Microsoft® Excel® Dashboards & Reports

for dummies®
A Wiley Brand

Microsoft® Excel® Dashboards & Reports

4th Edition

by Michael Alexander

for dummies®
A Wiley Brand

Microsoft® Excel® Dashboards & Reports For Dummies®, 4th Edition

Published by: **John Wiley & Sons, Inc.,** 111 River Street, Hoboken, NJ 07030-5774, www.wiley.com

Published simultaneously in Canada

Library of Congress Control Number: 2022931501

ISBN 978-1-119-84439-6 (pbk); ISBN 978-1-119-84440-2 (ebk); ISBN 978-1-119-84441-9 (ebk)

Contents at a Glance

Table of Contents

Introduction

The term *business intelligence* (BI), coined by Howard Dresner of Gartner, Inc., describes the set of concepts and methods to improve business decision-making by using fact-based support systems. Practically speaking, BI is what you get when you analyze raw data and turn that analysis into knowledge. BI can help an organization identify cost-cutting opportunities, uncover new business opportunities, recognize changing business environments, identify data anomalies, and create widely accessible reports.

Over the past few years, the BI concept has overtaken corporate executives who are eager to turn impossible amounts of data into knowledge. As a result of this trend, whole industries have been created. Software vendors that focus on BI and dashboarding are coming out of the woodwork. New consulting firms touting their BI knowledge are popping up virtually every week. And even the traditional enterprise solution providers, like Business Objects and SAP, are offering new BI capabilities.

This need for BI has manifested itself in many forms. Most recently, it has come in the form of dashboard fever. Dashboards are reporting mechanisms that deliver business intelligence in a graphical form.

Maybe *you've* been hit with dashboard fever. Or maybe your manager is hitting you with dashboard fever. Nevertheless, you're probably holding this book because you're being asked to create BI solutions (that is, dashboards) in Excel.

Although many IT managers would scoff at the thought of using Excel as a BI tool, Excel is inherently part of the enterprise BI tool portfolio. Whether or not IT managers are keen to acknowledge it, most of the data analysis and reporting done in business today is done by using a spreadsheet. You have several significant reasons to use Excel as the platform for your dashboards and reports, including

- **Tool familiarity:** If you work in corporate America, you are conversant in the language of Excel. You can send even the most seasoned of senior vice presidents an Excel-based reporting tool and trust that they will know what to do with it. With an Excel reporting process, your users spend less time figuring out how to use the tool and more time looking at the data.

- **Built-in flexibility:** In most enterprise dashboarding solutions, the capability to perform analyses outside the predefined views is either disabled or unavailable. How many times have you dumped enterprise-level data into Excel so that you can analyze it yourself? I know I have. You can bet that if you give users an inflexible reporting mechanism, they'll do what it takes to create their own usable reports. In Excel, features such as pivot tables, autofilters, and Form controls let you create mechanisms that don't lock your audience into one view. And because you can have multiple worksheets in one workbook, you can give your audience space to do their own side analysis as needed.
- **Rapid development:** Building your own reporting capabilities in Excel can liberate you from the IT department's resource and time limitations. With Excel, not only can you develop reporting mechanisms faster, but you also have the flexibility to adapt more quickly to changing requirements.
- **Powerful data connectivity and automation capabilities:** Excel is not the toy application some IT managers make it out to be. With its own native programming language and its robust object model, Excel can be used to automate processes and can import data from a wide range of external data sources. With a few advanced techniques, you can make Excel a hands-off reporting mechanism that practically runs on its own.
- **Little to no incremental costs:** Not all of us can work for multibillion-dollar companies that can afford enterprise-level reporting solutions. In most companies, funding for new computers and servers is limited, let alone funding for expensive BI reporting packages. For those companies, leveraging Microsoft Office is frankly the most cost-effective way to deliver key business reporting tools without compromising too deeply on usability and functionality.

All that being said, it's true that Excel has so many reporting functions and tools that it's difficult to know where to start. Enter your humble author, spirited into your hands via this book. Here, I show you how you can turn Excel into your own personal BI tool. Using a few fundamentals and some of the new BI functionality that Microsoft has included in this latest version of Excel, you can go from reporting data with simple tables to creating meaningful reporting components that are sure to wow management.

About This Book

The goal of this book is to show you how to leverage Excel functionality to build and manage better reporting mechanisms. Each chapter in this book provides a comprehensive review of the technical and analytical concepts that help you

create better reporting components — components that can be used for both dashboards and reports. It's important to note that this book is not a guide to visualizations or dashboarding best practices — although those subjects are worthy of their own book. This book is focused on the technical aspects of using Excel's various tools and functionality and applying them to reporting.

The chapters in this book are designed to be standalone chapters that you can selectively refer to as needed. As you move through this book, you'll be able to create increasingly sophisticated dashboard and report components. After reading this book, you'll be able to

- Analyze large amounts of data and report them in a meaningful way.
- Gain better visibility into data from different perspectives.
- Quickly slice data into various views on the fly.
- Automate redundant reporting and analyses.
- Create interactive reporting processes.

This book covers features released as of the October 2021 update of Office 365. The functionality covered here is available to those on Office 365 subscriptions and those using the standalone (perpetual license) version of Office/Excel 2021 for the desktop. Please note that this book is not applicable to Microsoft Excel for Mac.

Excel is available in several versions, including a web version and a version for tablets and phones. Though this book was written for the desktop version of Excel, much of the information here will also apply to the web and tablet versions.

Over the last few years, Microsoft has adopted an agile release cycle, releasing updates to Office 365 practically on a monthly basis. This is great news for those who love seeing new features added to Excel. It's not so great if you're trying to document the features of these tools in a book.

Microsoft will likely continue to add new bells and whistles to Excel at a rapid pace after this book is published. So you may encounter new functionality not covered in this book. That said, Excel has a broad feature set, much of which is stable and here to stay. So, even though changes will be made to Excel, they won't be so drastic as to turn this book into a doorstop. The core functionality covered in this book will remain relevant — even if the mechanics change a bit.

Foolish Assumptions

I make three assumptions about you as the reader. I assume that you

- Have already installed Microsoft Excel.
- Have some familiarity with the basic concepts of data analysis, such as working with tables, aggregating data, and performing calculations.
- Have a strong grasp of basic Excel concepts such as managing table structures, creating formulas, referencing cells, filtering, and sorting.

Icons Used in This Book

As you read this book, you'll see icons in the margins that indicate material of interest (or not, as the case may be).This section briefly describes each icon in this book.


TIP

Tips are nice because they help you save time or perform a task without having to do a lot of extra work. The tips in this book are time-saving techniques or pointers to resources that you should try in order to get the maximum benefit from Excel.


WARNING

Try to avoid doing anything marked with a Warning icon, which (as you might expect) represents a danger of one sort or another.


TECHNICAL STUFF

Whenever you see this icon, think *advanced* tip or technique. You might find these tidbits of useful information too boring for words, or they could contain the solution you need to get a program running. Skip these bits of information whenever you like.


REMEMBER

If you don't get anything else out of a particular chapter or section, remember the material marked by this icon. This text usually contains an essential process or a bit of information you ought to remember.

Beyond the Book

In addition to the book you have in your hands, you can access some extra content online. Check out the free Cheat Sheet for tips on adding symbol fonts to your Excel dashboards and reports, as well as a list of online resources for even more

information on Excel dashboards and reports. Just go to www.dummies.com and type **Microsoft Excel Dashboards & Reports For Dummies Cheat Sheet** in the Search box.

If you want to follow along with the examples in this book, you can download the sample files at www.dummies.com/go/exceldashboardsreportsfd4e. The files are organized by chapter.

Where to Go from Here

It's time to start your Excel dashboarding adventure! If you're a complete dashboard novice, start with Chapter 1 and progress through the book at a pace that allows you to absorb as much of the material as possible. If you've got the basics down and you're interested in advanced charting techniques that help create meaningful visualizations, skip to Part 3. Turn to Part 4 for an in-depth look at turning your basic dashboards into macro-driven interactive reporting.

1

Getting Started with Excel Dashboards and Reports

IN THIS PART . . .

Discover how to think about your data in terms of creating effective dashboards and reports and get a solid understanding of the fundamentals and basic ground rules for creating effective dashboards and reports.

Uncover the best practices for setting up the source data for your dashboards and reports and explore the key Excel functions that help you build effective dashboard models.

Explore how pivot tables can enhance your analytical and reporting capabilities as well as your dashboards.

Dive into Power Query and explore some of the ways to incorporate external data into your reporting mechanisms.

IN THIS CHAPTER

- Comparing dashboards to reports
- Getting started on the right foot
- Dashboarding best practices

Chapter 1

Getting in the Dashboard State of Mind

In his song "New York State of Mind," Billy Joel laments the differences between California and New York. In this homage to the Big Apple, he implies a mood and a feeling that come with thinking about New York. I admit it's a stretch, but I'll extend this analogy to Excel — don't laugh.

In Excel, the differences between building a dashboard and creating standard table-driven analyses are as great as the differences between California and New York. To approach a dashboarding project, you truly have to get into the dashboard state of mind. As you'll come to realize in the next few chapters, dashboarding requires far more preparation than standard Excel analyses. It calls for closer communication with business leaders, stricter data modeling techniques, and the following of certain best practices. It's beneficial to have a base familiarity with fundamental dashboarding concepts before venturing off into the mechanics of building a dashboard.

In this chapter, you get a solid understanding of these basic dashboard concepts and design principles as well as what it takes to prepare for a dashboarding project.

Defining Dashboards and Reports

It isn't difficult to use *report* and *dashboard* interchangeably. In fact, the line between reports and dashboards frequently gets muddied. I've seen countless reports referred to as dashboards just because they included a few charts. Likewise, I've seen many examples of what could be considered dashboards but have been called reports.

Now, this may all seem like semantics to you, but it's helpful to clear the air and understand the core attributes of what are considered to be reports and dashboards.

Defining reports

The report is probably the most common application of business intelligence. A *report* can be described as a document that contains data used for reading or viewing. It can be as simple as a data table or as complex as a subtotaled view with interactive drill-downs, similar to Excel's Subtotal or Pivot Table functionality.

The key attribute of a report is that it doesn't lead a reader to a predefined conclusion. Although reports can include analysis, aggregations, and even charts, reports often allow for the end users to apply their own judgment and analysis to the data.

To clarify this concept, Figure 1-1 shows an example of a report. This report shows the National Park overnight visitor statistics by period. Although this data can be useful, it's clear this report isn't steering the reader toward any predefined judgment or analysis; it's simply presenting the aggregated data.

	A	B	C	D	E	F
4		Number of Visitors (thousands)				
5		2009	2010	2011	2012	2013
6	Great Smoky Mountains NP	9,198	9,316	9,367	9,167	9,192
7	Grand Canyon NP	4,105	4,002	4,125	4,326	4,402
8	Yosemite NP	3,369	3,362	3,379	3,281	3,304
9	Olympic NP	3,416	3,691	3,225	3,074	3,143
10	Yellowstone NP	2,759	2,974	3,019	2,868	2,836
11	Rocky Mountain NP	3,140	2,988	3,067	2,782	2,798
12	Cuyahoga Valley NP	3,123	3,218	2,880	3,306	2,534
13	Zion NP	2,218	2,593	2,459	2,677	2,587
14	Grand Teton NP	2,535	2,613	2,356	2,360	2,463
15	Acadia NP	2,517	2,559	2,431	2,208	2,051
16	Glacier NP	1,681	1,906	1,664	2,034	1,925
17	Hot Springs NP	1,297	1,440	1,561	1,419	1,340
18	Hawaii Volcanoes NP	1,343	1,111	992	1,307	1,661

FIGURE 1-1: Reports present data for viewing but don't lead readers to conclusions.

Defining dashboards

A *dashboard* is a visual interface that provides at-a-glance views into key measures relevant to a particular objective or business process. Dashboards have three main attributes:

- Dashboards are typically graphical in nature, providing visualizations that help focus attention on key trends, comparisons, and exceptions.
- Dashboards often display only data that are relevant to the goal of the dashboard.
- Because dashboards are designed with a specific purpose or goal, they inherently contain predefined conclusions that relieve the end user from performing his own analysis.

Figure 1-2 illustrates a dashboard that uses the same data shown in Figure 1-1. This dashboard displays key information about the national park overnight-visitor stats. As you can see, this presentation has all the main attributes that define a dashboard. First, it's a visual display that allows you to quickly recognize the overall trending of the overnight-visitor stats. Second, you can see that not all the detailed data is shown here — you see only the key pieces of information relevant to support the goal of this dashboard, which in this case would be to get some insights on which parks would need some additional resources to increase visitor rates. Finally, by virtue of its objective, this dashboard effectively presents you with analysis and conclusions about the trending of overnight visitors.

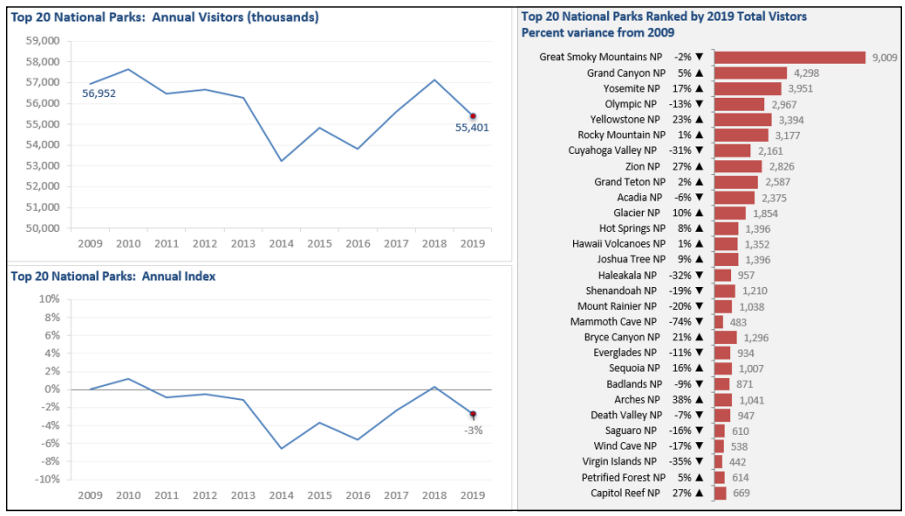

FIGURE 1-2: Dashboards provide at-a-glance views into key measures relevant to a particular objective or business process.

Preparing for Greatness

Imagine that your manager asks you to create a dashboard that tells him everything he should know about monthly service subscriptions. Do you jump to action and slap together whatever comes to mind? Do you take a guess at what he wants to see and hope it's useful? These questions sound ridiculous, but these types of situations happen more than you think. I'm continually called to create the next great reporting tool but am rarely provided the time to gather the true requirements for it. Between limited data and unrealistic deadlines, the end product often ends up being unused or having little value.

This brings me to one of the key steps in preparing for dashboarding: collecting user requirements.

In the non-IT world of the Excel analyst, user requirements are practically useless because of sudden changes in project scope, constantly changing priorities, and shifting deadlines. The gathering of user requirements is viewed to be a lot of work and a waste of valuable time in the ever-changing business environment. But as I mention at the start of this chapter, it's time to get into the dashboard state of mind.

Consider how many times a manager has asked you for an analysis and then said "No, I meant this." Or "Now that I see it, I realize I need this." As frustrating as this can be for a single analysis, imagine running into it again and again during the creation of a complex dashboard with several data integration processes. The question is, would you rather spend your time on the front end gathering user requirements or spend time painstakingly redesigning the dashboard you'll surely come to hate?

The process of gathering user requirements doesn't have to be an overly complicated or formal one. Here are some simple things you can do to ensure you have a solid idea of the purpose of the dashboard.

Establish the audience for, and purpose of, the dashboard

Chances are your manager has been asked to create the reporting mechanism and he has passed the task to you. Don't be afraid to ask about the source of the initial request. Talk to the requesters about what they're asking for. Discuss the purpose of the dashboard and the triggers that caused them to ask for a dashboard in the first place. You may find, after discussing the matter, that a simple Excel report meets their needs, foregoing the need for a full-on dashboard.

If a dashboard is indeed warranted, talk about who the end users are. Take some time to meet with a few of the end users to talk about how they'd use the dashboard. Will the dashboard be used as a performance tool for regional managers? Will the dashboard be used to share data with external customers? Talking through these fundamentals with the right people helps align your thoughts and avoids the creation of a dashboard that doesn't fulfill the necessary requirements.

Delineate the measures for the dashboard

Most dashboards are designed around a set of measures, or *key performance indicators (KPIs)*. A KPI is an indicator of the performance of a task deemed to be essential to daily operations or processes. The idea is that a KPI reveals performance that is outside the normal range for a particular measure, so it therefore often signals the need for attention and intervention. Although the measures you place into your dashboards may not officially be called KPIs, they undoubtedly serve the same purpose — to draw attention to problem areas.

REMEMBER

The topic of creating effective KPIs for your organization is a subject worthy of its own book and is out of the scope of this endeavor. For a detailed guide on KPI development strategies, pick up David Parmenter's *Key Performance Indicators: Developing, Implementing, and Using Winning KPIs* (Wiley Publishing, Inc.). That book provides an excellent step-by-step approach to developing and implementing KPIs.

The measures used on a dashboard should absolutely support the initial purpose of that dashboard. For example, if you're creating a dashboard focused on supply chain processes, it may not make sense to have human resources head-count data incorporated. It's generally good practice to avoid nice-to-know data in your dashboards simply to fill white space or because the data is available. If the data doesn't support the core purpose of the dashboard, leave it out.

TIP

Here's another tip: When gathering the measures required for the dashboard, I find that it often helps to write a sentence to describe the measure needed. For example, rather than simply add the word *Revenue* into my user requirements, I write what I call a *component question*, such as "What is the overall revenue trend for the past two years?" I call it a *component question* because I intend to create a single component, such as a chart or a table, to answer the question. For instance, if the component question is "What is the overall revenue trend for the past two years?" you can imagine a chart component answering this question by showing the two-year revenue trend.

I sometimes take this a step further and actually incorporate the component questions into a mock layout of the dashboard to get a high-level sense of the data the dashboard will require. Figure 1-3 illustrates an example.

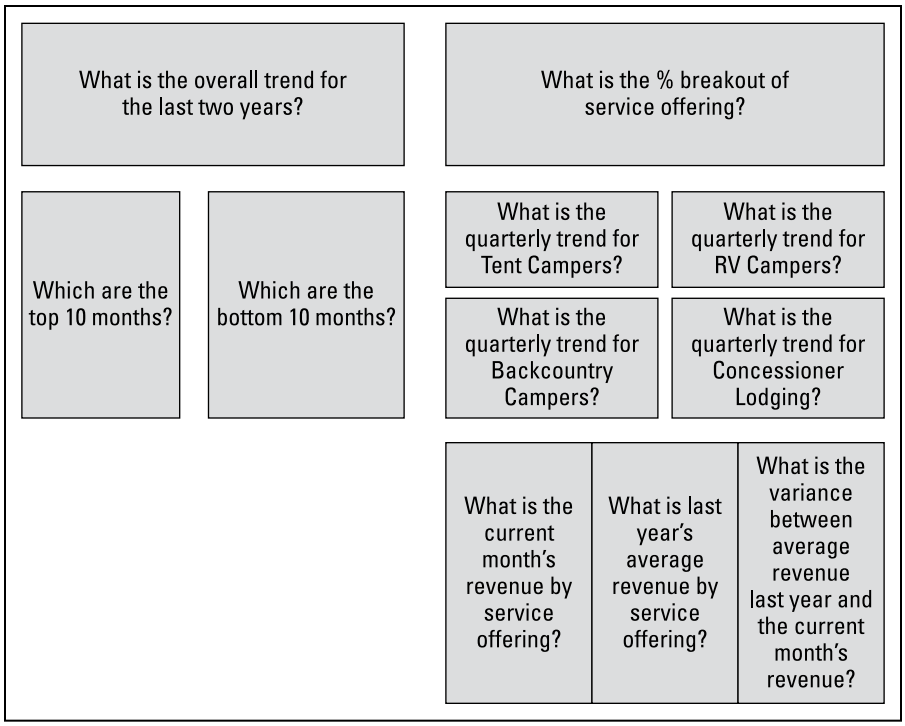

FIGURE 1-3: Each box in this dashboard layout mockup represents a component and the type of data required to create the measures.

Each box in this dashboard layout mockup represents a component on the dashboard and its approximate position. The questions within each box provide a sense of the types of data required to create the measures for the dashboard.

Catalog the required data sources

When you have the list of measures that need to be included on the dashboard, it's important to take a tally of the available systems to determine whether the data required to produce those measures is available. Ask yourself the following questions:

- Do you have access to the data sources necessary?
- How often are those data sources refreshed?
- Who owns and maintains those data sources?
- What are the processes to get the data from those resources?
- Does the data even exist?

These are all questions you need answered when negotiating dashboard development time, data refresh intervals, and change management.


TIP

Conventional wisdom says that the measures on your dashboard shouldn't be governed by the availability of data. Instead, you should let dashboard KPIs and measures govern the data sources in your organization. Although I agree with the spirit of that statement, I've been involved in too many dashboard projects that have fallen apart because of lack of data. Real-world experience has taught me the difference between the *ideal* and the *ordeal*.

If your organizational strategy requires that you collect and measure data that is nonexistent or not available, press Pause on the dashboard project and turn your attention to creating a data collection mechanism that will get the data you need.

Define the dimensions and filters for the dashboard

In the context of reporting, a *dimension* is a data category used to organize business data. Examples of dimensions are Region, Market, Branch, Manager, or Employee. When you define a dimension in the user requirements stage of development, you're determining how the measures should be grouped or distributed. For example, if your dashboard should report data by employee, you need to ensure that your data collection and aggregation processes include employee detail. As you can imagine, adding a new dimension after the dashboard is built can get complicated, especially when your processes require many aggregations across multiple data sources. The bottom line is that locking down the dimensions for a dashboard early in the process definitely saves you headaches.

Along those same lines, you want to get a clear sense of the types of filters that are required. In the context of dashboards, *filters* are mechanisms that allow you to narrow the scope of the data to a single dimension. For example, you can filter on Year, Employee, or Region. Again, if you don't account for a particular filter while building your dashboarding process, you'll likely be forced into an unpleasant redesign of both your data collection processes and your dashboard.

If you're confused by the difference between dimensions and filters, think about a simple Excel table. A dimension is like a column of data (such as a column containing employee names) in an Excel table. A filter, then, is the mechanism that allows you to narrow your table to show only the data for a particular employee. For example, if you apply Excel's AutoFilter to the Employee column, you are building a filter mechanism into your table.