



Key Features for Designing a Dashboard

By Sukumar Ganapati

There are two key elements in implementing organizational dashboards: the design of the dashboard — since it is a data visualization technique — and performance metrics — that is, the content.

Organizational dashboards are often likened to dashboards in plane cockpits and cars, which allow the pilot or the driver to see instant information about various metrics (e.g., speed, mileage, fuel level) and make travel adjustments or spot vehicular issues on the fly. Organizational dashboards can provide executives with an instant view of the organization's performance metrics on selected dimensions. Broadly, dashboards summarize “key performance metrics and underlying performance drivers.”¹ Like vehicular dashboards, organizational dashboards display performance metrics in a visually engaging way, so that key information is easily understood in a short time.

The vehicular metaphor, however, should be viewed with some caution, since the purposes of vehicular dashboards and organizational dashboards are distinct from one another. Organizational dashboards require more human, political judgment on performance metrics than vehicular dashboards do. Car dashboards do not give historical data; they provide a snapshot of information at a particular time.

The dashboard has been defined as a “visual display of the most impor-

tant information needed to achieve one or more objectives; consolidated and arranged on a single screen so the information can be monitored at a glance.”² In other words, it is a visual display or presentation mechanism; the term does not refer to a particular technology. Although there are many dashboard software vendors, dashboards are not solely software products. Before selecting dashboard software to serve as the platform for the organization's performance information, agencies must carefully select the performance metrics to be displayed in visually meaningful ways. Typically, dashboards integrate data from different sources and exhibit them through informative graphics with explanatory captions.

Data visualization allows readers to understand complex data in less time than it takes to read a full report. Unlike software that assists someone in making a presentation, the dashboard itself is the presentation. One attribute of the dashboard is that it “contains predefined conclusions relevant to the goal of the dashboard and relieves the reader from performing his own analysis.”³

KINDS OF DASHBOARDS

In terms of their display, dashboards can be either static or dynamic:

- Static dashboards such as printed reports are not interactive and cannot be updated on the fly; they provide performance metrics for a specific timeframe.

This article is adapted from Use of Dashboards in Government, Fostering Transparency and Democracy Series, IBM Center for the Business of Government, 2011. The paper is available at <http://www.businessofgovernment.org>.

■ Dynamic dashboards such as web-based dashboards (or other forms) draw on live information from data warehouses, making them interactive and capable of manipulation by the user. Dynamic dashboards have the power to provide information in real time, based on how often the underlying data are updated.

Government agencies use both forms of dashboards. Static dashboards are often deployed over the Internet as PDF files that can be downloaded by users. Deploying dynamic dashboards over the Internet, however, requires more advanced technical capacity (e.g., data warehousing, online analytical processing). Dynamic dashboards, although more technically challenging, may be preferred over static dashboards since they are more interactive and provide real-time information.

Based on the way a dashboard will be used, three types of dashboards have been identified:⁴

■ **Operational Dashboards** — used mainly for monitoring purposes. Front-line workers use operational dashboards to monitor operational processes, events, and activities on a real-time basis.

■ **Tactical Dashboards** — used mainly for analytical purposes. Executives use tactical dashboards to review and benchmark performance of departmental activities and processes. Departmental managers use them for monitoring their unit's progress.

■ **Strategic Dashboards** — used by executives to track progress toward achieving strategic objectives.

These definitions are mainly oriented toward internal management, but dash-

Lessons on Uses of Dashboards

- 1) Data quality is crucial to the credibility of dashboard performance measures.
- 2) Use best practice resources when designing and using dashboards.
- 3) Performance measures should reflect the organization's goals.
- 4) Dashboards are only tools; how effective they are depends on how they are used.

boards in government are not intended for internal management alone. They are also used to reach out to citizens for accountability and transparency. In this context, operational dashboards could be used for internal monitoring, but they might be less useful for accountability. Tactical and strategic dashboards could be used for both internal management and external outreach purposes.

There are two key elements in implementing organizational dashboards: the design of the dashboard (since it is a data visualization technique), and performance metrics (i.e., the content).

DESIGN ISSUES

Since dashboards are essentially data visualization techniques, the dashboard design is important. The design is meant not only for aesthetics, but also to make it easy for users to grasp the underlying data and information, and act upon it. Poorly designed dashboards can lead to erroneous conclusions or time-consuming interpretation, while well-designed dashboards with informative graphics can capture the user's imagination.

A compelling story of a good graphic was told by New York Times columnist Nicholas Kristof, who wrote a series of articles on Third World diseases in January 1997. In a subsequent interview, Bill and Melinda Gates told Kristof they were impressed with the series, which had gotten them thinking about public health in the Third World. Gates said it was not the text itself, but a graphic in the article that had captured his imagination and stayed with him. The graphic was a simple two-column insert that listed Third World health problems and the number of lives claimed. Kristof concluded, "No graphic in human history has saved so many lives in Africa and Asia."⁵ This demonstrates the significant role that graphics can play in contributing to the understanding of an issue.

Fundamental aspects of dashboard design include the following:

■ **Dashboards Should Fit on a Single Page or Screen.** It has been argued that all the key information of interest in a dashboard should fit on a single page or screen for easy visualization. Scrolling through screens or viewing multiple screens fragments the data, and the user might not be able to make connections among the performance indicators of interest.⁶

■ **Dashboards Should Be Simple.** Dashboards should provide the needed information in a sparse way. This has been referred to as maximizing the data-ink (i.e., the ratio of data-ink to total-ink). Visual components that are purely decorative in nature (that contribute to "chart junk") should be minimized.⁷

■ **Dashboards Should Use the Best Display Medium for Communicating Data Effectively.**

There are several ways of summarizing data: tables, graphs, icons, text.⁸ Selecting the appropriate medium is important for an effective dashboard. For example, tables allow identification of individual values more efficiently than a graph does. Graphs can condense complex data to give visual trends or comparison between data points. Icons can be used to highlight alerts (similar to stoplights in roads), up or down movement, or on/off state. Text can be used to supplement graphics, creating a self-contained explanation of the dashboard.

Some critics argue against basing dashboards on PowerPoint and similar software. There are concerns that the hierarchical bullet points in the presentations tend to ignore the richness of the larger context, and that such a presenta-

tion “stifles discussion, critical thinking, and thoughtful decision making.”⁹

PERFORMANCE MEASURES

The dashboard’s content in terms of performance measures greatly influences how it is used. The choice of performance measures can differ based on the type of dashboard. Operational dashboards used by front-line personnel dealing with day-to-day activities of the organization require detailed metrics related to their daily operations. Tactical dashboards used by executives require comparative metrics to review and benchmark data of the departments. Strategic dashboards used by organizational leaders require performance indicators reflecting organizational goals. Strategic dashboards often use the balanced scorecard framework, which identifies the leading and lagging performance indicators.

There are four types of performance measures in the private sector:¹⁰

■ **Key Results Indicators (KRIs)** — explain how an organization has performed in relation to a specific perspective or a critical success factor.

■ **Results Indicators** — explain what an organization has done.

■ **Performance Indicators** — describe what an organization does.

■ **Key Performance Indicators (KPIs)** — represent measures focusing on those aspects of organizational performance that are most critical for the current and future success of the organization.

In this approach, results are financially oriented. KPIs, however, are distinctive: They are non-financial measures that are measured frequently and acted on by the CEO and the senior management team; they clearly indicate what action is required by the staff and tie responsibility to a team; and they have a significant impact and encour-

Eye-Catching Display



In response to the Obama administration’s Open Government Directive, the United States Patent and Trademark Office (USPTO) launched its Data Visualization Center, a performance dashboard. The site has evolved since its September 2010 inception, adding new sets of performance measures. The USPTO’s three sets of dashboards are oriented toward achieving USPTO’s strategic goals, but they are not just for internal management — they also show the agency’s performance to stakeholders and the general public. In terms of design, the dashboards are visually rich, providing a summary overview of the measures at the top as animated gauges. The summary is followed by more detailed measures along each dimension, along with an explanation of the measure.



Organizational Assessment Services

You know your finances. But do you know whether your financial function is properly organized and operating at peak efficiency? Managing staffing, technology, customer service, and compliance can be a complicated undertaking. The rubric of “finance” includes many disparate areas: budgeting, treasury, procurement, and other disciplines. Managing performance at an optimal level of efficiency, while maintaining effective controls, is a delicate matter.

GFOA consulting services can help you strike an effective balance.

GFOA Consulting | Research and Consulting Center | 312-977-9700 | consulting@gfoa.org | www.gfoa.org

age appropriate action. Organizational leaders need to buy into the KPIs used, and the KPIs need to be aligned with the organization’s vision and mission.

The key performance management challenge is “to use — not just produce — performance goals and measures.”¹¹ In *Performance Management: Recommendations for the New Administration*, Shelley Metzenbaum proposed four guiding principles for implementing performance measures in federal agencies:

- Measures should communicate the direction of performance trends and targets (i.e., improvement or decline), rather than targeting attainment and ratings (which are limited performance indicators).
- Agencies should be encouraged to improve performance through diagnostic analysis, data-driven discussion, practical experiments, and knowledge-sharing with others who could analyze the patterns and inform decision making.
- Performance information should be presented in ways that meet the needs of specific stakeholder audiences.
- Accountability mechanisms need to be structured in a way that encourages and inspires agencies, rather than embarrassing, reprimanding, or punishing them.

CONCLUSIONS

While a principal purpose of dashboards is for internal management, government organizations also use dashboards for transparency to inform the public about their performance. When deployed over the Internet, dashboards are potentially accessible to

anyone. Citizens can therefore monitor an agency’s performance, which is crucial for the agency’s transparency and accountability. But using the dashboard for transparency in government organizations brings an additional layer of complexity. Dashboards must then not only make sense for internal management purposes, but should also be citizen-oriented and depict organizational performance. ■

Notes

1. Kowen Pauwels, Tim Ambler, Bruce H. Clark, et al, “Dashboards as a Service: Why, What, How, and What Research Is Needed?,” *Journal of Service Research: JSR*, 12, 2009.
2. Stephen Few, *Information Dashboard Design: The Effective Visual Communication of Data* (Sebastopol, CA: O’Reilly Media, 2006).
3. Michael Alexander and John Walkenbach, *Excel Dashboards and Reports* (Hoboken, NJ: John Wiley & Sons, 2010).
4. Wayne W. Eckerson, *Performance Dashboards: Measuring, Monitoring, and Managing Your Business* (Hoboken, NJ: Wiley, 2006).
5. Based on “Talk to the Newsroom: Graphics Director Steve Duenes,” *New York Times*, February 25, 2008.
6. Few, 2006.
7. Edward R. Tufte, *The Visual Display of Quantitative Information* (Cheshire, CT: Graphics Press, 2001).
8. Few, 2006.
9. Elisabeth Bumiller, “We Have Met the Enemy and He is PowerPoint,” *New York Times*, April 26, 2010.
10. David Parmenter, *Key Performance Indicators: Developing, Implementing, and Using Winning KPIs* (Hoboken, NJ: John Wiley & Sons, 2010).
11. Shelley H. Metzenbaum, *Performance Management: Recommendations for the New Administration* (Washington, D.C.: The IBM Center for The Business of Government, 2009).

SUKUMAR GANAPATI is an associate professor at Florida International University. He has a Ph.D. in planning from the University of Southern California. Ganapati can be reached at ganapati@fiu.edu.