# Lecture Note #14: Pivot Tables Part #1

### BUSI 201: Business Data Analysis

## Spring 2024

#### **Topic 1. PivotTables**

Charts are among the most powerful methods we have in summarizing any trends in the data. We can observe the correlations between variables using scatter charts, discover long run trends using line charts, and uncover the distribution of some variable using histograms. However, while visualization does provide an overview of the data, it lacks some clarity and exactness that tables can provide.

In most scenarios, it is necessary to generate a table that summarizes the data on hand, which we call "summary statistics." Navigate to the worksheet PIVOT-01 in BUSI201-LEC15-Workbook.xlsx to find aggregated sales data for three employees over the period of roughly 3 years. In order to manually summarize this data, we must rely on functions.

| A  | В    | С         | D        |    | Е          | F | G   | Н     | I.                    | J                  | 1 |
|----|------|-----------|----------|----|------------|---|-----|-------|-----------------------|--------------------|---|
| 2  | Year | , Month   | Employee | a  | Sales (\$) |   | Sum | nmary | Monthly Average Sales | Annual Total Sales |   |
| 3  | 2021 | January   | А        | \$ | 88,940.81  |   |     | Total |                       |                    |   |
| 4  | 2021 | February  | Α        | \$ | 66,793.73  |   |     | 2021  |                       |                    |   |
| 5  | 2021 | March     | Α        | \$ | 74,497.90  |   | A   | 2022  |                       |                    |   |
| 6  | 2021 | April     | Α        | \$ | 44,960.47  |   |     | 2023  |                       |                    |   |
| 7  | 2021 | May       | Α        | \$ | 47,151.75  |   |     | Total |                       |                    |   |
| 8  | 2021 | June      | Α        | \$ | 52,510.32  |   |     | 2021  |                       |                    |   |
| 9  | 2021 | July      | Α        | \$ | 80,881.12  |   | В   | 2022  |                       |                    |   |
| 10 | 2021 | August    | Α        | \$ | 69,283.09  |   |     | 2023  |                       |                    |   |
| 11 | 2021 | September | Α        | \$ | 56,141.29  |   |     | Total |                       |                    |   |
| 12 | 2021 | October   | А        | \$ | 68,160.26  |   |     | 2021  |                       |                    |   |
| 13 | 2021 | November  | А        | \$ | 57,906.10  |   | С   | 2022  |                       |                    |   |
| 14 | 2021 | December  | Α        | \$ | 84,227.43  |   |     | 2023  |                       |                    |   |
| 15 | 2022 | January   | А        | \$ | 80,006.05  |   |     |       |                       |                    |   |

Figure 1: PIVOT-01

Specifically to fill out the empty table in worksheet PIVOT-01, we will be using the functions we handled in previous classes, AVERAGEIFS and SUMIFS. Please try out manually filling the empty table using the functions. As a hint, the cells I4 and J4 can be filled out using:

- I4: =AVERAGEIFS(\$E\$3:\$E\$104,\$D\$3:\$D\$104,\$G\$3,\$B\$3:\$B\$104,\$H4)
- J4: =SUMIFS(\$E\$3:\$E\$104,\$D\$3:\$D\$104,\$G\$3,\$B\$3:\$B\$104,\$H4)

#### **Inserting Pivot Tables**

| File Ho    | ome Insert Page                      | Layout Formulas Data                   | Review View Aut                                | omate Help            |   |     |                 |                        |                 |               |                               |                      |                  |                   |
|------------|--------------------------------------|----------------------------------------|------------------------------------------------|-----------------------|---|-----|-----------------|------------------------|-----------------|---------------|-------------------------------|----------------------|------------------|-------------------|
| PivotTable | Recommended<br>PivotTables<br>Tables | Pictures Shapes Icons<br>N<br>Illustre | 3D<br>3D<br>Screenshot ~<br>Iodels ~<br>ations | Recommended<br>Charts |   | . 👻 | PivotChart<br>- | 3D<br>Tours Sparklines | Slicer Timeline | Link Comments | Text Header<br>Bax ~ & Footer | A<br>WordArt<br>Text | Signature Object | t Equation Symbol |
|            | $\sim$ : $\times \checkmark f_X$     | Year                                   |                                                |                       |   |     |                 |                        |                 |               |                               |                      |                  |                   |
| A          | В                                    | С                                      | D                                              | E                     | F | G   | Н               |                        |                 | J             |                               |                      | K                | L N               |
| 2          | Year                                 | • Month                                | Employee                                       | Sales (\$)            |   | Sum | imary           | Monthly Average        | Sales           | Annual Tota   | al Sales                      |                      |                  |                   |
| 3          | 2021                                 | January                                | А                                              | \$ 88,940.81          |   |     | Total           |                        |                 |               |                               |                      |                  |                   |
| 4          | 2021                                 | February                               | А                                              | \$ 66,793.73          |   | A   | 2021            |                        |                 |               |                               |                      |                  |                   |
| 5          | 2021                                 | March                                  | А                                              | \$ 74,497.90          |   | А   | 2022            |                        |                 |               |                               |                      |                  |                   |
| 6          | 2021                                 | April                                  | А                                              | \$ 44,960.47          |   |     | 2023            |                        |                 |               |                               |                      |                  |                   |
| 7          | 2021                                 | May                                    | А                                              | \$ 47,151.75          |   |     | Total           |                        |                 |               |                               |                      |                  |                   |
| 8          | 2021                                 | June                                   | A                                              | \$ 52,510.32          |   |     | 2021            |                        |                 |               |                               |                      |                  |                   |
| 9          | 2021                                 | July                                   | A                                              | \$ 80,881.12          |   | В   | 2022            |                        |                 |               |                               |                      |                  |                   |
| 10         | 2021                                 | August                                 | А                                              | \$ 69,283.09          |   |     | 2023            |                        |                 |               |                               |                      |                  |                   |
| 11         | 2021                                 | September                              | A                                              | \$ 56,141.29          |   |     | Total           |                        |                 |               |                               |                      |                  |                   |
| 12         | 2021                                 | October                                | A                                              | \$ 68,160.26          |   | _   | 2021            |                        |                 |               |                               |                      |                  |                   |
| 13         | 2021                                 | November                               | A                                              | \$ 57,906.10          |   | С   | 2022            |                        |                 |               |                               |                      |                  |                   |
| 14         | 2021                                 | December                               | A                                              | \$ 84,227.43          |   |     | 2023            |                        |                 |               |                               |                      |                  |                   |

Figure 2: First Step of Inserting Pivot Table

Instead of manually filling the table, we can rely on Pivot Tables to produce a summary table instead. We will replicate the table we just created using Pivot Tables. To create a table using Pivot Tables, follow the steps illustrated in Figure 2. First select the data including the variable names as shown in the red box. Then, head over to the Insert tab, and select Pivot Table in the blue box.

| A  | В    | С         | D        | E            | F | G H       | I                                                                                | J                  | К | L | N |
|----|------|-----------|----------|--------------|---|-----------|----------------------------------------------------------------------------------|--------------------|---|---|---|
| 2  | Year | • Month   | Employee | Sales (\$) 💡 |   | Summary   | Monthly Average Sales                                                            | Annual Total Sales |   |   |   |
| з  | 2021 | January   | А        | \$ 88,940.81 |   | Tota      |                                                                                  |                    |   |   |   |
| 4  | 2021 | February  | А        | \$ 66,793.73 |   | 2021<br>A |                                                                                  |                    |   |   |   |
| 5  | 2021 | March     | А        | \$ 74,497.90 |   | 2022      |                                                                                  |                    |   |   |   |
| 6  | 2021 | April     | А        | \$ 44,960.47 |   | 2023      |                                                                                  |                    |   |   |   |
| 7  | 2021 | Мау       | А        | \$ 47,151.75 |   | Tota      |                                                                                  |                    |   |   |   |
| 8  | 2021 | June      | А        | \$ 52,510.32 |   | 2021<br>B | PivotTable from table or range                                                   | 7 ×                |   |   |   |
| 9  | 2021 | July      | А        | \$ 80,881.12 |   | 2022      | Select a table or range<br>Table/Range: 'PIVOT-01'\$8\$2:\$E\$104                |                    |   |   |   |
| 10 | 2021 | August    | А        | \$ 69,283.09 |   | 2023      |                                                                                  |                    | _ |   |   |
| 11 | 2021 | September | А        | \$ 56,141.29 |   | Tota      | New Worksheet     Existing Worksheet                                             |                    |   |   |   |
| 12 | 2021 | October   | А        | \$ 68,160.26 |   | 2021<br>C | Location: 'PIVOT-01'ISG\$16<br>Choose whether you want to analyze multiple table | ±.                 |   |   |   |
| 13 | 2021 | November  | А        | \$ 57,906.10 |   | 2022      | Add this data to the Data Model                                                  |                    |   |   |   |
| 14 | 2021 | December  | А        | \$ 84,227.43 |   | 2023      |                                                                                  | Cancel             | _ |   |   |
| 15 | 2022 | January   | А        | \$ 80,006.05 |   |           |                                                                                  |                    |   |   |   |
| 16 | 2022 | February  | А        | \$ 70,020.74 |   |           |                                                                                  |                    |   |   |   |
| 17 | 2022 | March     | А        | \$ 45,976.12 |   |           |                                                                                  |                    |   |   |   |
| 18 | 2022 | April     | А        | \$ 52,075.45 |   |           |                                                                                  |                    |   |   |   |

Figure 3: Second Step of Inserting Pivot Table

A new window should pop up, and the Table range will be pre-populated with the range of the data we selected in the previous step.<sup>1</sup> For this exercise, we want the new table to be visible in the same worksheet, so we will be choosing Existing Worksheet, and then we will select a cell that we will "begin" building the new table. In this example, we will be using G16 as the initial location, and click Ok.<sup>2</sup>

<sup>&</sup>lt;sup>1</sup>Note that it is not strictly necessary to select the table range before clicking the PivotTable button, as we can always add/change the range after we call up this new window by selecting a new data area in the orange box.

<sup>&</sup>lt;sup>2</sup>Cell G16 will serve as the top left corner of the newly generated table.

| A  | В    | С         | D | E            | F | G    | н    |                              | J | K | PivotTable Fi            | elds v x   |
|----|------|-----------|---|--------------|---|------|------|------------------------------|---|---|--------------------------|------------|
| 14 | 2021 | December  | Α | \$ 84,227.43 |   |      | 2023 |                              |   | _ | Choose fields to add t   |            |
| 15 | 2022 | January   | Α | \$ 80,006.05 |   |      |      |                              |   |   | Search                   |            |
| 16 | 2022 | February  | А | \$ 70,020.74 |   |      |      |                              |   |   | Vear                     |            |
| 17 | 2022 | March     | А | \$ 45,976.12 |   | Г    |      | PivotTable1                  |   |   | Month Employee           |            |
| 18 | 2022 | April     | А | \$ 52,075.45 |   |      |      | Histianer                    |   |   | Sales (5)<br>More Tables |            |
| 19 | 2022 | May       | Α | \$ 84,191.77 |   | To b |      | port, choose fields from the |   |   |                          |            |
| 20 | 2022 | June      | А | \$ 42,632.69 |   |      | Pi   | votTable Field List          |   |   |                          |            |
| 21 | 2022 | July      | А | \$ 40,982.76 |   |      |      |                              |   |   |                          |            |
| 22 | 2022 | August    | А | \$ 59,977.70 |   |      |      |                              |   |   |                          |            |
| 23 | 2022 | September | А | \$ 50,816.65 |   |      |      |                              |   |   | Drag fields between a    |            |
| 24 | 2022 | October   | А | \$ 58,858.40 |   |      |      |                              |   |   | T Filters                | II Columns |
| 25 | 2022 | November  | А | \$ 61,842.25 |   |      |      |                              |   |   |                          |            |
| 26 | 2022 | December  | А | \$ 57,654.44 |   |      |      |                              |   |   |                          |            |
| 27 | 2023 | January   | Α | \$ 53,521.77 |   |      |      |                              |   |   | = Rows                   | Σ Values   |
| 28 | 2023 | February  | А | \$ 71,225.76 |   |      |      |                              |   |   |                          |            |
| 29 | 2023 | March     | А | \$ 50,811.77 |   |      |      |                              |   |   |                          |            |
| 30 | 2023 | April     | Α | \$ 68,667.63 |   |      |      |                              |   |   |                          |            |

Figure 4: Third Step of Inserting Pivot Table

Figure 4 shows us an empty PivotTable, which we will fill out by clicking and dragging items in the red box down to the appropriate bins in the blue box. It is at this point we will look back to the table we are attempting to replicate. The "row" elements are "two-layered," in that the first (left) layer is divided up by employees, and the second (right) layer is divided by years. Then, there are two "values" that we will be calculating; the monthly average sales by years, and the annual total sales.

| A  | В    | C         | D | E            | F G          | н    | I. I. | J         | · · · · · · · · · · · · · · · · · · · | PivotTable Fields v ×            |
|----|------|-----------|---|--------------|--------------|------|-------|-----------|---------------------------------------|----------------------------------|
| 14 | 2021 | December  | Α | \$ 84,227.43 |              | 2023 |       |           |                                       | Choose fields to add to report   |
| 15 | 2022 | January   | Α | \$ 80,006.05 |              |      |       |           |                                       | Search D                         |
| 16 | 2022 | February  | Α | \$ 70,020.74 | Row Labels 🕞 |      |       |           |                                       | Vear                             |
| 17 | 2022 | March     | А | \$ 45,976.12 | А            |      |       |           |                                       | Month                            |
| 18 | 2022 | April     | Α | \$ 52,075.45 | в            |      |       |           |                                       | Sales (5)<br>More Tables         |
| 19 | 2022 | May       | Α | \$ 84,191.77 | с            |      |       |           |                                       |                                  |
| 20 | 2022 | June      | Α | \$ 42,632.69 | Grand Total  |      |       | · · · · ( |                                       |                                  |
| 21 | 2022 | July      | Α | \$ 40,982.76 |              |      |       |           |                                       |                                  |
| 22 | 2022 | August    | Α | \$ 59,977.70 |              |      |       |           |                                       |                                  |
| 23 | 2022 | September | Α | \$ 50,816.65 |              |      |       |           |                                       | Drag fields between areas below: |
| 24 | 2022 | October   | Α | \$ 58,858.40 |              |      |       |           | $\mathbf{X}$                          | T Filters II Columns             |
| 25 | 2022 | November  | Α | \$ 61,842.25 |              |      |       |           |                                       |                                  |
| 26 | 2022 | December  | Α | \$ 57,654.44 |              |      |       |           |                                       |                                  |
| 27 | 2023 | January   | Α | \$ 53,521.77 |              |      |       |           |                                       | TRows E Values                   |
| 28 | 2023 | February  | Α | \$ 71,225.76 |              |      |       |           |                                       | Employee -                       |
| 29 | 2023 | March     | Α | \$ 50,811.77 |              |      |       |           |                                       | T I                              |
| 30 | 2023 | April     | Α | \$ 68,667.63 |              |      |       |           |                                       |                                  |
|    | 2022 | Mau       | ٨ | C EA COC 01  |              |      |       |           |                                       |                                  |

Figure 5: Fourth Step of Inserting PivotTable

See Figure 5 as we start with the row elements. Click and drag the field Employee to the orange box. This will start to populate the Pivot Table which was previously empty. In the blue box, you can see some changes where the rows for each employees have been generated. Next, we will add the second layer of years, following a similar click-and-drag method shown in the green box and arrow. Make sure that the Year field is situated below Employee, as it is the inner most layer in our table.

| A | В    | C         | D | E            | F G         | Н                 | 1 | J | - <sup>*</sup> F | vivotTable Field            |                   |
|---|------|-----------|---|--------------|-------------|-------------------|---|---|------------------|-----------------------------|-------------------|
| 1 | 2021 | December  | Α | \$ 84,227.43 |             | 2023              |   |   |                  | hoose fields to add to repo |                   |
| 5 | 2022 | January   | А | \$ 80,006.05 |             |                   |   |   |                  | Search                      |                   |
| 5 | 2022 | February  | Α | \$ 70,020.74 | Row Labels  | Sum of Sales (\$) |   |   |                  | V Year                      |                   |
|   | 2022 | March     | Α | \$ 45,976.12 | A           | 2074144.742       |   |   |                  | Month                       |                   |
|   | 2022 | April     | Α | \$ 52,075.45 | 2021        | 791454.2651       |   |   |                  | Sales (\$)<br>More Tables   |                   |
|   | 2022 | May       | Α | \$ 84,191.77 | 2022        | 705035.0215       |   |   |                  |                             |                   |
|   | 2022 | June      | Α | \$ 42,632.69 | 2023        | 577655.4556       |   |   |                  |                             |                   |
|   | 2022 | July      | Α | \$ 40,982.76 | В           | 2090376.318       |   |   |                  |                             |                   |
|   | 2022 | August    | Α | \$ 59,977.70 | 2021        | 801088.0541       |   |   |                  |                             |                   |
|   | 2022 | September | Α | \$ 50,816.65 | 2022        | 744318.5372       |   |   | c.               | Drag fields between areas b | elow:             |
|   | 2022 | October   | А | \$ 58,858.40 | 2023        | 544969.7271       |   |   |                  | T Filters                   | III Columns       |
|   | 2022 | November  | А | \$ 61,842.25 | ■c          | 1951789.754       |   |   |                  |                             |                   |
|   | 2022 | December  | Α | \$ 57,654.44 | 2021        | 681590.6933       |   |   |                  |                             |                   |
|   | 2023 | January   | А | \$ 53,521.77 | 2022        | 682963.7802       |   |   |                  | E Rows                      | Σ Value           |
|   | 2023 | February  | Α | \$ 71,225.76 | 2023        | 587235.28         |   |   |                  | Employee ~<br>Year ~        | Sum of Sales (\$) |
|   | 2023 | March     | Α | \$ 50,811.77 | Grand Total | 6116310.814       |   |   |                  | 1001                        | 1                 |
|   | 2023 | April     | A | \$ 68,667.63 |             |                   |   |   |                  |                             |                   |

Figure 6: Fifth Step of Inserting Pivot Table

Now we have the rows all ready, we can start adding the other elements. In this case, we will be adding the monthly average value of each employee's sales. Lets move on to the steps illustrated in Figure 6. Click, and drag the field Sales(\$) down to Values in the orange box. You will see that a new column has been added to the PivotTable in the blue box. However, it does not display the values that we want at this point, so we must edit its properties.

| A | В    | С         | D | E            | F G         | Н                   | I J                                                                                                                    | PivotTable Fields $\checkmark$ ×                 |
|---|------|-----------|---|--------------|-------------|---------------------|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| 4 | 2021 | December  | Α | \$ 84,227.43 |             | 2023                |                                                                                                                        | Choose fields to add to report:                  |
| 5 | 2022 | January   | Α | \$ 80,006.05 |             |                     |                                                                                                                        | Search D                                         |
| 5 | 2022 | February  | А | \$ 70,020.74 | Row Labels  | - Sum of Sales (\$) | Value Field Settings - 🗆 🗙                                                                                             | Vear                                             |
| 7 | 2022 | March     | А | \$ 45,976.12 | A           | 2074144.742         | Source Name: Sales (\$)<br>Custom Name: Average of Sales (\$)                                                          | Month Employee                                   |
| 3 | 2022 | April     | Α | \$ 52,075.45 | 2021        | 791454.2651         | Summarize Values By Show Values As                                                                                     | Sales (S)<br>More Tables                         |
|   | 2022 | May       | А | \$ 84,191.77 | 2022        | 705035.0215         | Summarize value field by Choose the type of calculation that you want to use to summarize date from the selected field |                                                  |
|   | 2022 | June      | А | \$ 42,632.69 | 2023        | 577655.4556         | dia from the selected field<br>Sum<br>Court                                                                            |                                                  |
|   | 2022 | July      | А | \$ 40,982.76 | В           | 2090376.318         | Average<br>Max<br>Min                                                                                                  |                                                  |
| 2 | 2022 | August    | Α | \$ 59,977.70 | 2021        | 801088.0541         | Product                                                                                                                | Move Up                                          |
| 3 | 2022 | September | Α | \$ 50,816.65 | 2022        | 744318.5372         | Number Format OK Cancel                                                                                                | Drag fields between areas be Move to Beginning   |
|   | 2022 | October   | А | \$ 58,858.40 | 2023        | 544969.7271         |                                                                                                                        | T Filters Move to End                            |
| 5 | 2022 | November  | А | \$ 61,842.25 | c           | 1951789.754         |                                                                                                                        | Move to Report Filter     Move to Row Labels     |
| 5 | 2022 | December  | А | \$ 57,654.44 | 2021        | 681590.6933         |                                                                                                                        | Move to Column Labels     Move to Values         |
| , | 2023 | January   | А | \$ 53,521.77 | 2022        | 682963.7802         |                                                                                                                        | Remove Field     Rows     Kennove Field Settings |
|   | 2023 | February  | Α | \$ 71,225.76 | 2023        | 587235.28           |                                                                                                                        | Employee V Sum of Sales (\$)                     |
| ) | 2023 | March     | Α | \$ 50,811.77 | Grand Total | 6116310.814         |                                                                                                                        | Year ~                                           |
| ) | 2023 | April     | А | \$ 68,667.63 |             |                     |                                                                                                                        |                                                  |

Figure 7: Sixth Step of Inserting Pivot Table

Click the icon in the red box in Figure 7, and select Value Field Settings. Then, in the popup window Value Field Settings, select the option Average, and click Ok. It will automatically change the field's name to Average of Sales(\$), and the PivotTable will also have been updated. Compare the two values highlighted in Figure 8.

| A | В    | С         | D        | E             | F | G |       | Н     |      | 1                 | J          | К                     |
|---|------|-----------|----------|---------------|---|---|-------|-------|------|-------------------|------------|-----------------------|
| 1 | Year | Month     | Employee | Sales (\$)    |   |   | Summa | D/    | Mont | hly Average Sales |            |                       |
| 2 | Tear | v Month v | Employee | j Sales (Ş) 💡 |   |   | Summa | l y   | wonu | niy Average Sales | Row Labels | Average of Sales (\$) |
| 3 | 2021 | January   | Α        | \$ 88,940.81  |   |   |       | Total |      |                   | A          | 61004.25712           |
| 4 | 2021 | February  | Α        | \$ 66,793.73  |   |   |       | 2021  | \$   | 65,954.52         | 2021       | 65954.52209           |
| 5 | 2021 | March     | Α        | \$ 74,497.90  |   | A |       | 2022  |      |                   | 2022       | 58752.91846           |
| 6 | 2021 | April     | А        | \$ 44,960.47  |   |   |       | 2023  |      |                   | 2023       | 57765.54556           |
| 7 | 2021 | May       | Α        | \$ 47,151.75  |   |   |       | Total |      |                   | B          | 61481.65642           |
| 8 | 2021 | June      | Α        | \$ 52,510.32  |   | в |       | 2021  |      |                   | 2021       | 66757.33785           |

Figure 8: Comparing Functions and Pivot Tables

| A | В    | С         | D | E               | F G         | Н                     | 1                 | J | PivotTable Field           | İs                        |
|---|------|-----------|---|-----------------|-------------|-----------------------|-------------------|---|----------------------------|---------------------------|
|   | 2021 | December  | Α | \$<br>84,227.43 |             | 2023                  |                   |   | Choose fields to add to re | ports                     |
|   | 2022 | January   | Α | \$<br>80,006.05 |             | _                     |                   |   | Search                     |                           |
| 5 | 2022 | February  | А | \$<br>70,020.74 | Row Labels  | Average of Sales (\$) | Sum of Sales (\$) |   | Vear                       |                           |
|   | 2022 | March     | А | \$<br>45,976.12 | A           | 61004.25712           | 2074144.742       |   | Month  Employee            |                           |
|   | 2022 | April     | А | \$<br>52,075.45 | 2021        | 65954.52209           | 791454.2651       |   | Sales (\$)<br>More Tables  |                           |
|   | 2022 | May       | А | \$<br>84,191.77 | 2022        | 58752.91846           | 705035.0215       |   |                            |                           |
|   | 2022 | June      | А | \$<br>42,632.69 | 2023        | 57765.54556           | 577655.4556       |   |                            |                           |
|   | 2022 | July      | А | \$<br>40,982.76 | B           | 61481.65642           | 2090376.318       |   |                            |                           |
|   | 2022 | August    | А | \$<br>59,977.70 | 2021        | 66757.33785           | 801088.0541       |   |                            |                           |
|   | 2022 | September | А | \$<br>50,816.65 | 2022        | 62026.54476           | 744318.5372       |   | Dang fields between areas  | below:                    |
|   | 2022 | October   | А | \$<br>58,858.40 | 2023        | 54496.97271           | 544969.7271       |   | T Filters                  | II Columns<br>Σ Values    |
|   | 2022 | November  | А | \$<br>61,842.25 | c           | 57405.58099           | 1951789.754       |   |                            |                           |
|   | 2022 | December  | А | \$<br>57,654.44 | 2021        | 56799.22444           | 681590.6933       |   |                            |                           |
|   | 2023 | January   | А | \$<br>53,521.77 | 2022        | 56913.64835           | 682963.7802       |   | E Rows                     | Σ Values                  |
|   | 2023 | February  | А | \$<br>71,225.76 | 2023        | 58723.528             | 587235.28         |   | Employee                   | Average of<br>Sum of Sale |
|   | 2023 | March     | А | \$<br>50,811.77 | Grand Total | 59963.83151           | 6116310.814       |   | Year                       | Sum of Sale               |
|   | 2023 | April     | Α | \$<br>68,667.63 |             |                       |                   |   |                            |                           |
|   |      |           |   |                 |             |                       |                   |   |                            |                           |

Figure 9: Final Step of Inserting Pivot Table

We will now add the second element, annual total sales. To achieve this, simply click and drag the Sales(\$) down to Values in the orange box once more. In order to place this new entry to the right of the existing column, make sure to place it below the Average of Sales(\$).

| G                               | Н     |           | I                        |            | J                | К    | L            | М                     | Ν                 |
|---------------------------------|-------|-----------|--------------------------|------------|------------------|------|--------------|-----------------------|-------------------|
| Sum                             | mary  | Month     | ly Average Sales         | Ar         | nual Total Sales |      | Row Labels 🖃 | Average of Sales (\$) | Sum of Sales (\$) |
|                                 | Total | \$        | 61,004.26                | \$         | 2,074,144.74     |      | A            | 61004.25712           | 2074144.742       |
| A                               | 2021  | \$        | 65 <mark>,</mark> 954.52 | \$         | 791,454.27       |      | 2021         | 65954.52209           | 791454.2651       |
| А                               | 2022  | \$        | 58,752.92                | \$         | 705,035.02       |      | 2022         | 58752.91846           | 705035.0215       |
|                                 | 2023  | \$        | 57,765.55                | \$         | 577,655.46       |      | 2023         | 57765.54556           | 577655.4556       |
|                                 | Total | \$        | 61,481.66                | \$         | 2,090,376.32     |      | В            | 61481.65642           | 2090376.318       |
| в                               | 2021  | \$        | 66,757.34                | \$         | 801,088.05       |      | 2021         | 66757.33785           | 801088.0541       |
| D                               | 2022  | \$        | 62,026.54                | \$         | 744,318.54       |      | 2022         | 62026.54476           | 744318.5372       |
|                                 | 2023  | \$        | 54,496.97                | \$         | 544,969.73       |      | 2023         | 54496.97271           | 544969.7271       |
|                                 | Total | \$        | 57,405.58                | \$         | 1,951,789.75     |      | c            | 57405.58099           | 1951789.754       |
| C                               | 2021  | \$        | 56,799.22                | \$         | 681,590.69       |      | 2021         | 56799.22444           | 681590.6933       |
| 2023<br>Total<br>C 2021<br>2022 | \$    | 56,913.65 | \$                       | 682,963.78 |                  | 2022 | 56913.64835  | 682963.7802           |                   |
|                                 | 2023  | \$        | 58,723.53                | \$         | 587,235.28       |      | 2023         | 58723.528             | 587235.28         |
|                                 |       |           |                          |            |                  |      | Grand Total  | 59963.83151           | 6116310.814       |

Figure 10: Completed PivotTable

Comparing the table manually generated using functions to the Pivot Table, we can see that they are identical. The only minor difference in the values would be their formatting.

# Topic 2. PivotTable Columns

Navigate to the next worksheet PIVOT-02, which has revenue and profit data on a large corporation with offices in multiple cities. Suppose that we want to see how each offices' revenue evolved over time.

|            | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|------------|------|------|------|------|------|------|------|------|------|
| Atlanta    |      |      |      |      |      |      |      |      |      |
| Boston     |      |      |      |      |      |      |      |      |      |
| Chicago    |      |      |      |      |      |      |      |      |      |
| Denver     |      |      |      |      |      |      |      |      |      |
| Eugene     |      |      |      |      |      |      |      |      |      |
| Fort Worth |      |      |      |      |      |      |      |      |      |
| Galesburg  |      |      |      |      |      |      |      |      |      |
| Houston    |      |      |      |      |      |      |      |      |      |

Table 1: Empty Table to Replicate

That is, we want to use PivotTables to automatically fill out Table 1. In addition to the "rows" that we learned how to deal with in the previous section, we will now add "columns." To start off this process, select the data and start off the PivotTable.

| X | Cut                    |             | ulas Data Review        | w View Automa<br>Ξ Ξ <u>Ξ</u> ≫·· | te Help PivotTabl<br>양화 Wrap Text | e Analyze Design | ,<br>🖽                   | Normal 2                    | Percent 2   | Normal    |              | 8 🖬          | _    | #oSum = A <sub>7</sub> , Q         | Comments             | er su<br>F |
|---|------------------------|-------------|-------------------------|-----------------------------------|-----------------------------------|------------------|--------------------------|-----------------------------|-------------|-----------|--------------|--------------|------|------------------------------------|----------------------|------------|
|   | Copy ~                 | B I U - B   | - <u>A</u> - <u>A</u> - | = = = = = =                       | Merge & Center                    | - \$ - %         | Condition     Formatting | al Format as<br>Table * Bad | Good        | Neutral   | v Insert De  | elete Format | Fill | SOLUCE FIND OC                     | Add-ins Analy<br>Dat | /ze        |
|   | Format Painter         | For         | t G                     | AB                                | inment                            | G Numb           |                          | 0 1801e 0                   | Styles      |           |              | iells        | € Ci | ear • Filter • Select •<br>Editing | Add-Ins              | •          |
|   | $\vee$ $\times \vee f$ | Sum of Reve | nue                     |                                   |                                   |                  |                          |                             |             |           |              |              |      |                                    |                      |            |
|   | В                      | С           | D                       | E                                 | F                                 | G                | н                        | J                           | K           | L         | М            | N            |      | PivotTable Field                   | la.                  |            |
| - |                        |             |                         |                                   |                                   |                  |                          | _                           |             |           |              |              | _    |                                    |                      |            |
|   | Office                 | Year        | Revenue                 | Profit                            | Profit Margin                     | Sales            | Sum of Revenu            | Le Column Labels            | •           |           |              |              |      | Choose fields to add to rep        | iort:                |            |
|   | Atlanta                | 2014        | \$818,403.33            | \$ 83,477.14                      | 10.2%                             | 907              | Row Labels               | × 201                       | 4 2015      | 2016      | 2017         | 2018         |      | Search                             |                      |            |
|   | Atlanta                | 2015        | \$462,975.20            | \$ 92,132.06                      | 19.9%                             | 542              | Atlanta                  | 818403.3                    | 3 462975.2  | 430191.58 | 219155.35 5  | 70443.14     | 8    | Office                             |                      |            |
|   | Atlanta                | 2016        | \$430,191.58            | \$ 61,517.40                      | 14.3%                             | 981              | Boston                   | 587791.2                    | 2 932301.96 | 137105.11 | 709333.24 3  | 804546.65    | 7    | Vear<br>Revenue                    |                      |            |
|   | Atlanta                | 2017        | \$219,155.35            | \$ 11,615.23                      | 5.3%                              | 614              | Chicago                  | 430907.7                    | 4 775170.75 | 552446.08 | 599624.31 6  | 645867.48    | 4    | Profit Profit Margin               |                      |            |
|   | Atlanta                | 2018        | \$570,443.14            | \$ 56,473.87                      | 9.9%                              | 533              | Denver                   | 595079.5                    | 9 952827.8  | 655636.46 | 105466.36 5  | 32064.37     | 8    | Sales                              |                      |            |
|   | Atlanta                | 2019        | \$863,517.26            | \$ 54,401.59                      | 6.3%                              | 973              | Eugene                   | 850002                      | 7 261420.05 | 798342.97 | 433765.68 7  | 76052.14     | 9    | More Tables                        |                      |            |
|   | Atlanta                | 2020        | \$422,946.78            | \$ 25,376.81                      | 6.0%                              | 547              | Fort Worth               | 183354.4                    | 2 972272.19 | 904482.44 | 778191.84 7  | 91010.74     | 3    |                                    |                      |            |
|   | Atlanta                | 2021        | \$402,477.10            | \$ 22,538.72                      | 5.6%                              | 1,009            | Galesburg                | 980725.8                    | 7 470698.13 | 165685.09 | 670793.84 8  | 803818.87    | 9    |                                    |                      |            |
|   | Atlanta                | 2022        | \$255,117.35            | \$ 42,604.60                      | 16.7%                             | 588              | Houston                  | 447294.1                    | 7 106501.22 | 908074.37 | 474887.35 7  | 51431.21     | 2    |                                    |                      |            |
|   | Boston                 | 2014        | \$587,791.22            | \$101,687.88                      | 17.3%                             | 623              | Grand Total              | 4893559.0                   | 4 4934167.3 | 4551964.1 | 3991217.97 5 | 175234.6     | 53:  | Drag fields between areas          |                      |            |
|   | Boston                 | 2015        | \$932,301.96            | \$ 99,756.31                      | 10.7%                             | 663              |                          |                             |             |           |              |              |      | T Filters                          | II Columns           |            |
|   | Boston                 | 2016        | \$137,105.11            | \$ 11,105.51                      | 8.1%                              | 878              |                          |                             |             |           |              |              |      | 1 Pitters                          | Year                 |            |
|   | Boston                 | 2017        | \$709,333.24            | \$140,447.98                      | 19.8%                             | 693              |                          |                             |             |           |              |              |      |                                    |                      |            |
|   | Boston                 | 2018        | \$304,546.65            | \$ 53,295.66                      | 17.5%                             | 973              |                          |                             |             |           |              |              |      |                                    |                      |            |
|   | Boston                 | 2019        | \$713,085.68            | \$124,789.99                      | 17.5%                             | 531              |                          |                             |             |           |              |              |      |                                    |                      |            |
|   | Boston                 | 2020        | \$699,168.62            | \$ 91,591.09                      | 13.1%                             | 630              |                          |                             |             |           |              |              |      | = Rows                             | Σ Values             |            |
|   | Boston                 | 2021        | \$497,796.15            | \$ 99,061.43                      | 19.9%                             | 907              |                          |                             |             |           |              |              |      | Office                             | - Sum of Reve        | nue        |
|   | Boston                 | 2022        | \$204,172.14            | \$ 26,542.38                      | 13.0%                             | 993              |                          |                             |             |           |              |              |      |                                    |                      |            |
|   | Chicago                | 2014        | \$430,907.74            | \$ 35,765.34                      | 8.3%                              | 952              |                          |                             |             |           |              |              |      |                                    |                      |            |
|   | Chicago                | 2015        | \$775.170.75            | \$ 89,919.81                      | 11.6%                             | 812              |                          |                             |             |           |              |              |      |                                    |                      | _          |

Figure 11: Completed PivotTable

Replicate Figure 11 by moving Office to the red box, Year to the orange box, and Revenue to the blue box. Double check if the results are correct by comparing this new table to the table in the next worksheet, PIVOT-03.