

# Chapter 10

## Improving Decision Making and Managing Knowledge

### LEARNING TRACK 1: BUILDING AND USING PIVOT TABLES

Spreadsheet software is useful for helping managers detect and understand patterns in data. For instance, let's take a look at one day's worth of transactions at an online firm, Online Management Training Inc. (OMT Inc.), that sells online management training books and streaming online videos to corporations and individuals who want to improve their management techniques. On this day, the firm experienced 517 order transactions. Figure 1 shows the first 15 transaction records produced at the firm's Web site that day. The names of customers and other identifiers have been removed from this list.

You can think of this list as a database composed of transaction records (the rows). The fields for each customer record are: customer ID, region of purchase, payment method, source of contact (e-mail versus Web banner ad), amount of purchase, the product purchased (either online training or a book), and time of day (in 24-hour time).

There's a great deal of valuable information in this transaction database that could help managers answer important questions and make important decisions:

- Where do most of our customers come from? The answer might tell managers where to spend more marketing resources, or to initiate new marketing efforts.
- Where are the average purchases higher? The answer might tell managers where to focus marketing and sales resources, or pitch different messages to different regions.

**FIGURE 1** SAMPLE LIST OF TRANSACTIONS FOR ONLINE MANAGEMENT TRAINING INC.

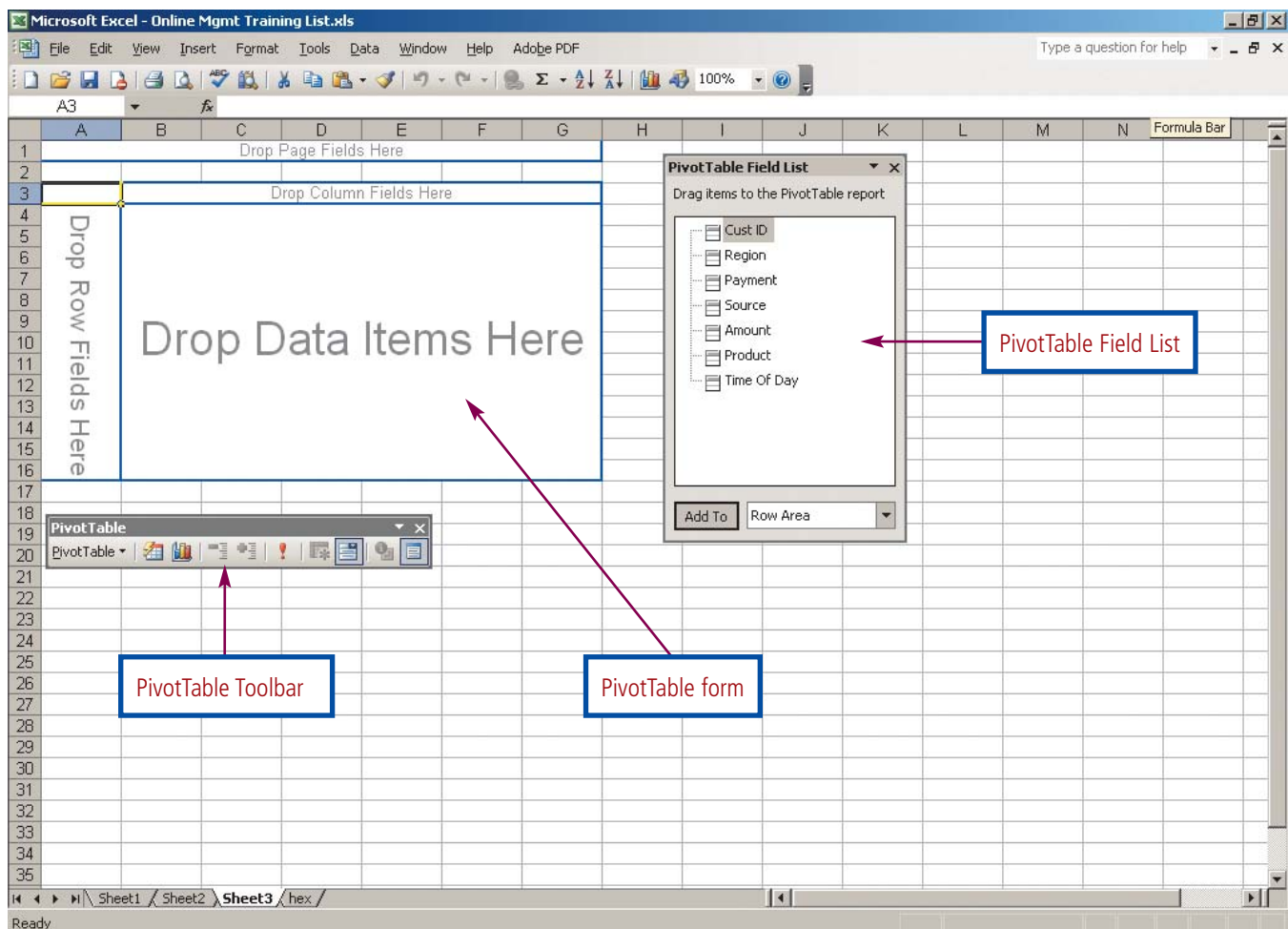
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Online Management Training Inc.														
2	Transaction Log: October 28														
3															
4															
5	Cust ID	Region	Payment	Source	Amount	Product	Time Of Day								
6	10001	East	Paypal	Web	\$20.19	Online	22:19								
7	10002	West	Credit	Web	\$17.85	Online	13:27								
8	10003	North	Credit	Web	\$23.98	Online	14:27								
9	10004	West	Paypal	Email	\$23.51	Book	15:38								
10	10005	South	Credit	Web	\$15.33	Book	15:21								
11	10006	West	Paypal	Email	\$17.30	Online	13:11								
12	10007	East	Credit	Web	\$177.72	Book	21:59								
13	10008	West	Credit	Web	\$21.76	Book	4:04								
14	10009	West	Paypal	Web	\$15.92	Online	19:35								
15	10010	South	Paypal	Web	\$23.39	Online	13:26								
16	10011	South	Paypal	Email	\$24.45	Book	14:17								
17	10012	East	Credit	Web	\$20.39	Book	1:01								
18	10013	North	Paypal	Web	\$19.54	Online	10:04								
19	10014	East	Credit	Web	\$151.67	Book	9:09								
20	10015	West	Credit	Web	\$21.01	Online	5:05								

This list shows a portion of the order transactions for Online Management Training Inc. (OMT Inc.) on October 28, 2006.

- What form of payment is the most common? The answer could be used to emphasize in advertising the most preferred means of payment.
- Are there any times of day when purchases are most common? Do people buy products while at work (likely during the day) or at home (likely in the evening)?
- Are there regional differences in the average purchase? If one region is much more lucrative, managers could focus their marketing and advertising resources on that region.
- Are there regional differences in the sources of our customers? Perhaps in some regions, e-mail is the most effective marketing tool, whereas in other regions, Web banner ads are more effective? The answer to this more complicated question could help managers develop a regional marketing strategy.

Microsoft Excel spreadsheet software offers many tools that are helpful in answering these kinds of questions. If the list was small, you could simply inspect the list and try to get a sense of patterns in the data. But this is impossible when you have a list of over 500 transactions. Notice that these questions often involve two dimensions: region and average purchase, time of day and average purchase, payment type and average purchase. But the last question is more complex because it has three dimensions: region, source of customer, and purchase.

**FIGURE 2 THE EXCEL PIVOTTABLE WIZARD**



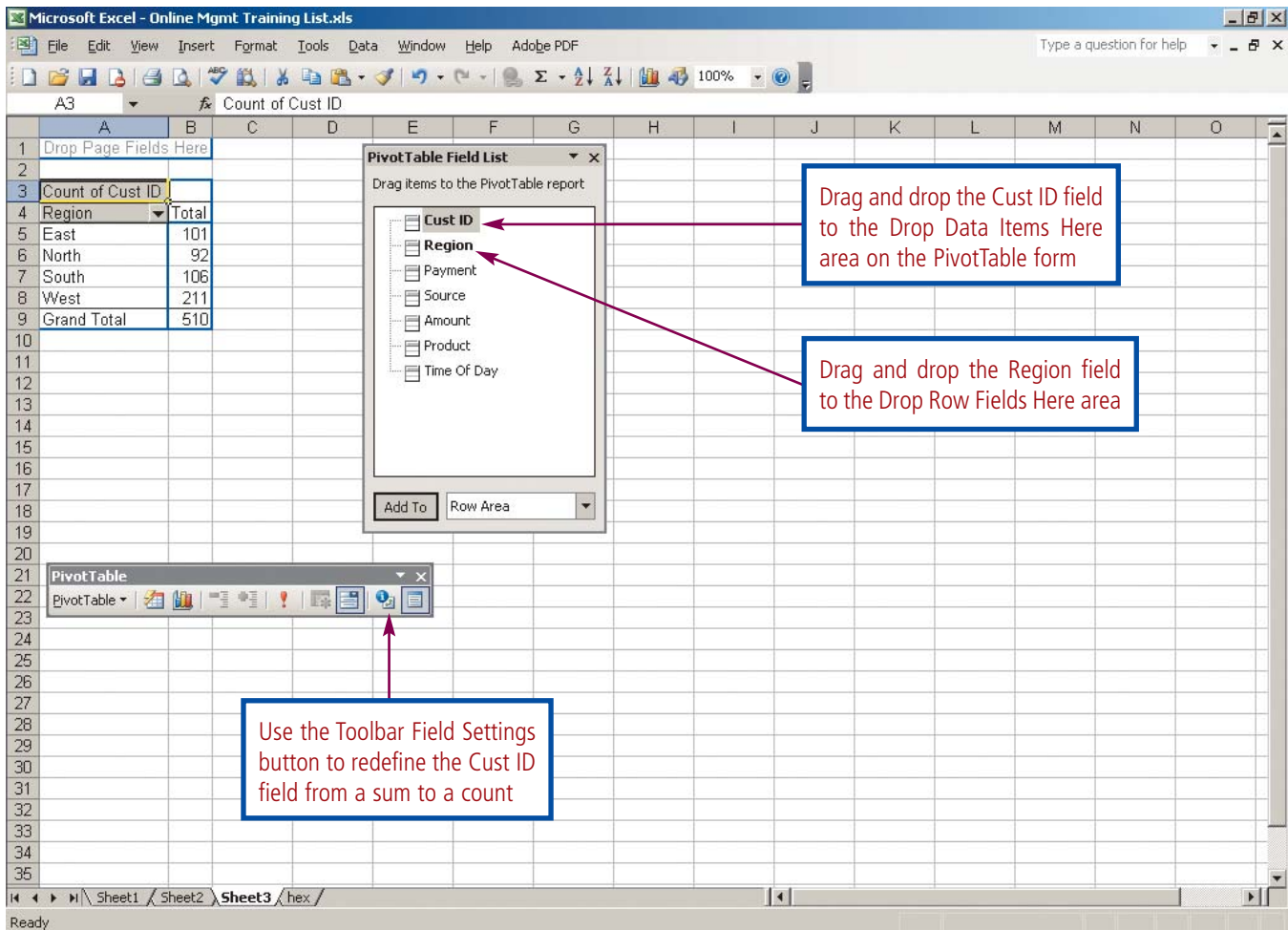
The PivotTable Wizard in Excel makes it easy to analyze lists and databases by simply dragging and dropping elements from the Field List to the PivotTable area.

You could use Excel's charting capabilities, such as a bar chart, to answer some of these questions, but this would require you to sort the transactions on one dimension, calculate an average purchase price for each value of that dimension, manually create a new worksheet, and then create a bar chart. This would take a lot of time and be very inefficient.

Fortunately, spreadsheet software has a very powerful tool called a pivot table that categorizes and summarizes data very quickly. A **pivot table** is simply a table that displays two or more dimensions of data in a convenient format. Excel's PivotTable Wizard creates a pivot table for you. It is located in the drop-down Data menu. When you click on **PivotTable and PivotChart Report** in the Excel Data menu and tell Excel where your data are, and what type of report you want (select PivotTable), the PivotTable and PivotChart Wizard screen appears (Figure 2).

The PivotTable Wizard has three elements: an empty PivotTable with labels for rows, columns, and data areas; a PivotTable Field List which lists the fields in your list or database; and a PivotTable Toolbar. By dragging and dropping the fields you want to look at in your pivot table, you can analyze this list quickly, and arrive at decisions quickly.

**FIGURE 3 A PIVOT TABLE THAT QUICKLY DETERMINES THE REGIONAL DISTRIBUTION OF CUSTOMERS**

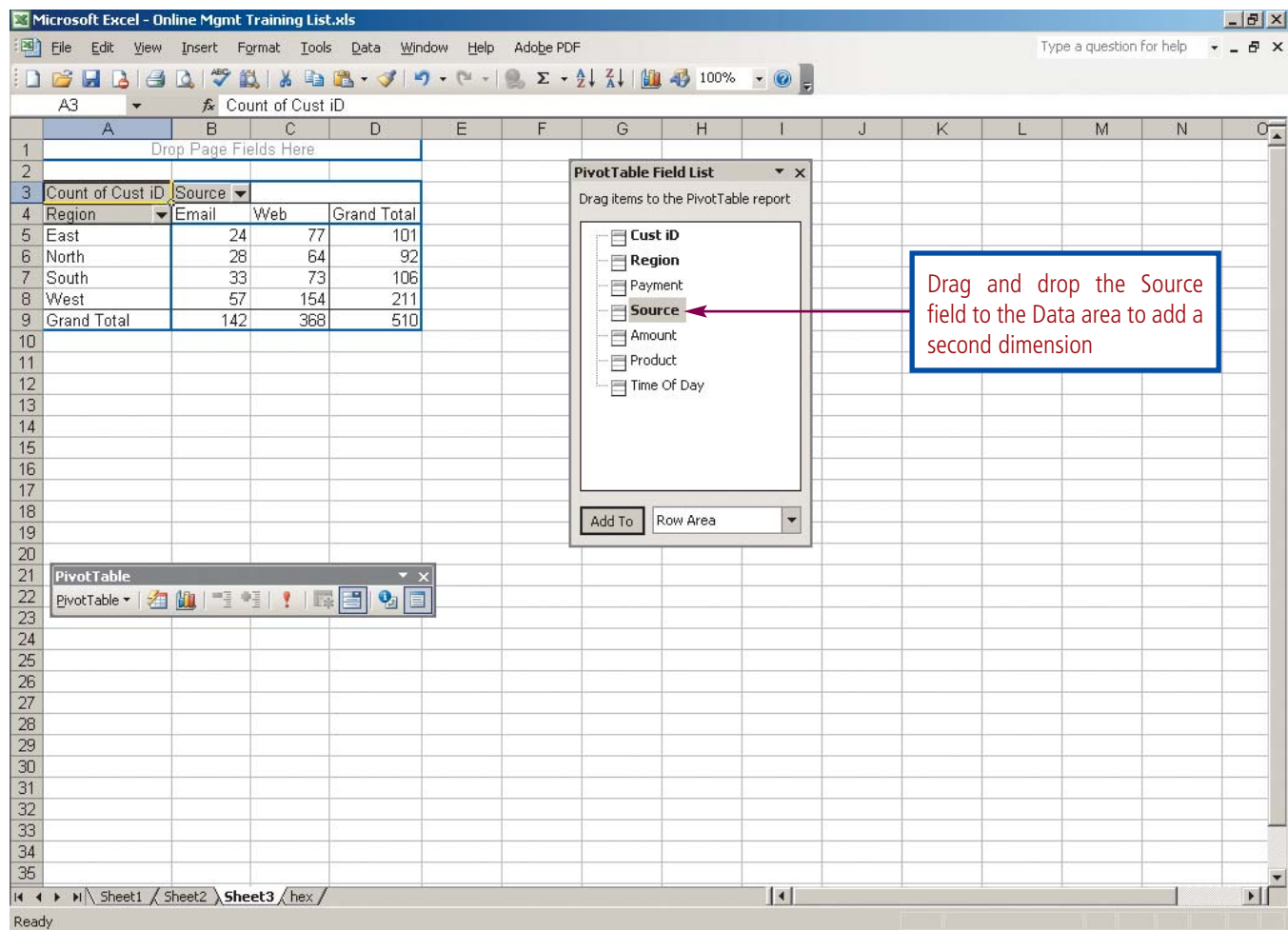


By dragging and dropping fields to row and data areas of the pivot table form, you can quickly produce a table showing the relationship between region and number of customers. You will need to use the Field Settings button on the Toolbar to produce this table in order to redefine the Cust ID field as a count rather than a sum so Excel reports the number of customers, not the sum of their customer IDs, which would be meaningless.

For instance, let's take the first question: "Where do our customers come from?" There's several answers to this question, but let's start with region and ask the question: "How many customers come from each region?" To find the answer, simply drag the Region field to the "Drop Row Fields Here" area of the empty pivot table, and drag Cust ID to the "Drop Data Items Here" areas of the empty pivot table. Figure 3 shows the results.

The PivotTable shows most of our customers come from the Western region. So far we've looked at a single dimension, region, in understanding where our customers come from. Now let's take a more complicated question that involves two dimensions: Does the source of the customer make a difference in addition to region? We have two sources of customers: some customers respond to e-mail campaigns, and others respond to online banner advertising. In a few seconds you can find the answer shown in Figure 4. This pivot table shows that Web banner advertising produces most of the customers, and this is true of all the regions.

Could we analyze the average amount of the purchase to the table in Figure 4? The answer is yes, very easily: just drag the Amount field to the data area of the pivot table. If you do this, you will find that while the average purchase on this day was \$38, the customers who responded to e-mail from the Western region had an average sale of nearly \$49! As a manager you might want to use this knowledge and expand your e-mail campaigns to Western audiences, and perhaps enlarge your banner advertising in other regions.

**FIGURE 4** A PIVOT TABLE THAT EXAMINES TWO DIMENSIONS

In this pivot table, we can examine where our customers come from in terms of two dimensions: region and advertising source. It appears nearly 40 percent of the customers respond to e-mail campaigns, and there are some regional variations in this theme.