me help my community | Results_8 |
| | My organization is a good place to work | Results_9 |

### 2.2 Participants and data collection

Considering only full-time hospital employees, the team leader identified 1,337 frontline potential respondents. Each team leader was responsible to distribute the paper-based questionnaire to his/her team. During three weeks, three mailboxes were located in strategic places around the hospital in order to anonymous collected participant responses.

### 2.3 Data screening and data analysis

Data screening was conducted using three criteria (Hair et al., 2013): remove participants with 10% or more of data missing, remove participants that answered the 40 questions with the same scale (also known as straight-lining), and remove questions with 5% or more of missing data. Three data analysis were conducted in this investigation. First, internal consistency reliability was tested using Cronbach's $\alpha$ (0.6 or higher is satisfactory). Second, descriptive statistics to obtain an overall picture of the data collected. Third, exploratory factor analysis (EFA) was conducted using principal component exploratory factor analysis with oblique (oblimin) rotation. An eigenvalue > 1 was used to determinate the initial number of variables extracted.

## 3. Results

A total of 348 responses were collected, but 47 responses were removed from this investigation after applied data screening criteria; therefore, 301 valid responses were used in this investigation (23% response rate). The self-assessment tool internal consistency was tested using Cronbach $\alpha$, obtaining a value of 0.97, similar to other studies (Colombo et al., 2010). Overall, frontline tends to agree ("Undecided" = 3 and "Agree" = 4) on how the organization is performing in each of the seven categories (see Table 2); however, frontline tends to be undecided (3-point scale) on hospital strategy. Hence, it is important to observe descriptive statistics by item (see Table 3).

Table 2. Descriptive statistics by MBNQA categories (n=301)

| MBNQA categories | Mean | SD |
|---|---|---|
| Leadership | 3.72 | 0.78 |
| Strategy | 3.35 | 0.82 |
| Customers | 4.04 | 0.62 |
| MAK | 3.74 | 0.77 |
| Workforce | 3.81 | 0.80 |
| Operations | 3.66 | 0.82 |
| Results | 3.74 | 0.64 |

At least one of the 301 respondents assigned a 1-point score and 5-point score in each of the 40 self-assessment tool items. The item with the highest score is "I regularly ask my customers (or patients) what they need and want (Customers_2)" and "I know who my most important customers (or patients) are (Customers_1)" both items with a relatively low SD (0.7 and 0.8 respectively). On the other hand, the five self-assessment items related to Strategy category are in the quartile four mean (lowest 10 mean values).

Table 3. Descriptive statistics by self-assessment items (n=301)

| Code | Mean | SD | | Code | Mean | SD |
|---|---|---|---|---|---|---|
| Leadership_1 | 4.06 | 0.78 | | Workforce_1 | 3.81 | 1.11 |
| Leadership_2 | 3.87 | 0.90 | | Workforce_2 | 3.63 | 1.18 |
| Leadership_3 | 3.72 | 0.95 | | Workforce_3 | 3.55 | 1.13 |
| Leadership_4 | 3.58 | 1.05 | | Workforce_4 | 3.97 | 0.94 |
| Leadership_5 | 3.70 | 0.98 | | Workforce_5 | 3.63 | 1.11 |
| Leadership_6 | 3.42 | 1.09 | | Workforce_6 | 4.26 | 0.75 |
| Strategy_1 | 3.18 | 1.05 | | Operations_1 | 3.45 | 1.10 |
| Strategy_2 | 3.41 | 1.00 | | Operations_2 | 3.67 | 0.94 |
| Strategy_3 | 3.43 | 0.96 | | Operations_3 | 3.60 | 1.02 |
| Strategy_4 | 3.40 | 0.99 | | Operations_4 | 3.92 | 0.85 |
| Strategy_5 | 3.36 | 1.02 | | Results_1 | 3.95 | 0.74 |
| Customers_1 | 4.31 | 0.80 | | Results_2 | 4.13 | 0.69 |
| Customers_2 | 4.32 | 0.77 | | Results_3 | 2.89 | 0.99 |
| Customers_3 | 3.71 | 0.96 | | Results_4 | 3.55 | 0.96 |
| Customers_4 | 3.82 | 0.95 | | Results_5 | 3.30 | 1.01 |
| Customers_5 | 4.06 | 0.88 | | Results_6 | 4.06 | 0.79 |
| MAK_1 | 4.04 | 0.83 | | Results_7 | 3.99 | 0.89 |
| MAK_2 | 3.94 | 0.91 | | Results_8 | 3.77 | 0.90 |
| MAK_3 | 3.72 | 0.96 | | Results_9 | 4.02 | 0.88 |
| MAK_4 | 3.60 | 1.08 | | | | |
| MAK_5 | 3.40 | 0.98 | | | | |

Six instead of seven categories were extracted from an exploratory factor analysis with an eigenvalue > 1. Two out of this six categories were removed because the factors extracted in both categories showed low factor loading (less and 0.5) and cross loading. A second exploratory factor analysis was conducted extracting seven categories, observing that self-assessment tool items Leadership_1 and Leadership_2 are items more related to organization profile (mission and vision), than the leadership in the organization. Additional, self-assessment tool items in Results categories were grouped in other categories; for example, "My customers (or patients) are satisfied with my work (Results_2) was integrated with another self-assessment tool item from Customers category. Therefore, self-assessment tool items from Results category were considered as a dependent variable. A third exploratory factor analysis was conducted only for self-assessment item from Results extracting only one component (or category).

Then, the fourth exploratory factor analysis was conducted using the remaining six categories. The ration between respondents (301) and self-assessment items (31) is 9.7:1, satisfying the minimum of 5:1 required to conduct an exploratory factor analysis (Hair et al., 2010). Also, the Kaize-Meyer-Oklin (KMO) and Barlett's test (0.095 and p-value = 0 respectively) showed that it is possible to conduct an exploratory factor analysis (see Table 4). Two main

finding could be highlighted from Table 4. First, 13 out of 31 self-assessment items were not loaded in a category because have a low factor loading (less than 0.5), cross-loading (higher than 0.3), or both situations. Cross-loading is an important aspect to highlight because of shows that self-assessment tool items are not clearly defined and understood by respondents. In this investigation there are 5 items were removed in this situation.

Table 4. Exploratory factor analysis results

| Self-assessment tool items | Communality | C01 | C02 | C03 | C04 | C05 | C06 | C07 |
|---|---|---|---|---|---|---|---|---|
| ***C01: Workforce Recognition (Cronbach α =0.72)*** | | | | | | | | |
| *Strategy_4* | *0.72* | *0.68* | | | | | | |
| Workforce_2[b] | 0.75 | 0.68 | | 0.32 | | | | |
| *Workforce_3* | *0.73* | *0.61* | | | | | | |
| Strategy_3[b] | 0.71 | 0.60 | -0.34 | | | | | |
| Workforce_5[a] | 0.75 | 0.47 | | | | | | |
| MAK_4[a, b] | 0.70 | 0.46 | | | | 0.34 | | |
| Workforce_4[a, b] | 0.71 | 0.43 | | 0.32 | | | 0.33 | |
| ***C02: Strategy (Cronbach α = 0.87)*** | | | | | | | | |
| *Strategy_2* | *0.76* | | *-0.81* | | | | | |
| *Strategy_1* | *0.75* | | *-0.80* | | | | | |
| *Leadership_6* | *0.71* | | *-0.70* | | | | | |
| *Strategy_5* | *0.66* | | *-0.67* | | | | | |
| Leadership_5[b] | 0.70 | | -0.51 | | | | | 0.35 |
| Leadership_4[a, b] | 0.72 | | -0.42 | | | | | 0.31 |
| MAK_5[a] | 0.58 | | -0.32 | | | | | |
| ***C03: Operations (Cronbach α = 0.74)*** | | | | | | | | |
| *Workforce_1* | *0.54* | | | *0.69* | | | | |
| *Operations_2* | *0.75* | | | *0.65* | | | | |
| Operations_4[b] | 0.68 | | | 0.56 | | | | 0.32 |
| *Operations_1* | *0.64* | | | *0.55* | | | | |
| Operations_3[a, b] | 0.69 | | | 0.47 | | 0.33 | | |
| ***C04: Customers Requirements and Satisfaction(Cronbach α = 0.62)*** | | | | | | | | |
| *Customers_3* | *0.69* | | | | *0.84* | | | |
| *Customers_2* | *0.62* | | | | *0.68* | | | |
| ***C05: Measurement, Analysis, and Knowledge Management (Cronbach α =0.86)*** | | | | | | | | |
| *MAK_2* | *0.81* | | | | | *0.85* | | |
| *MAK_1* | *0.77* | | | | | *0.80* | | |
| *MAK_3* | *0.75* | | | | | *0.64* | | |
| Customers_4[a, b] | | | | 0.38 | | 0.40 | | |
| ***C06: Customer Identification (Cronbach α = 0.75)*** | | | | | | | | |
| *Customers_5* | *0.78* | | | | | | *0.88* | |
| *Customers_1* | *0.78* | | | | | | *0.80* | |
| ***C07: Organization Profile (Cronbach α = 0.87)*** | | | | | | | | |
| *Leadership_1* | *0.78* | | | | | | | *0.73* |
| *Leadership_2* | *0.78* | | | | | | | *0.73* |
| Leadership_3[b] | 0.73 | | -0.35 | | | | | 0.60 |
| Workforce_6[a, b] | 0.63 | | | | 0.36 | | | 0.45 |

[a] Low factor loading
[b] Cross loading

Second, self-assessment tool items were not grouped as the MBNQA suggest in its instrument "Are we making progress?". For example, questionnaire items Leadership_1 and Leadership_2 are related to organization mission and vision (organization Profile), Strategy_4 and Workforce_3 (Workforce Recognition), and the category defined by MBNQA as Customers was split into two (customer requirements and satisfaction and customer identification).

In order to review how these new categories were grouped, an internal consistency test was conducted, obtaining Cronbach $\alpha$ values higher than 0.6 (see Table 4), satisfying the initial requirement (Hair et al., 2013).

## 4. Conclusions

Although this paper describes results from the application of "Are we making progress?" available on 2010, findings still could be significantly important to practitioners and researchers. Contrasting the self-assessment tool used in this investigation vs. the currently available, there are only four changes observed in the self-assessment tool items (see Table 5). The self-assessment tool "Are we making progress?" was useful to identify opportunities for improvement. In this investigation (single case study), hospital frontline responses identified hospital strategy as an opportunity for improvement as well as the lack of communication about the financial status of the hospital. On the other hand, the exploratory factor analysis suggested that items used in "Are we making progress?" are not well grouped in the initial set of seven categories. Future work should be focused in this research line to support or reject this particular finding.

Table 5. "Are we making progress?" version used in this investigation vs. currently available

| **Code** | **Self-assessment tool used in this investigation** | **Currently available (2015)** |
|---|---|---|
| Leadership_3 | My senior (top) leaders use our organization's values to guide us | My senior (top) leaders are ethical and demonstrate our organization's values |
| Strategy_5 | My organization is flexible and can make changes quickly when needed | My organization is flexible and makes changes quickly when needed |
| Customers_4 | I am allowed to make decisions to solve problems for my customers | I am allowed to make decisions to satisfy my customers |
| Operations_3 | I have control over my work processes | I can improve my work processes when necessary |

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## Biographies

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