

Microsoft® Excel®

Dashboards & Reports

Michael Alexander
& John Walkenbach

1	Commission Rate	5.00%	Improvement from last month				
2	Sales Goal	500,000					
3	Bonus Rate	6.50%	Paid if Sales Goal is attained				
4							
5	Sales Rep	Last Month	This Month	Change	Pct. Change	Met Goal?	Commission
6	Murray	101,233	108,444	7,211	7.1%	TRUE	7,049
7	Knuckles	120,933	108,434	-12,499	-10.3%	FALSE	5,964
8	Lefty	139,832	165,901	26,069	18.6%	TRUE	10,784
9	Lucky	98,323	100,083	1,760	1.8%	FALSE	5,505
10	Scarface	78,322	79,923	1,601	2.0%	FALSE	4,396
11	Total	538,643	562,785	24,142	4.5%		33,697
12							
13	Average Commission Rate:		5.99%				

1	0.055						
2	0.15						
3	0.065						
4							
5							
6	101233	=B6/B5		=D6/B6	=E6>=\$B\$3	=F{F6	
7	120933	=B7/B5		=D7/B7	=E7>=\$B\$3	=F{F7	
8	139832	=B8/B5		=D8/B8	=E8>=\$B\$3	=F{F8	
9	98323	=B9/B5		=D9/B9	=E9>=\$B\$3	=F{F9	
10	78322	=B10/B5		=D10/B10	=E10>=\$B\$3	=F{F10	
11	=SUM(B6:B10)	=SUM(C6:C10)	=SUM(D6:D10)	=D11/B11		=SUM	
12							

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2nd Edition

by Michael Alexander and John Walkenbach

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Dedication

This is dedicated to the fans of `DataPigTechnologies.com`...all twelve of you.

Michael Alexander

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My deepest thanks to Katie Mohr and Pat O'Brien, for all the hours of work put into making this book as clear as it can be. Thanks also to the brilliant team of professionals who helped bring this book to fruition. Finally, a special thank you goes to my family for putting up with all the time spent away on this project.

Michael Alexander

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INTRODUCTION

Business intelligence (BI) is what you get when you analyze raw data and turn that information into actionable 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.

The BI concept is overtaking corporate executives who are eager to turn impossible amounts of data into useful knowledge. As a result of this trend, software vendors who focus on BI and build dashboards are coming out of the woodwork. Dashboards are ideal mechanisms for delivering this targeted information in a graphical, user-friendly form. 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 presented in a dashboard format.

So maybe you've been hit with dashboard fever? Or maybe you're holding this book because someone is asking you to create BI solutions (that is, create a dashboard) in Excel.

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

- **Familiarity with Excel:** If you work in corporate America, you're conversant in the language of Excel. You can send even the most seasoned senior vice-president an Excel-based presentation and trust he'll know what to do with it. With an Excel dashboard, your users spend less time figuring how to use the tool and more time viewing the data.
- **Built-in flexibility:** With most enterprise dashboards, the ability to analyze the data outside of the predefined views is either disabled or unavailable. In Excel, features such as pivot tables, drop-down lists, and other interactive controls (such as a check box) don't lock your audience into one view. And because an Excel workbook contains multiple worksheets, the users have space to add their own data analysis as needed.

- **Rapid development:** Using Excel to build your own dashboards can liberate you from assorted resource and time limitations from within an organization. With Excel, you can develop dashboards faster and adapt more quickly to changing business 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 help to automate certain processes and even connect with various data sources. With a few advanced techniques, your dashboard can practically run on its own.
- **Little to no incremental costs:** Not all of us can work for multi-billion 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 dashboard software packages. For those companies, Excel is frankly the most cost-effective way to deliver key business reporting tools without compromising too deeply on usability and function.

Excel contains so many functions and features that it's difficult to know where to start. Enter your humble authors, spirited into your hands via this book. Here we show you how you can turn Excel into your own personal BI tool. With a few fundamentals and some of the new BI functionality Microsoft has included in this latest version of Excel, you can go from reporting data with simple tables to creating meaningful dashboards sure to wow everyone.

What You Need to Know

The goal of this book is to show you how to leverage Excel functionality to build and manage better presentations. Each chapter in this book provides a comprehensive review of Excel functions and features, and the analytical concepts that will help you create better reporting components — components that can be used for both dashboards and reports. As you move through this book, you'll be able to create increasingly sophisticated components.

After reading this book, you'll be able to:

- Analyze large amounts of data and report those results in a meaningful way.
- Get better visibility into data from different perspectives.
- Add interactive controls to show various views.
- Automate repetitive tasks and processes.
- Create eye-catching visualizations.
- Create impressive dashboards and What-If analyses.
- Access external data sources to expand your message.

What You Need to Have

In order to get the most out of this book, it's best that you have certain skills before diving into the topics highlighted in this book. The ideal candidate for this book will have the following:

- Some experience working with data and familiarity with the basic concepts of data analysis such as working with tables, aggregating data, and performing calculations
- Experience using Excel with a strong grasp of concepts such as table structures, filtering, sorting, and using formulas

Conventions in This Book

Take a minute to skim this section and become familiar with some of the typographic conventions used throughout this book.

Keyboard conventions

You need to use the keyboard to enter formulas. In addition, you can work with menus and dialog boxes directly from the keyboard — a method you may find easier if your hands are already positioned over the keys.

Formula listings

Formulas usually appear on a separate line in monospace font. For example, we may list the following formula:

```
=VLOOKUP (StockNumber , PriceList , 2 , False)
```

Excel supports a special type of formula known as an array formula. When you enter an array formula, press Ctrl+Shift+Enter (not just Enter). Excel encloses an array formula in brackets in order to remind you that it's an array formula. When we list an array formula, we include the brackets to make it clear that it is, in fact, an array formula. For example:

```
{=SUM (LEN (A1 : A10 ) ) }
```



Note

Do not type the brackets for an array formula. Excel puts them in automatically.

Key names

Names of keys on the keyboard appear in normal type, for example Alt, Home, PgDn, and Ctrl. When you need to press two keys simultaneously, the keys are connected with a plus sign: for example, “Press Ctrl+G to display the Go To dialog box.”

Functions, procedures, and named ranges

Excel’s worksheet functions appear in all uppercase, like so: “Use the SUM function to add the values in column A.”

Macro and procedure names appear in normal type: “Execute the InsertTotals procedure.” We often use mixed upper- and lowercase letters to make these names easier to read. Named ranges appear in *italic*: “Select the InputArea range.”

Unless you’re dealing with text inside quotation marks, Excel is not sensitive to case. In other words, both of the following formulas produce the same result:

```
=SUM (A1 : A50)  
=sum (a1 : a50)
```

Excel, however, will convert the characters in the second formula to uppercase.

Mouse conventions

The mouse terminology in this book is all standard fare: “pointing,” “clicking,” “right-clicking,” “dragging,” and so on. You know the drill.

What the icons mean

Throughout the book, icons appear to call your attention to points that are particularly important.



New Feature

This icon indicates a feature new to Excel 2013.



Note

This icon tells you that something is important — perhaps a concept that may help you master the task at hand or something fundamental for understanding subsequent material.



Tip

This icon indicates a more efficient way of doing something or a technique that may not be obvious. These icons will often impress your officemates.

**On the Web**

This icon indicates that an example file is on the companion website:

www.wiley.com/go/excelldr

**Caution**

We use Caution icons when the operation that we're describing can cause problems if you're not careful.

**Cross-Ref**

We use the Cross-Reference icon to refer you to other chapters that have more to say on a particular topic.

How This Book Is Organized

The chapters in this book are organized into six parts. Each of these parts includes chapters that build on the previous chapters' instruction. The idea is that as you go through each part, you will be able to build dashboards of increasing complexity until you're an Excel dashboarding guru.

Part I: Getting Started with Excel Dashboards

Part I is all about helping you think about your data in terms of creating effective dashboards and reports. Chapter 1 introduces you to the topics of dashboards and reports, defining some of the basic concepts and outlining key steps to take to prepare for a successful project. Chapter 2 shows you how to design effective data tables. Chapter 3 shows you how you can leverage the sparkline functionality found in Excel 2013. Finally, Chapter 4 rounds out this section with a look at the various techniques that you can use to visualize data without the use of charts or graphs.

Part II: Introducing Charts into Your Dashboards

Part II provides a solid foundation in visualizing data using Excel charts. Chapter 5 starts with the basics, introducing you to Excel's charting engine. Chapters 6 and 7 focus on formatting techniques that enable you to build customized charts that fit your distinct needs. After that, Part II takes you beyond basic chart-building with a look at some advanced business techniques that can help make your dashboards more meaningful. Starting with Chapter 8, we demonstrate how to represent trending across multiple series and distinct time periods. In Chapter 9, we explore how best to use charts to group data into meaningful views. And Chapter 10 demonstrates some of charting techniques that can help you display and measure performance against a target. By the end of this section, you will be able to effectively leverage Excel charts to synthesize your data into meaningful visualizations.

Part III: Advanced Dashboarding Concepts

In Part III, we offer an in-depth look at some of the key dashboarding concepts you can leverage to create a cutting-edge dashboard presentation. Chapter 11 shows you how to build an effective data model that provides the foundation upon which your dashboard or report is built. In this chapter, you discover the impact of poorly organized data and how to set up the source data for the most positive outcome. Chapter 12 illustrates how interactive controls can provide your clients with a simple interface, allowing them to easily navigate through and interact with your dashboard or report. Chapter 13 provides a clear understanding of how you can leverage macros to automate your reporting systems.

Part IV: Pivot Table Driven Dashboards

With Part IV, you find out how pivot tables can enhance your analytical and reporting capabilities, as well as your dashboards. In Chapter 14, we introduce you to pivot tables and explore how this Excel feature can play an integral role in Excel-based presentations. Chapter 15 provides a primer on building pivot charts, giving you a solid understanding of how Excel pivot charts work with pivot tables. Chapter 16 shows you how pivot slicers can add interactive filtering capabilities to your pivot reporting. Finally, Chapter 17 introduces you to the new internal Data Model and Power View features of Excel 2013.

Part V: Working with the Outside World

The theme in Part V is importing information from external data sources. Chapter 18 explores some of the ways to incorporate data that doesn't originate in Excel. In this chapter, you learn how to import data from external sources, such as Microsoft Access and SQL Server, as well as create systems that allow for dynamic refreshing of external data sources. Chapter 19 wraps up this look at Excel dashboards and reports by showing you the various ways to distribute and present your work in a safe and effective way.

About the Companion Website

This book contains many examples, and the workbooks for those examples are available on the companion website that is arranged in directories that correspond to the chapters. You can download example files for this book at the following website:

www.wiley.com/go/exceldr

The example workbook files on the website aren't compressed (installation isn't required). These files are all Excel 2007–2013 files.

About the Power Utility Pak Offer

Toward the back of the book, you'll find a coupon that you can redeem for a discounted copy of John Walkenbach's award-winning Power Utility Pak — a collection of useful Excel utilities, plus many new worksheet functions. John developed this package using VBA exclusively.

You can also use this coupon to purchase the complete VBA source code for a nominal fee. Studying the code is an excellent way to pick up some useful programming techniques.

You can download a 30-day trial version of the most-recent version of the Power Utility Pak from John's website:

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http://spreadsheetpage.com
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If you find it useful, use the coupon to purchase a licensed copy at a discount.

Reach Out

We're always interested in getting feedback on our books. The best way to provide this feedback is via e-mail. Send your comments and suggestions to

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mha105@yahoo.com  
john@j-walk.com
```

Unfortunately, we're not able to reply to specific questions. Posting your question to one of the Excel newsgroups is, by far, the best way to get such assistance.

Also, when you're out surfing the web, don't overlook John's website ("The Spreadsheet Page"). You'll find lots of useful Excel information, including tips and downloads. The URL is

```
http://spreadsheetpage.com
```

Now, without further ado, it's time to turn the page and expand your horizons.

PART

I

Getting Started with Excel Dashboards

Chapter 1

Introducing Dashboards

Chapter 2

Table Design Best Practices

Chapter 3

Using Excel Sparklines

Chapter 4

Chartless Visualization Techniques

Introducing Dashboards

In This Chapter

- Defining dashboards and reports
- Determining user requirements
- Establishing visualization and design principles
- Reviewing your dashboard prior to distribution

Creating a dashboard in Excel is not the same as creating a standard table-driven analysis. It's tempting to jump right in and start building away, but a dashboard requires far more preparation than a typical Excel report. It calls for closer communication with business leaders, stricter data modeling techniques, and the following of certain best practices. It's helpful to be familiar with fundamental dashboard concepts before venturing off into the mechanics of building your own. In this chapter, we discuss basic dashboard concepts and design principles and what it takes to prepare for a dashboarding project.



On the Web

All workbook examples that we list in this book are available on this book's companion website at www.wiley.com/go/excelldr.

What Are Dashboards and Reports?

It isn't difficult to use the words *report* and *dashboard* interchangeably. In fact, the line between dashboards and reports frequently gets muddled. We see countless reports that are referred to as dashboards just because they include a few charts. Likewise, we see many examples of what could be considered dashboards but are called reports.

Now this may all seem like semantics to you, but it's helpful to clear the air a bit and understand the core attributes of both dashboards and reports.

Defining reports

Reports are probably the most common way to communicate business intelligence. A *report* can be described as a document that contains data used for viewing and analysis. It can be as simple as a data table (or a database) or as complex as a subtotaled view with interactive drilling.

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

To clarify this concept, Figure 1-1 shows an example of a report. This report shows National Park visitor statistics by year. Although this data can be useful, this report doesn't steer the reader to any predefined conclusions or in any directions; it simply presents the aggregated data.

	A	B	C	D	E	F
4	Number of Visitors (thousands)					
5		2001	2002	2003	2004	2005
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 predefined 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. A dashboard consists of three key attributes.

- Displays data graphically (such as in charts). Provides visualizations that help focus attention on key trends, comparisons, and exceptions.
- Displays only data that is relevant to the goal of the dashboard.
- Contains predefined conclusions relevant to the goal of the dashboard and relieves the reader from having to perform her own analysis.

Figure 1-2 illustrates a dashboard that uses the same data shown in Figure 1-1. This dashboard displays information about National Park attendance. As you can see, this presentation has all the key attributes that define a dashboard. First, it's a visual display that allows you to quickly recognize the