

# Are You Drowning in BI Reports? Using Analytical Dashboards to Cut Through the Clutter

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REVIEW

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**B**usiness intelligence (BI) is all about leveraging key information to communicate ideas and make sound, timely business decisions. However, many business intelligence solutions only deliver static reports and summary graphical dashboards. These summaries often do not provide the depth, flexibility and interactivity required to make accurate business decisions.

The situation is compounded by the advent of large-scale data warehouses and the explosion of e-commerce. Businesses are now able to amass unprecedented amounts of data about their customers and operations. While this new environment is data- and information-rich, it is knowledge- and results-poor. Attempting to make sense of huge data sets can be a labor-intensive, difficult and often fruitless exercise.

Today, management experts and software vendors regularly promote reporting dashboards, scorecards and reports as the ideal way to monitor business performance. They provide visibility into key performance indicators (KPIs) through simple visual graphics such as gauges, charts and tables within a Web browser. Dashboards are appealing because they:

- Present a wide number of different metrics in a single consolidated view.
- Roll up details into high-level summaries.
- Provide intuitive indicators, such as gauges and stoplights, that are

instantly understandable (e.g., red bar means problem; green bar means everything is on plan).

In many respects, a reporting dashboard can be likened to a dashboard in an automobile which provides an “at-a-glance view” of the current operational state of the vehicle. Note that each gauge provides an independent indicator of performance: the speedometer tells how fast the vehicle is moving, the tachometer indicates RPMs and the voltmeter is an indicator of charge.

Although the vehicle’s dashboard alerts the driver to conditions surrounding the operation of the vehicle, it seldom tells the underlying cause of an abnormal reading. A low-voltage reading, for example, could indicate a bad battery, a bad alternator or some other problem. Some level of exploration is required to determine the actual cause of the abnormal reading in order to make a reasonable decision on the corrective course of action.

In a similar vein, business users need to understand the reasons behind the KPI results displayed in reporting dashboards for decision making.

Most reporting dashboards serve as a launch pad to access the underlying detail. The detail behind a KPI is usually accessed through a hot link to a report. The initial report often contains links to more reports for additional detail that, in turn, may link to even more reports. Cross-tabs/pivot tables/online analytical processing (OLAP), spreadsheets and charts may

be leveraged within the reports or as separately linked products/interfaces in the sequence.

The tension comes in trying to navigate from summary to detail and



in trying to correlate across the different dimensions and indicators.

## Analytical Dashboards

Analytical dashboards represent a new approach to dashboards. Rather than hide the details from the dashboard, an analytical dashboard is capable of representing a vast amount of information all at once. By using business visualization techniques, summaries and details can be selected and correlated on one screen in real time. A single visual interface can be used to empower users to engage in a discovery process with their information, eliminating the need for the user to integrate reports, spreadsheets, charts and other tools.

Analytical dashboards provide the understanding of *why* KPIs are as they are, what trends are driving them and

what really matters. They empower business users to navigate and interpret underlying KPI detail, replacing complex pivot table interfaces and the need to string together “reporting threads” that lack flexibility and present navigational challenges for business users.

### Key Features of Analytical Dashboards

Analytical dashboards go significantly beyond current dashboards, charting or OLAP. Key features of analytical dashboards include:

- **Big picture and all the details:** An analytical dashboard is not just an output report – it’s an interactive console. It shows the big picture while also presenting the details. There is no need to transition to another report, slice and

dice a cube or perform a database query to access the detail.

- **Navigation with one interface:** Drill down in traditional reports and graphical front ends tends to be an art that few can master – typically involving layers of KPIs, down through OLAP tables, through to reports to the critical pieces of data. Then, if you don’t hit the right piece of data, it’s back up, over and down again. An analytical dashboard enables summary-to-detail navigation – all in one interactive interface with the flexibility to navigate “sideways” and take slices at any point in the analysis without having to backtrack.
- **Correlation and discovery:** The core to analysis is understanding causal relationships across the intersection of multiple variables. Analytical dashboards are unique in their ability to accomplish this from an intuitive graphical interface. They allow the end user to select subsets of multiple dimensions directly from the visualizations in the dashboard and then see the resultant intersection immediately in the same viewing screen. The user is able to compare selected subsets with each other and against the whole – a critical step in determining which path(s) to take to obtain their answer. This unique capability enables a dashboard viewer to perform powerful what-if exploratory analysis without ever leaving the analytical dashboard and discover key insights critical to business decision making.
- **More information:** Analytical dashboards can display tens of thousands to millions of data elements simultaneously. Details are not lost in the summarization – they are right there in the display.
- **Results export:** Getting the answer is step one. Exporting it into standard reports or operational systems is step two. Analytical dashboards are designed to facilitate action on insight through the export of results to other systems.

In essence, a properly structured



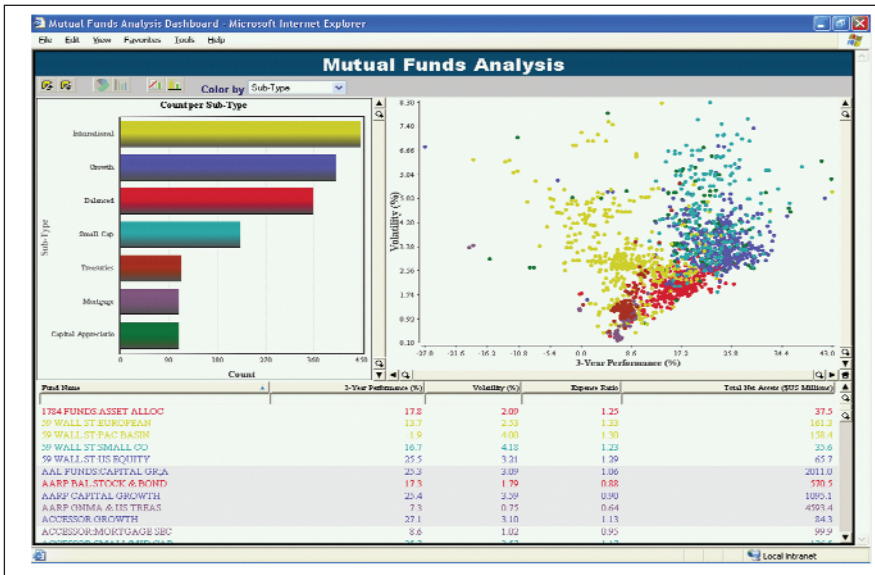


Figure 1: Analytical Dashboard

analytical dashboard enables “self service” analysis by many people across an organization. Such analysis is performed intuitively by an end user whenever he or she needs it – without delay and without intervention by IT or other groups.

The interactive nature of the analytical dashboard facilitates exploring and navigating through business data in an ad hoc manner – essentially ad hoc queries against a preset structure.

The ability to perform guided analysis empowers the user to gain fact-based understanding of issues previously hidden in the BI information assets. This drives more accurate and timely decision making and relieves much of the burden associated with analyzing static reports.

Typically, three types of users engage with analytical dashboards. First and foremost are *dashboard authors*. These are the core analysts who understand the business objectives, the critical measures and performance indicators, and have the knowledge of how to apply reports and dashboards to best represent results to a variety of stakeholders. They have an intuitive understanding of how to apply visualization, graphics and reports to key data sets to create the best representations for the organization. They work with componentized tools that allow them to quickly prototype, test and deploy their reports and dashboards.

*Business analysts and power users* come next. Each organization has a limited number of highly skilled and focused analysts who are adept at solving the “tough” questions and problems. In some cases, these people will also be the dashboard authors. In other cases, they will take the structured dashboards and enhance, rework or recreate them by applying additional components and analytical techniques to answer their particular questions.

*Dashboard viewers* represent the majority of the users in most organizations. They are business executives, line managers, store owners, front-line workers and a variety of others who need to see critical information in an easy-to-digest format, but also need the ability to interrogate it and get answers to their questions as situations and conditions change. Analytical dashboards provide a unique and highly valuable capability to provide and communicate the right fact-based

answers for this group.

While each of these types of users has very different needs and different levels of day-to-day interactions with the analytical dashboards, they all interact. Therefore, it is critical that they have a common tool with a consistent look and feel, and the ability to share and communicate results.

### An Example

A financial planner might start with an analytical dashboard similar to that shown in Figure 1. In this example, a bar chart shows the number of funds in the portfolio by category, a scatter plot shows risk versus return for the individual funds, and a data sheet lists individual funds and their details.

There is definite value even if this were just a static report – the simple display of several dimensions on one screen with consistent coloring reveals the following insights: higher returns involve higher risk (there are no funds in the bottom right-hand corner of the scatter plot – there are no funds that offer high rates of return for no risk), and international funds produced poor returns relative to risk (the color gold represents international funds – these are visible in the upper-left quadrant of the scatter plot; high risk and low returns).

However, the financial planner’s situation is greatly enhanced if he or she is given the ability to interact with and change the dashboard in real time to answer client questions. This enables the planner to answer questions during a live conversation (as opposed to contacting the client with answers once he/she has retrieved and reviewed new reports).

If this were an analytical dash-

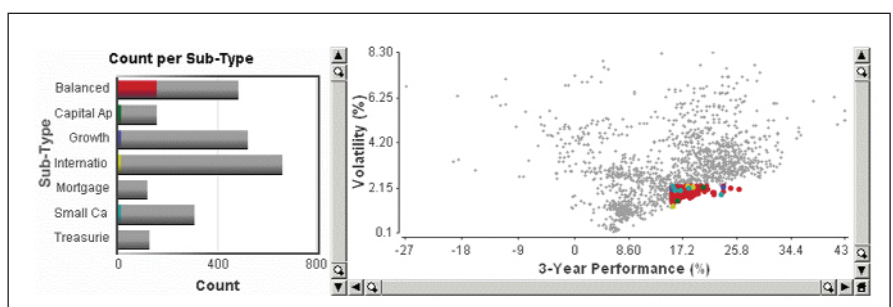


Figure 2: Target Risk/Return Profile

board, the financial planner would simply click and drag a rectangle around points in the scatter plot that represent funds with a target risk/return profile. This would immediately highlight the mix of fund categories in the bar chart, and would show that balanced funds offer a good rate of return for moderate risk (see Figure 2).

Then, by clicking to remove the “grayed” data, the financial planner would drill down to a chosen subset of best performers in the target profile. In this case, Fidelity, Vanguard, Merrill and Dodge offer large balanced funds with reasonable rates of return for moderate risk (Figure 3). Using an analytical dashboard, the financial planner has shown his or her client the facts behind the fund recommendation in a clear and compelling manner.

In this example, the financial planner has easily navigated through a number of multidimensional characteristics (risk, return, type, assets). The financial planner has shown the big picture (with the bar chart showing a categorized roll-up of the funds), while at the same time presenting the details (the individual funds in the scatterplot with attributes in the table). Big patterns and small anomalies can be seen simultaneously.

The same analysis could have been performed using other business intelligence techniques, but execution would be much more difficult. It would also be much more difficult for the typical client to understand the financial planner’s analysis.

For example, OLAP and/or pivot tables could be used. However, the data would first need to be organized into dimensions and measures for OLAP. The user would need to read across various attributes and attempt to “see” the patterns, but they are not obvious (see Figure 4).

With pivot tables and OLAP, the financial planner can also drill down to see further details, but it is quite difficult to see where the interesting details are – such as outliers in the mortgage funds, or that the balanced funds are tightly grouped together, or that the largest funds (by net assets) tend to be growth funds. While it is

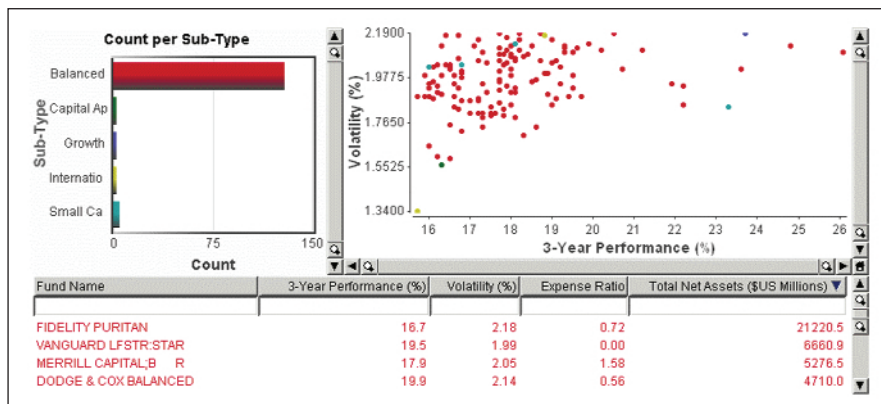


Figure 3: Drill Down

Sub-Type	Count of Fund Name	Average of 3-Year Performance (%)	Average of Volatility (%)	Average of Total Net Assets (\$US Millions)
Balanced	480	16.39	2.04	467.71
Capital Appreciation	153	19.77	4.01	565.22
Growth	521	23.10	3.52	887.73
International	657	7.55	3.01	362.43
Mortgage	115	6.92	0.95	489.70
Small Cap	304	22.25	4.47	342.98
Treasuries	123	7.89	1.49	276.39
Grand Total	2353	15.51	2.95	512.61


Figure 4: Pivot Table

possible that using the correct descriptive statistics might reveal some of these patterns, the analytical dashboard makes these patterns immediately visible and easily accessed without any statistical knowledge.

Traditional dashboards or reports could also be used by the financial planner. However, such tools would require the client to view various disconnected charts that are not interactive and do not facilitate selection and drill down. The client would not be able to isolate details, nor would the client be able to see where those occurred at the big-picture level. The financial planner’s strategic discussion with the client would be far less informative and far more difficult.

### Benefits of Analytical Dashboards

Analytical dashboards make BI solutions better. They complement other analysis and reporting tools by helping people across an organization

cut through the clutter to find the information they really need in the glut of reports they deal with every day. The benefits are better decisions made faster, with results communicated more easily and clearly. 

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