Microsoft®

Business Intelligence Tools for Excel® Analysts

Michael Alexander
Jared Decker
Bernard Wehbe

WILEY

Microsoft®

Business Intelligence Tools for Excel® Analysts

Microsoft®

Business Intelligence Tools for Excel® Analysts

by Michael Alexander, Jared Decker, Bernard Wehbe

WILEY

Microsoft® Business Intelligence Tools for Excel® Analysts

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

Copyright © 2014 by John Wiley & Sons, Inc., Hoboken, New Jersey

Published simultaneously in Canada

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise, except as permitted under Sections 107 or 108 of the 1976 United States Copyright Act, without the prior written permission of the Publisher. Requests to the Publisher for permission should be addressed to the Permissions Department, John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030, (201) 748-6011, fax (201) 748-6008, or online at http://www.wiley.com/go/permissions.

Trademarks: Wiley and the Wiley logo are trademarks or registered trademarks of John Wiley & Sons, Inc. and/or its affiliates in the United States and other countries and may not be used without written permission. Microsoft and Excel are registered trademarks of the Microsoft Corporation. All other trademarks are the property of their respective owners. John Wiley & Sons, Inc. is not associated with any product or vendor mentioned in this book.

LIMIT OF LIABILITY/DISCLAIMER OF WARRANTY: THE PUBLISHER AND THE AUTHOR MAKE NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO THE ACCURACY OR COMPLETENESS OF THE CONTENTS OF THIS WORK AND SPECIFICALLY DISCLAIM ALL WARRANTIES, INCLUDING WITHOUT LIMITATION WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE. NO WARRANTY MAY BE CREATED OR EXTENDED BY SALES OR PROMOTIONAL MATERIALS. THE ADVICE AND STRATEGIES CONTAINED HEREIN MAY NOT BE SUITABLE FOR EVERY SITUATION. THIS WORK IS SOLD WITH THE UNDERSTANDING THAT THE PUBLISHER IS NOT ENGAGED IN RENDERING LEGAL, ACCOUNTING, OR OTHER PROFESSIONAL SERVICES. IF PROFESSIONAL ASSISTANCE IS REQUIRED, THE SERVICES OF A COMPETENT PROFESSIONAL PERSON SHOULD BE SOUGHT. NEITHER THE PUBLISHER NOR THE AUTHOR SHALL BE LIABLE FOR DAMAGES ARISING HEREFROM. THE FACT THAT AN ORGANIZATION OR WEBSITE IS REFERRED TO IN THIS WORK AS A CITATION AND/OR A POTENTIAL SOURCE OF FURTHER INFORMATION DOES NOT MEAN THAT THE AUTHOR OR THE PUBLISHER ENDORSES THE INFORMATION THE ORGANIZATION OR WEBSITE MAY PROVIDE OR RECOMMENDATIONS IT MAY MAKE. FURTHER, READERS SHOULD BE AWARE THAT INTERNET WEBSITES LISTED IN THIS WORK MAY HAVE CHANGED OR DISAPPEARED BETWEEN WHEN THIS WORK WAS WRITTEN AND WHEN IT IS READ. FULFILLMENT OF EACH COUPON OFFER IS THE SOLE RESPONSIBILITY OF THE OFFEROR.

For general information on our other products and services, please contact our Customer Care Department within the U.S. at 877-762-2974, outside the U.S. at 317-572-3993, or fax 317-572-4002. For technical support, please visit www.wiley.com/techsupport.

Wiley publishes in a variety of print and electronic formats and by print-on-demand. Some material included with standard print versions of this book may not be included in e-books or in print-on-demand. If this book refers to media such as a CD or DVD that is not included in the version you purchased, you may download this material at http://booksupport.wiley.com. For more information about Wiley products, visit www.wiley.com.

Library of Congress Control Number: 2013954104

ISBN 978-1-118-82152-7 (pbk); ISBN 978-1-118-82156-5 (ebk); ISBN 978-1-118-82155-8 (ebk)

Manufactured in the United States of America

10 9 8 7 6 5 4 3 2 1

About the Authors

Mike Alexander is a Microsoft Certified Application Developer (MCAD) and author of several books on advanced business analysis with Microsoft Access and Excel. He has more than 16 years' experience consulting and developing Office solutions. Mike has been named a Microsoft MVP for his ongoing contributions to the Excel community. You can visit Mike at `www.datapigtechnologies.com`, where he regularly shares Excel and Access tips and techniques.

Jared Decker has over fourteen years of experience in the IT industry and ten years of consulting experience focused exclusively on data warehousing and business intelligence. In addition to playing an architect or lead role on dozens of projects, he has spent more than five hundred hours in-house with corporations training their development teams on the Microsoft SQL Server, Tableau, and QlikView BI platforms. His breadth of experience entails everything from architecture and design to system implementation, with particular focus on business analytics and data visualization. Jared holds technical certifications in Microsoft (MCITP Business Intelligence Developer and certified trainer), Tableau Developer, and QlikView Developer and Trainer.

Bernard Wehbe has over 14 years of consulting experience focused exclusively on data warehousing, analytics, and business intelligence. His experience includes data warehousing architecture, OLAP, data modeling, ETL, reporting, business analysis, team leadership, and project management. Prior to founding StatSlice Systems, Bernard served as a technical architect for Hitachi Consulting in the Dallas, TX area.

Publisher's Acknowlegments

Sr. Acquisitions Editor: Katie Mohr

Project Editor: Rebecca Senninger

Copy Editor: Lynn Northrup

Technical Editor: Mike Talley

Editorial Assistant: Anne Sullivan

Sr. Editorial Assistant: Cherie Case

Project Coordinator: Patrick Redmond

Contents at a Glance

Introduction 1

Part I: Leveraging Excel for Business Intelligence

Chapter 1: Important Database Concepts 7
Chapter 2: PivotTable Fundamentals. 19
Chapter 3: Introduction to Power Pivot 47
Chapter 4: Loading External Data into Power Pivot 69
Chapter 5: Creating Dashboards with Power View 93
Chapter 6: Adding Location Intelligence with Power Map 107
Chapter 7: Using the Power Query Add-In. 129

Part II: Leveraging SQL for Business Intelligence

Chapter 8: Essential SQL Server Concepts 157
Chapter 9: Introduction to SQL 181
Chapter 10: Creating and Managing SQL Scripts. 195
Chapter 11: Calling Views and Stored Procedures from Excel 215
Chapter 12: Understanding Reporting Services. 231
Chapter 13: Browsing Analysis Services OLAP Cubes with Excel 249
Chapter 14: Using the Data Mining Add-In for Microsoft Office. 269

Part III: Delivering Business Intelligence with SharePoint and Excel Services

Chapter 15: Publishing Your BI Tools to SharePoint 293
Chapter 16: Leveraging PerformancePoint Services 307

Part IV: Appendixes

Appendix A: Understanding the Big Data Toolset 331
Appendix B: Considerations for Delivering Mobile BI 341

Index 347

Table of Contents

Introduction 1

Part I: Leveraging Excel for Business Intelligence

Chapter 1: Important Database Concepts 7
Traditional Limits of Excel and How Databases Help 8
Scalability 8
Transparency of analytical processes 9
Separation of data and presentation 9
Database Terminology 10
Databases 10
Tables 11
Records, fields, and values 11
Queries 12
How Databases Are Designed 12
Step 1: The overall design — from concept to reality 12
Step 2: Report design 13
Step 3: Data design 13
Step 4: Table design 15

Chapter 2: PivotTable Fundamentals 19
Introducing the PivotTable 19
Anatomy of a PivotTable 20
Creating the basic PivotTable 21
Customizing Your PivotTable 27
Changing the PivotTable layout 27
Renaming the fields 27
Formatting numbers 29
Changing summary calculations 29
Suppressing subtotals 30
Hiding and showing data items 31
Hiding or showing items without data 33
Sorting your PivotTable 35
Understanding Slicers 35
Creating a standard slicer 36
Formatting slicers 37
Controlling multiple PivotTables with one slicer 39
Creating a Timeline Slicer 40
Understanding the Internal Data Model 42
Building out your first Data Model 42
Using your Data Model in a PivotTable 45

Chapter 3: Introduction to Power Pivot 47
Understanding the Power Pivot Internal Data Model 48
Linking Excel Tables to Power Pivot 49
Preparing your Excel tables 50
Adding your Excel tables to the Data Model 51
Creating Relationships Among Your Power Pivot Tables. 53
Creating a PivotTable from Power Pivot Data 56
Enhancing Power Pivot Data with Calculated Columns 57
Creating a calculated column 58
Formatting your calculated columns 60
Referencing calculated columns in other calculations. 60
Hiding calculated columns from end users 60
Utilizing DAX to Create Calculated Columns 61
Identifying DAX functions that are safe for calculated columns. 61
Building DAX-driven calculated columns 63
Understanding Calculated Fields 65

Chapter 4: Loading External Data into Power Pivot 69
Loading Data from Relational Databases. 69
Loading data from SQL Server 70
Loading data from Microsoft Access databases 76
Loading data from other relational database systems. 78
Loading Data from Flat Files. 81
Loading data from external Excel files 82
Loading data from text files. 84
Loading data from the clipboard. 86
Loading Data from Other Data Sources 88
Refreshing and Managing External Data Connections 89
Manually refreshing your Power Pivot data. 89
Setting up automatic refreshing 89
Preventing Refresh All 90
Editing your data connection 91

Chapter 5: Creating Dashboards with Power View. 93
Activating the Power View Add-In 93
Creating a Power View Dashboard. 94
Creating and working with Power View charts. 96
Visualizing data in a Power View map 101
Changing the look of your Power View dashboard. 104

Chapter 6: Adding Location Intelligence with Power Map. 107
Installing and Activating the Power Map Add-In 108
Loading Data into Power Map. 108
Choosing geography and map level. 110
Handling geocoding alerts. 111
Navigating the map 113

Managing and Modifying Map Visualizations 114
Visualization types 116
Adding categories 119
Visualizing data over time 119
Adding layers 121
Adding Custom Components 122
Adding a top/bottom chart 123
Adding annotations and text boxes 124
Adding legends 125
Customizing map themes and labels 125
Customizing and Managing Power Map Tours 125
Understanding scenes 126
Configuring scenes 126
Playing and sharing a tour 128
Sharing screenshots 128

Chapter 7: Using the Power Query Add-In 129
Installing and Activating the Power Query Add-In 130
Downloading the Power Query Add-In 130
Power Query Basics 131
Searching for source data 131
Shaping the selected source data 132
Understanding query steps 135
Outputting your query results 137
Refreshing Power Query data 138
Managing existing queries 139
Understanding Column and Table Actions 140
Column level actions 140
Table actions 142
Power Query Connection Types 143
Creating and Using Power Query Functions 145
Creating and using a basic custom function 146
Advanced function example: Combining all Excel files in a directory into one table 149

Part II: Leveraging SQL for Business Intelligence

Chapter 8: Essential SQL Server Concepts 157
SQL Server Components 157
SQL Server Relational Database Engine 158
SQL Server Management Studio 158
Connecting to a Database Service 160
SQL Server Security 160
Server access 160
Database access 162
Database object access 165

Working with Databases 167
Creating a database 168
Database maintenance 169
Working with Tables and Views 171
Creating a table 172
Creating a view 174
Data Importing and Exporting 177

Chapter 9: Introduction to SQL 181
SQL Basics 181
The Select statement 181
The From clause 182
Joins basics 182
The Where clause 183
Grouping 184
The Order By clause 184
Selecting Distinct records 185
Selecting Top records 186
Advanced SQL Concepts 187
The Union operator 187
Case expression 187
Like operator 188
Subqueries 189
Advanced joins 190
Advanced grouping 191
Manipulating data 192

Chapter 10: Creating and Managing SQL Scripts 195
Design Concepts 195
Stay organized 196
Move data in one direction 197
Divide data according to metrics and attributes 197
Consider data volumes up front 198
Consider full data reload requirements 199
Set up logging and data validation 200
Working with SQL Scripts 200
Data extraction scripting 201
Data preparation scripting 204
Data delivery scripting 205
Error handling 206
Creating and altering stored procedures 207
Indexing and Performance Considerations 208
Understanding index types 208
Creating an index 209
Dropping an index 210
Additional tips and tricks 211

SQL Solutions to Common Analytics Problems 211
Creating an Active Members Report 211
Creating a Cumulative Amount Report 213
Creating a Top Performers Report 213
Creating an Exception List Report 214

Chapter 11: Calling Views and Stored Procedures from Excel 215
Importing Data from SQL Server 215
Passing Your Own SQL Statements to External Databases 219
Manually editing SQL statements 220
Running stored procedures from Excel 221
Using VBA to create dynamic connections 222
Creating a Data Model with Multiple SQL Data Objects 224
Calling Stored Procedures Directly from Power Pivot 227

Chapter 12: Understanding Reporting Services 231
Reporting Services Overview 231
Developing a Reporting Services Report 233
Defining a shared data source 239
Defining a shared dataset 240
Deploying Reports 242
The deployment process 242
Accessing reports 243
SSRS security 244
Managing Subscriptions 245

Chapter 13: Browsing Analysis Services OLAP Cubes with Excel 249
What Is an OLAP Database and What Can It Do? 250
Understanding OLAP Cubes 251
Understanding dimensions and measures 251
Understanding hierarchies and dimension parts 251
Connecting to an OLAP Data Source 252
Understanding the Limitations of OLAP PivotTables 256
Creating Offline Cubes 256
Using Cube Functions 259
Adding Calculations to Your OLAP PivotTables 260
Creating calculated measures 261
Creating calculated members 264
Managing your OLAP calculations 266
Performing what-if analysis with OLAP data 266

Chapter 14: Using the Data Mining Add-In for Microsoft Office 269
Installing and Activating the Data Mining Add-In 269
Downloading the Data Mining Add-In 269
Pointing to an Analysis Services database 270
Analyze Key Influencers 272
Detect Categories 274