

# DATA AT WORK

USING YOUR BOOKING DATA WITH POWER BI

## Introduction

This manual has been written to allow business owners to analyse the reservation data of their own business. This manual does assume that the data has been successfully exported so that it can be analysed. The analysis will happen in *Power BI*, a program developed by Microsoft. A basic version of *Power BI* is available for free whilst there are also paid subscription models if more functionalities are required. In this manual the free version is used. There is a range of so called business intelligence tools available and some of the more popular ones are: *Power BI*, *Tableau*, *Spotfire* and *Qlik*. One of the primary advantages of *Power BI* is that it has a free version and is thus particularly useful for small business owners. A Microsoft account is a requirement to use *Power BI*.

The chapters will guide the reader step by step to create commonly used plots and a simple dashboard. Chapter 1 provides a brief installation guide. Once *Power BI* has been installed the data need to be loaded and prepared (Chapter 2). The actual data analysis and chart making can be found in Chapter 3. In Chapter 4 an example dashboard is shown. Whilst technically speaking it is not a real dashboard, the chapter does provide information on how to add text and change styles. Finally a few information sources are provided for those who want to learn more about *Power BI*.

A *Power BI* file that contains the graphs of this manual as well as an example data set is available, please contact William Hazel ([w.a.hazel@hz.nl](mailto:w.a.hazel@hz.nl)) at HZ University of Applied Sciences. If you have other questions regarding *Power BI* in the scope of this manual, you can contact William Hazel too.

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# 1. Installing Power BI

To use this manual you will need to have *Power BI* installed on your desktop. *Power BI* can be installed via the website: <https://powerbi.microsoft.com/en-us/> (Figure 1). Having a Microsoft account is a requirement. Click “Start free” and then “Use it free” (Figure 2).

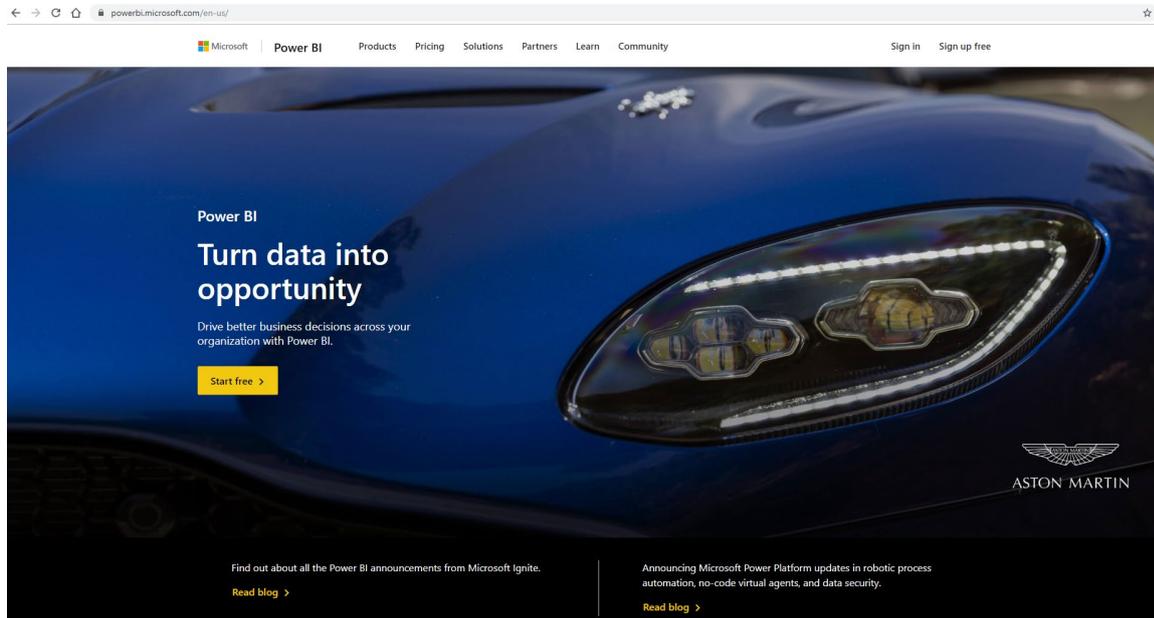


Figure 1. Power BI website. Here one can find user stories of companies such as Aston Martin.

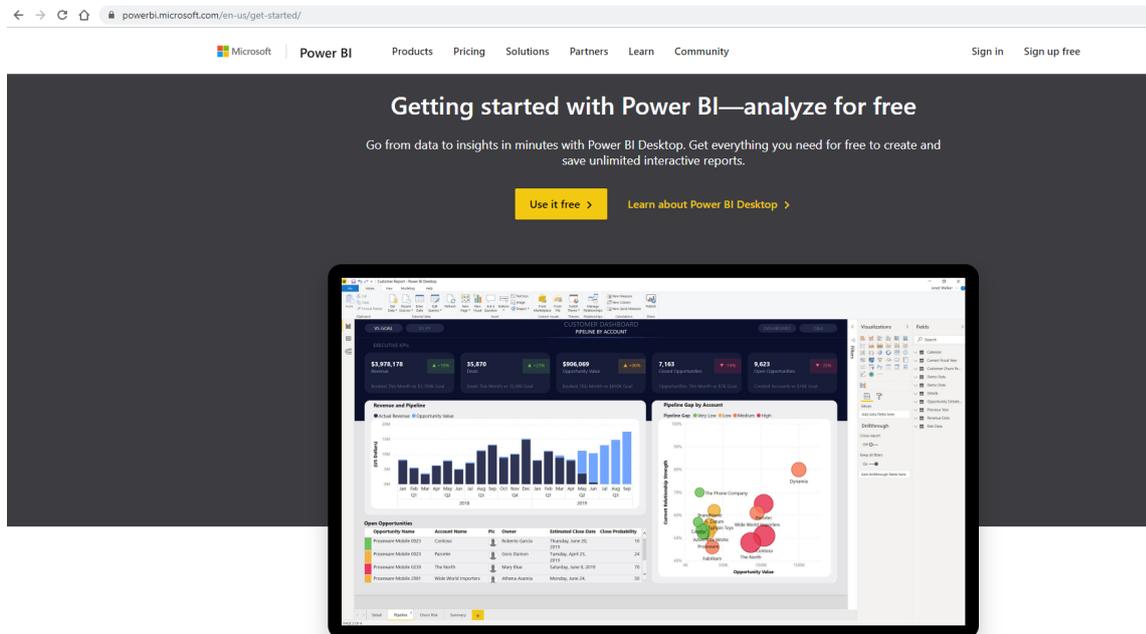


Figure 2. Another webpage after clicking “Start free”.

You will then be led to the *Microsoft Store* (Figure 3). Follow the installation procedure, this will involve filling in some personal details. Once it has been installed run the program. Microsoft wants you to upgrade to a premium version and so every time you start Power BI a window will appear (Figure 4). Close it and then we can start!

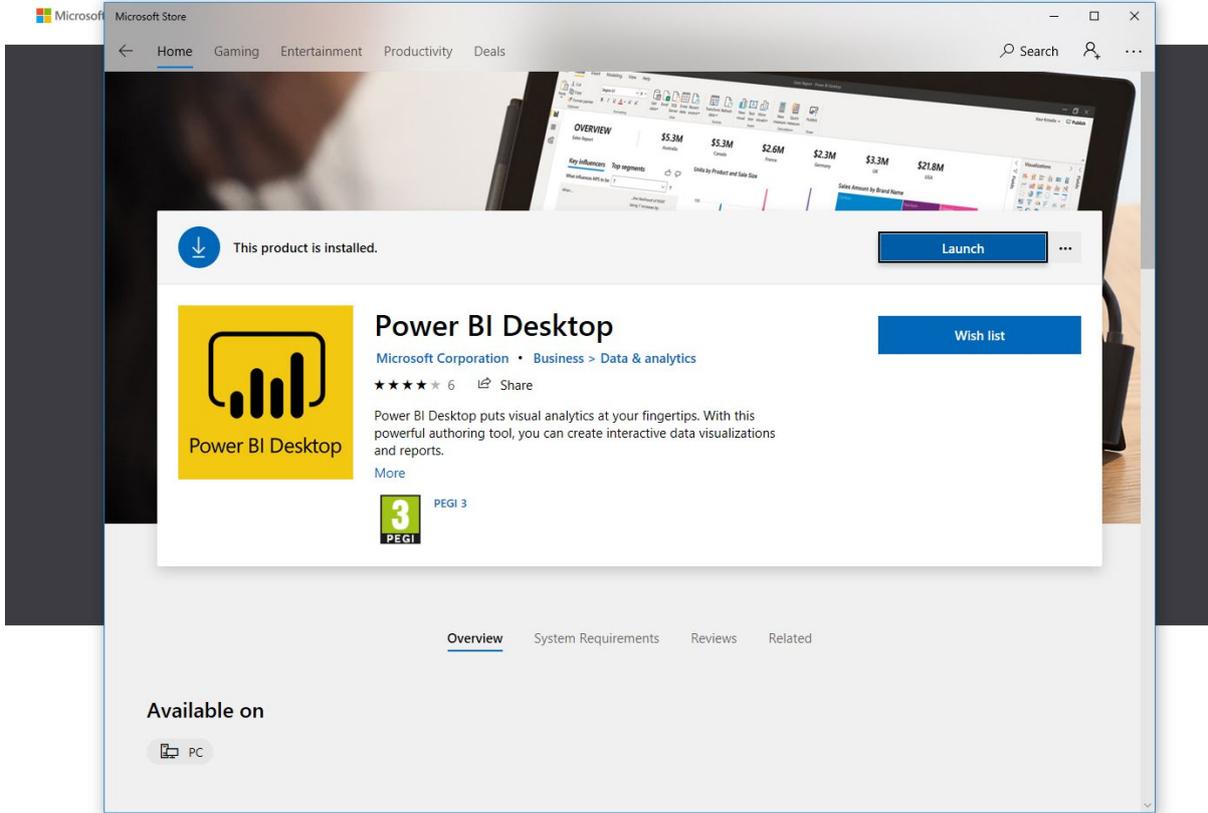


Figure 3. Power BI in the Microsoft Store. In this case Power BI has already been installed. Instead of “Launch” you should see a “Get” button.

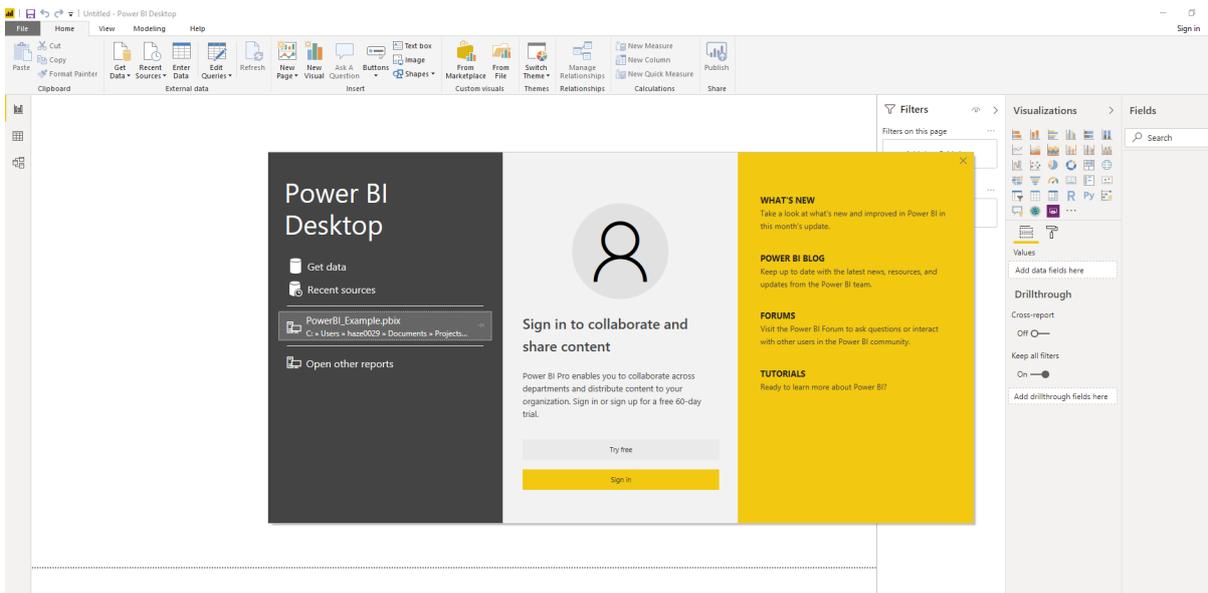


Figure 4. Sign up window that appears every time Power BI is started.

## 2. Data Preparation

Before we can analyse the data set it needs to be prepared. This can involve cleaning the set or adding new variables that we want to use. In this chapter we will show a few examples. Power BI is at its best when analysing data rather than cleaning it. This chapter also assumes that the user has managed to acquire the relevant data set.

The information presented in this chapter will be presented as sequential steps that one would normally undertake during the data preparation process. The first part consists of a check to ensure that the data set will be usable for this manual.

### 2.1 Available Data

A business owner might have many or only a few sources of data available to them. During the lifetime of the PROFIT project we have seen that there is interest among accommodation providers in analysing and understanding their reservation data. For instance to see if there are large differences between nationalities. The focus of this report will be on booking data, but Power BI could certainly be used to analyse financial data. The data set in this report consists of randomly generated data that has in part been inspired by real data sets from businesses in the Netherlands.

To best utilise this report, it is assumed that the user has an *Excel* sheet with booking data containing the following columns:

- Arrival date
- Departure date
- Reservation date
- Nationality
- Postcode
- Room type
- Number of people per booking

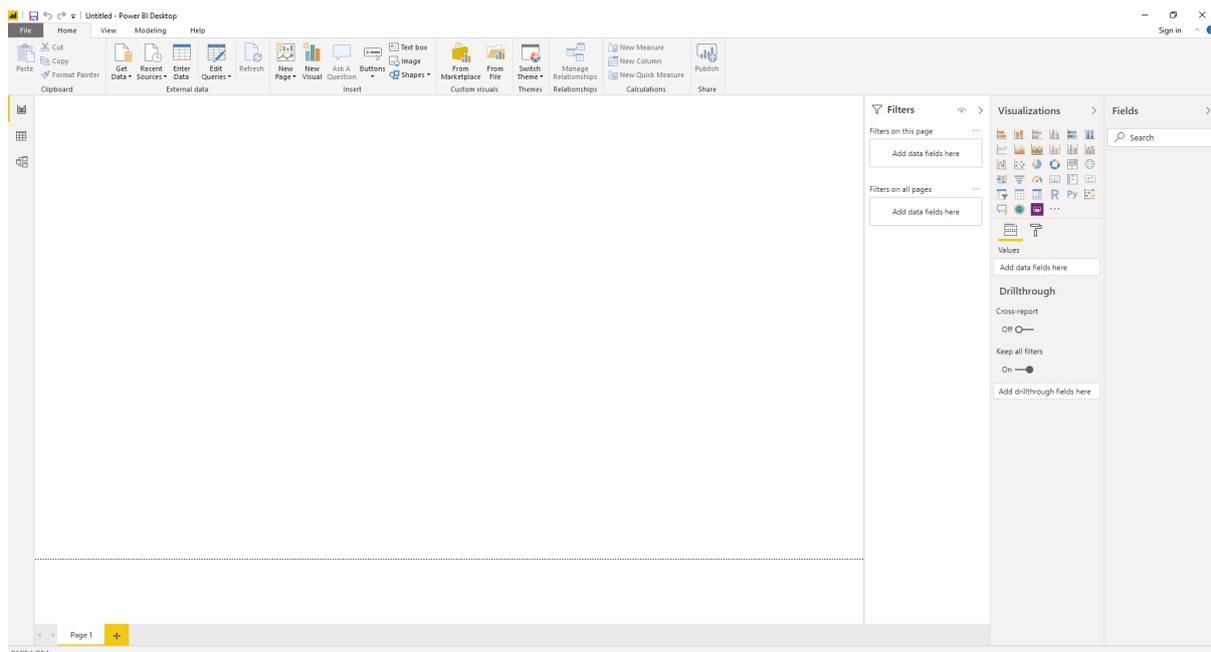


Figure 5. User interface of Power BI.

## 2.2 Loading Data

The first step is to load the data set of interest. The “Get Data” button in the top left corner of the screen (Figure 6) allows the user to load the data set. Once we have clicked the button a number of different data formats become visible and we can choose the relevant file type (Figure 7). For most readers *Excel* will be the most relevant choice, however, *Text/CSV* is another commonly used format for booking data and would also be usable for this manual.

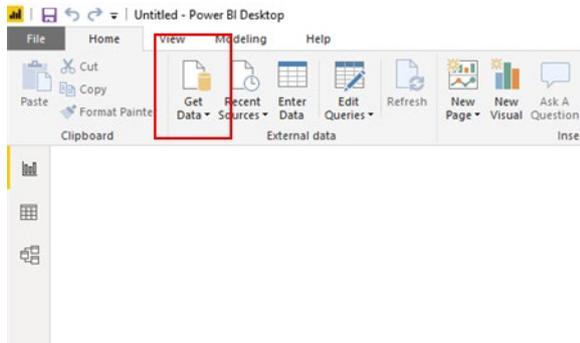


Figure 6. The “Get Data” button.

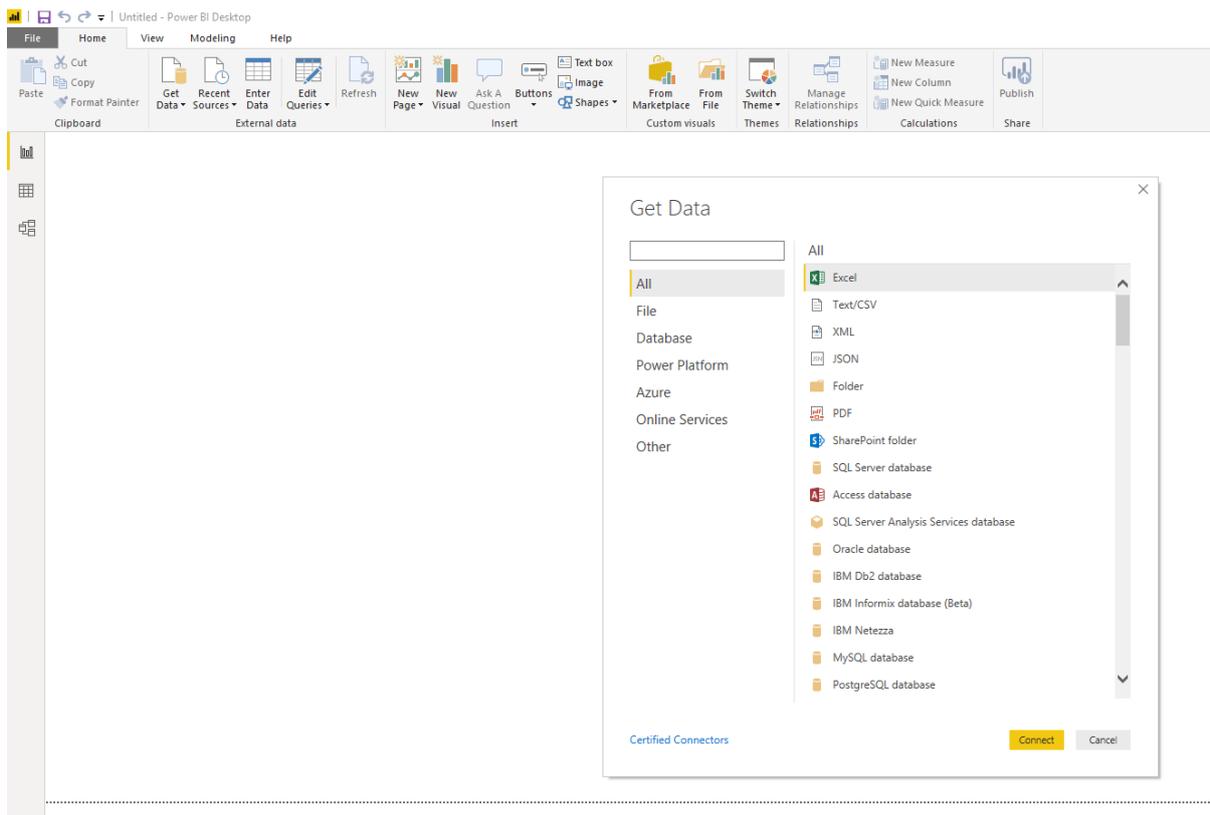


Figure 7. Different data types.

Once the file has been found the user can specify the data of interest. In this case we have an *Excel* file and we can choose which sheet we want to use (Figure 8). By selecting the sheet a preview screen will pop up (Figure 9), then press “Load”.

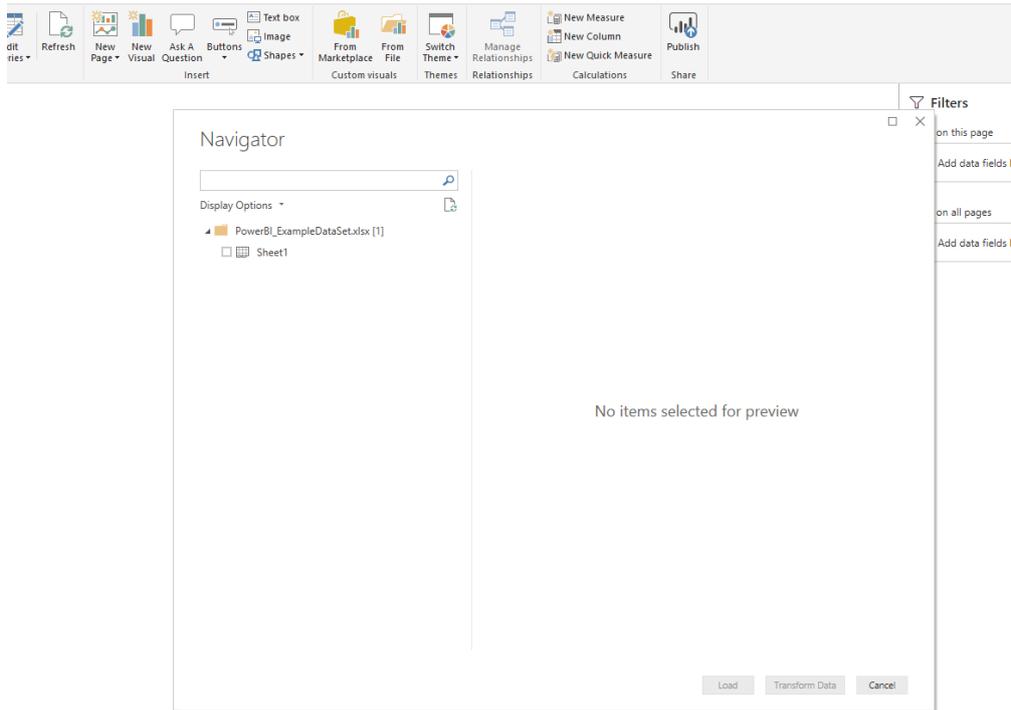


Figure 8. The file of interest. Note that the sheets of the Excel file are also visible (“Sheet1”).

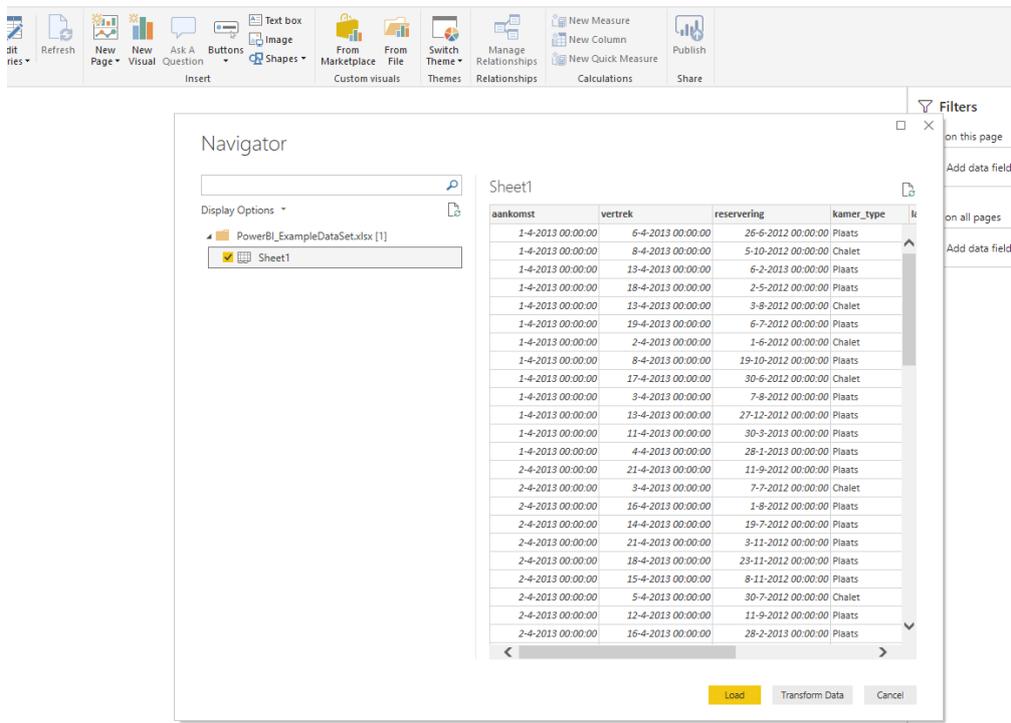


Figure 9. The file of interest with the selected Excel sheet. Power BI provides a preview of the data.

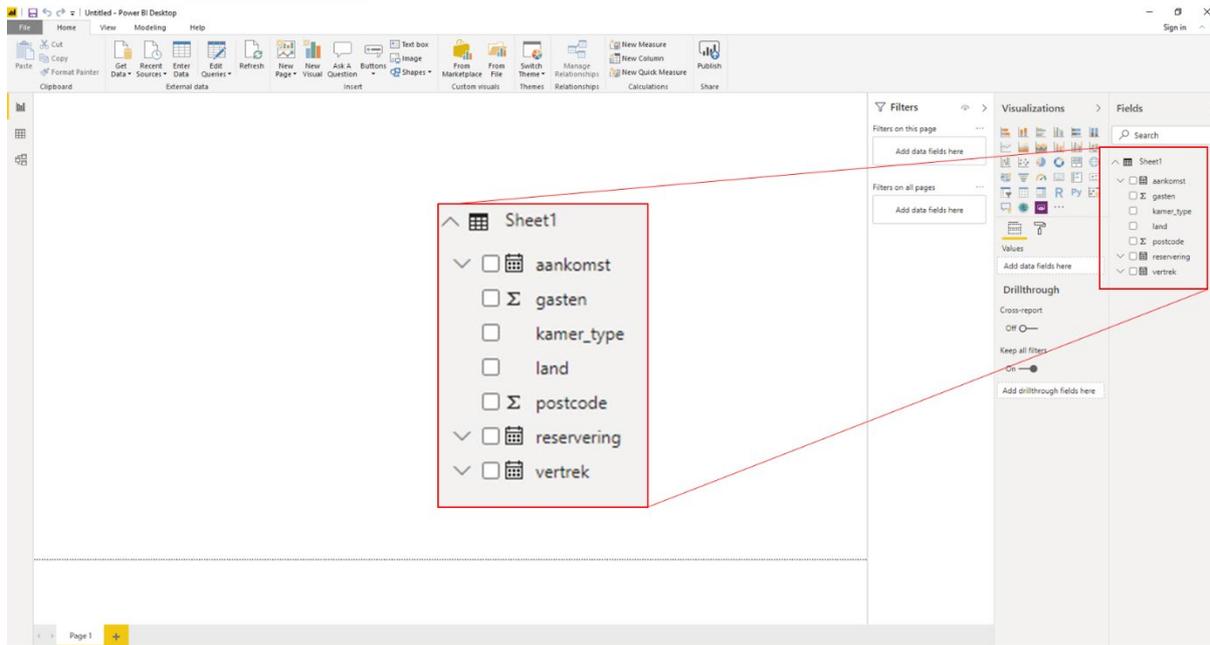


Figure 10. The columns in the data set.

Now that the data have been loaded we can see that the “Fields” plane has changed (Figure 10) and shows the columns of the *Excel* sheet “Sheet 1”. However the names are in Dutch so we can change these into English. An important button in *Power BI* is “Edit Queries” (Figure 11). This is used to modify the data set. Modifying a data set is very common so we will spend some time in this report showing basic operations.

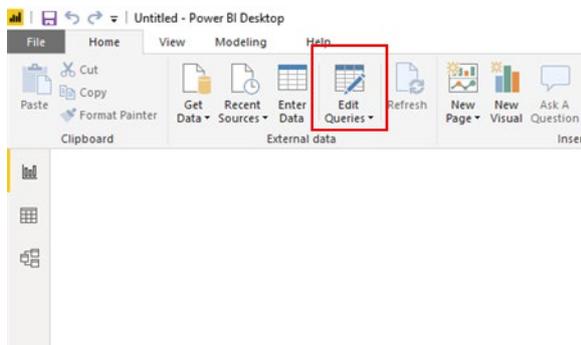


Figure 11. The “Edit Queries” button. This is used to change and manipulate the data.

By clicking the button “Edit Queries” a new window pops up (Figure 12). On the left hand side we can see the name of the data set, in this case “Sheet 1”. Change the name of the data set by right clicking “Sheet1” and replacing it with “All Data” (Figure 12). In the middle of the window we can see the columns of the data set. The symbols next to the column indicate what type of variable the column consists of (e.g. number, text or date). *Power BI* has already, correctly, identified the different data types.

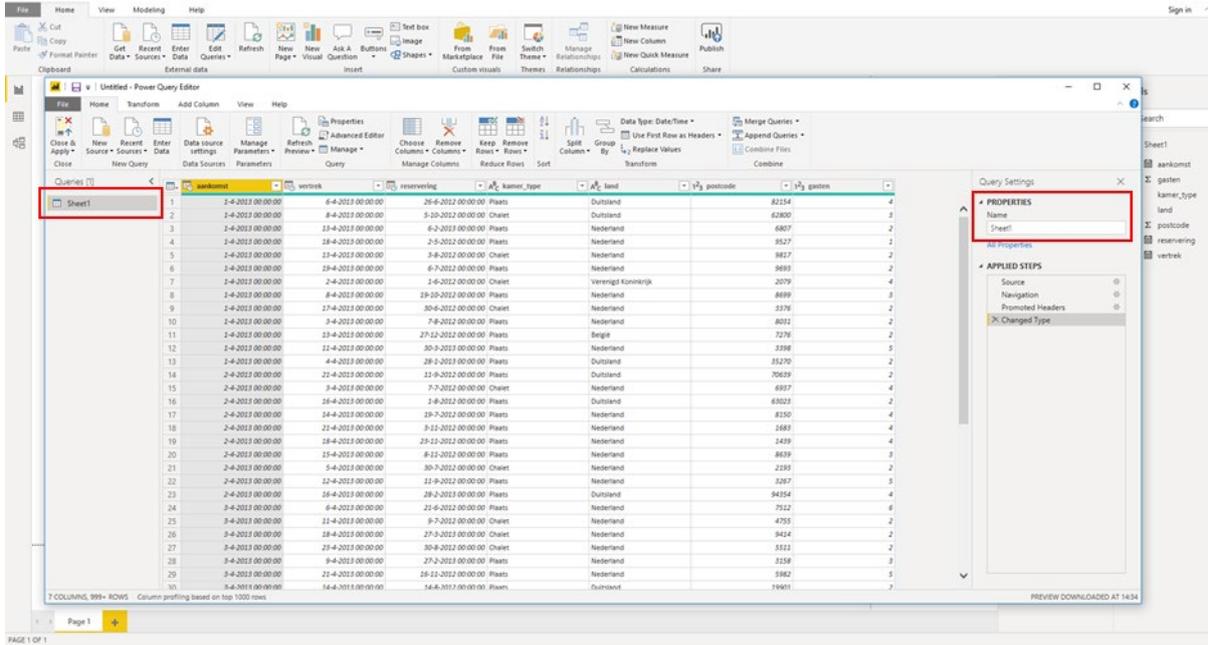


Figure 12. "Edit Queries" window and the name of the data set. Rename "Sheet1" to "All Data".

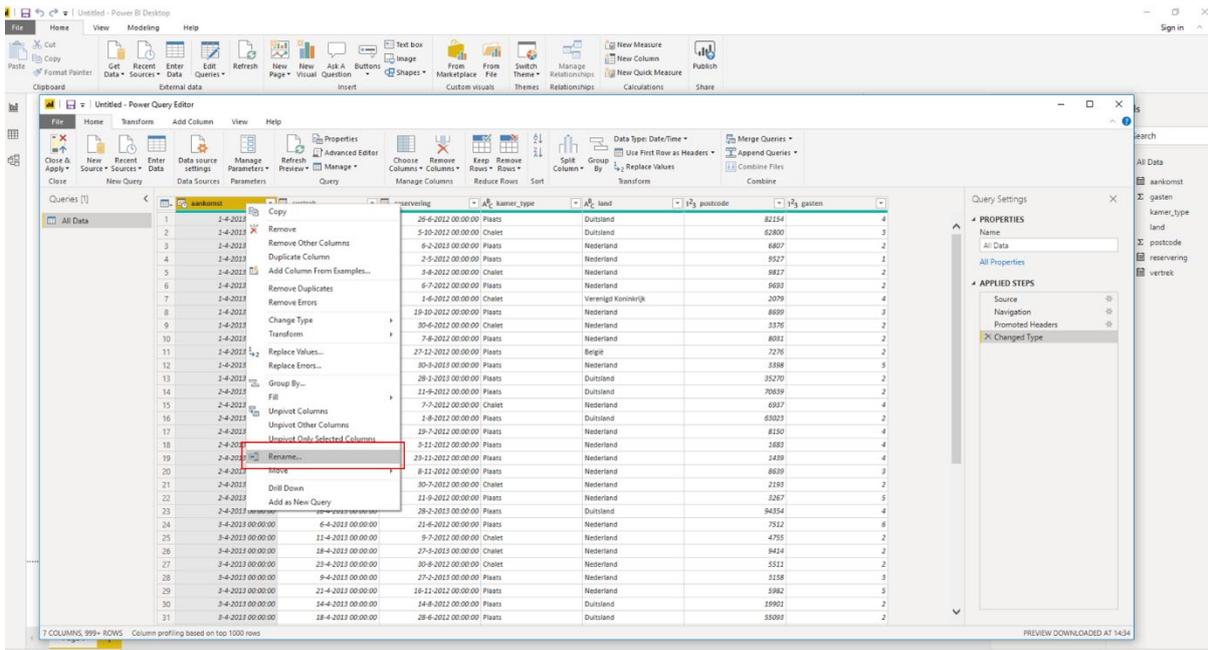


Figure 13. Renaming a column in "Edit Queries". Right click the column name.

As this manual is in English we will rename the columns (Figure 13). Change them to:

- aankomst: arrival
- vertrek: departure
- reservering: reservation
- kamer\_type: room\_type
- land: country
- postcode: postcode
- gasten: guests

The values can also be changed by right clicking the column name and selecting “Replace Values”. In the “room\_type” column replace “Plaats” with “Camping\_pitch”. In the “country” column change the following values:

- Nederland: Netherlands
- Duitsland: Germany
- België: Belgium

There are other countries in the list but these three countries are by far the most important. Finally click “Close & Apply” in the top left corner to apply these changes.

### 2.3 Adding Variables

Now that the data have been loaded and adjusted we can start to move onto the modelling side of data analysis. By creating variables it is possible to gain new or other insights from the data. A commonly used parameter in the hospitality industry is *lead time*. *Lead time* is the difference between the reservation date and the arrival date. So now we need to create this new variable. New columns can be added to the analysis by clicking the “New Column” button on the top of the screen (Figure 14).

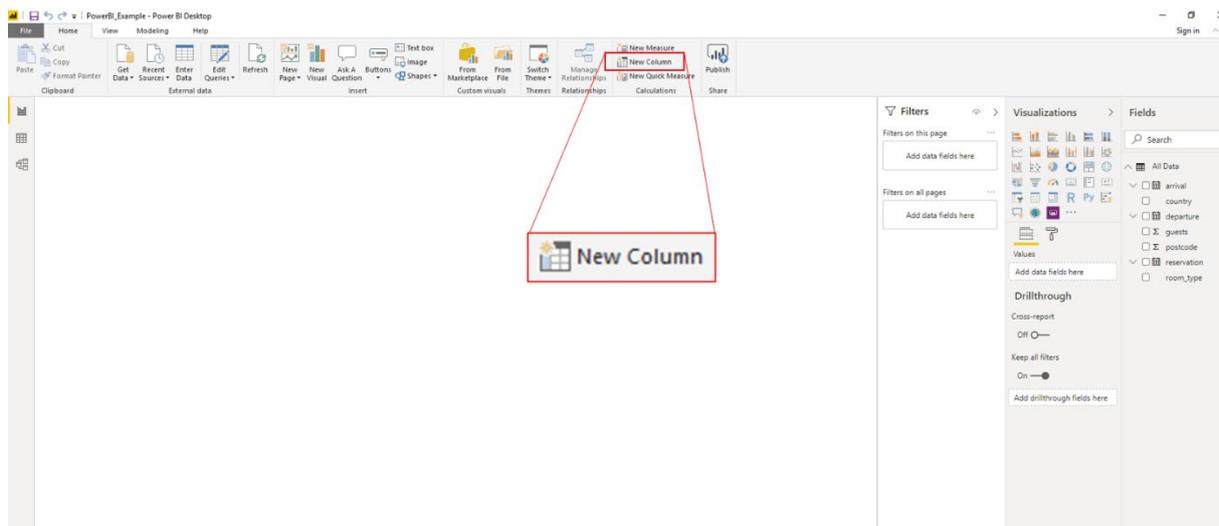


Figure 14. Creating a new column. Note that the column names on the right have changed after the actions of the previous section.

We need to perform a simple calculation to obtain the lead time as shown in Figure 15. The line on the top of the screen needs to be copied to create the variable. In general the line of code means:

- Variable = 1,0\*(‘name\_of\_data\_set’[‘column\_name’].[‘variable\_type’] – ‘name\_of\_data\_set’[‘column\_name’].[‘variable\_type’])

In *Power BI*:

- lead\_time = 1,0\*(‘All Data’[arrival].[Date] – ‘All Data’[reservation].[Date])

The booking date (“reservation”) is subtracted from the arrival date (“arrival”) and multiplied by 1 to obtain the result as a number instead of a date. We could also obtain the number of nights per booking (Figure 16) and the postcode district. Note the symbol in front of the newly created variables.

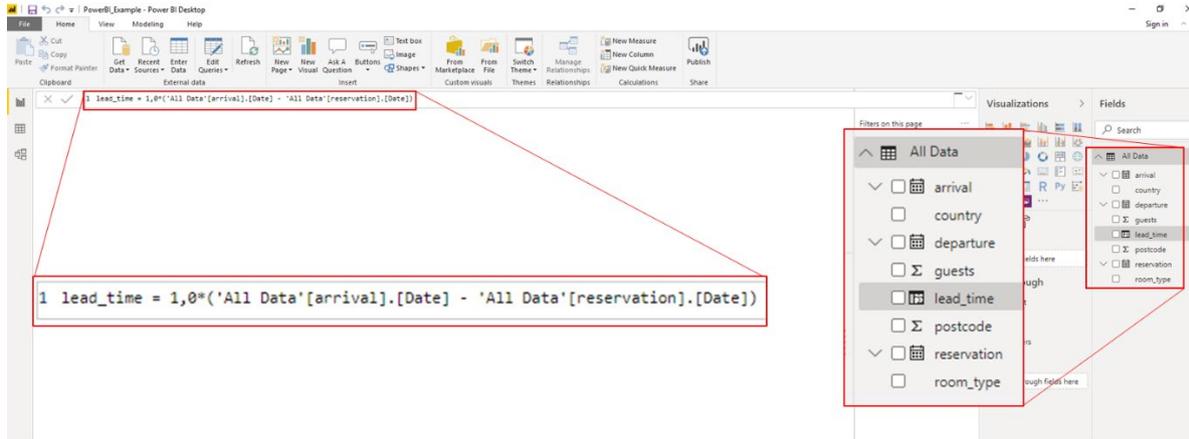


Figure 15. Adding the “lead\_time” variable.

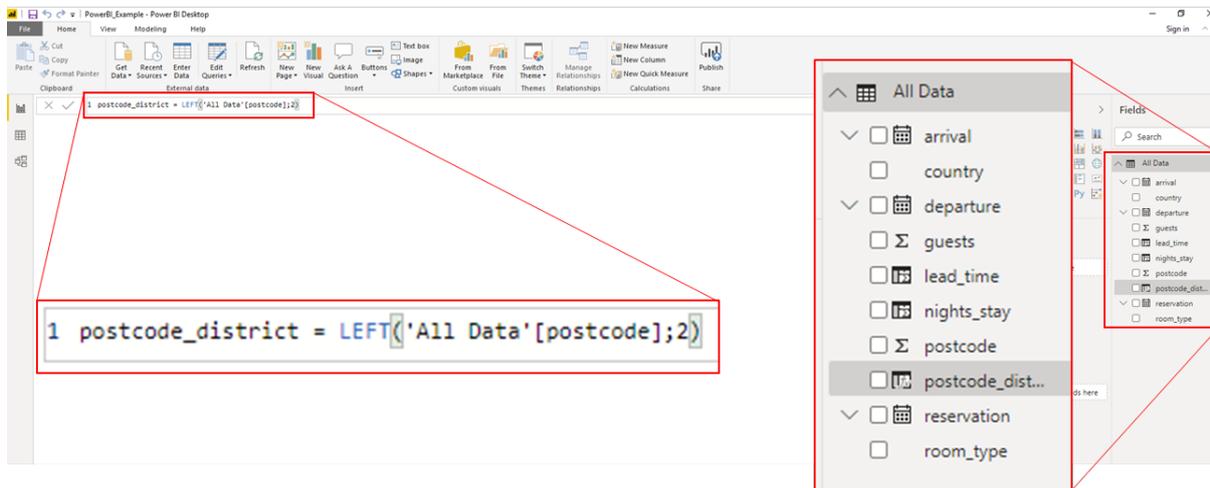
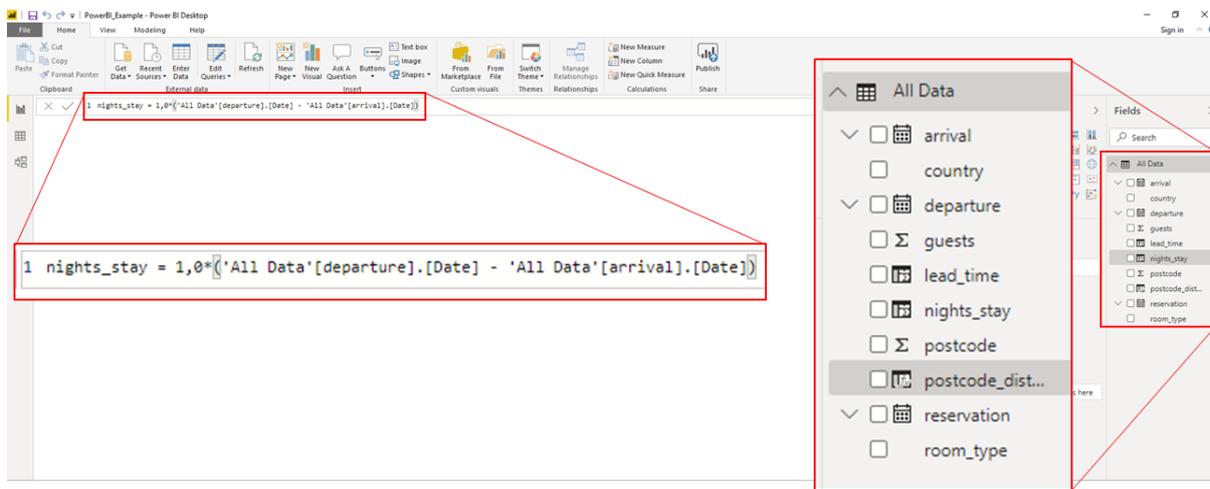


Figure 16. Adding the “nights\_stay” and “postcode\_district” variables.

By clicking on the “Data” button on the left side of the screen (Figure 17) the data columns are shown, including the ones that we have just made.

arrival	departure	reservation	room_type	country	postcode	guests	lead_time	nights_stay	postcode_district
1-4-2012 00:00:00	19-4-2012 00:00:00	6-2-2012 00:00:00	Camping_pitch	Netherlands	6807	2	54	12	68
1-4-2012 00:00:00	19-4-2012 00:00:00	6-2-2012 00:00:00	Camping_pitch	Netherlands	6899	2	269	18	96
1-4-2012 00:00:00	5-6-2012 00:00:00	2-6-2012 00:00:00	Camping_pitch	Netherlands	8021	2	237	1	80
3-4-2012 00:00:00	16-4-2012 00:00:00	1-2-2012 00:00:00	Camping_pitch	Netherlands	9170	2	61	13	91
4-4-2012 00:00:00	19-4-2012 00:00:00	4-5-2012 00:00:00	Camping_pitch	Netherlands	7876	2	835	15	78
5-4-2012 00:00:00	6-4-2012 00:00:00	19-10-2012 00:00:00	Camping_pitch	Netherlands	6250	2	174	1	82
6-4-2012 00:00:00	14-4-2012 00:00:00	9-2-2012 00:00:00	Camping_pitch	Netherlands	2332	2	56	8	23
8-4-2012 00:00:00	20-4-2012 00:00:00	1-6-2012 00:00:00	Camping_pitch	Netherlands	3302	2	309	14	33
7-4-2012 00:00:00	25-4-2012 00:00:00	6-2-2012 00:00:00	Camping_pitch	Netherlands	2720	2	82	15	37
8-4-2012 00:00:00	23-4-2012 00:00:00	24-1-2012 00:00:00	Camping_pitch	Netherlands	6085	2	74	15	60
8-4-2012 00:00:00	23-4-2012 00:00:00	18-10-2012 00:00:00	Camping_pitch	Netherlands	3930	2	172	17	39
8-4-2012 00:00:00	12-4-2012 00:00:00	4-6-2012 00:00:00	Camping_pitch	Netherlands	6885	2	308	4	68
9-4-2012 00:00:00	24-4-2012 00:00:00	19-8-2012 00:00:00	Camping_pitch	Netherlands	5633	2	294	15	56
10-4-2012 00:00:00	12-4-2012 00:00:00	14-3-2012 00:00:00	Camping_pitch	Netherlands	3409	2	27	2	34
10-4-2012 00:00:00	22-4-2012 00:00:00	8-1-2012 00:00:00	Camping_pitch	Netherlands	2942	2	82	11	29
12-4-2012 00:00:00	25-4-2012 00:00:00	25-11-2012 00:00:00	Camping_pitch	Netherlands	6155	2	196	14	61
12-4-2012 00:00:00	27-4-2012 00:00:00	30-10-2012 00:00:00	Camping_pitch	Netherlands	5121	2	164	15	51

Figure 17. "Data" view in Power BI.

### 3. Data Analysis

Now that the data has been prepared it can be analysed. In this chapter there will be examples of figures that business owners have found useful on an anecdotal basis. We will start the data analysis chapter with the question:

*“Where do my guests come from?”*

The first sections will detail how to obtain figures regarding the nationality and location of the guests. The variables that were created in the preceding chapter will now be plotted into figures. The second section will show how we can analyse the postcodes in a reservation data set. Lead time is useful metric to see differences in booking behaviour between different types of guests. The third and fourth sections will provide information to visualise the lead time.

#### 3.1 Nationality

We can analyse the nationality of the guests that visit the accommodation site. One way of presenting numbers is by using a pie chart. Go back to the “Report” view (Figure 17). Select the pie chart button under “Visualizations” and a figure will appear in the main window pane (Figure 18 ).

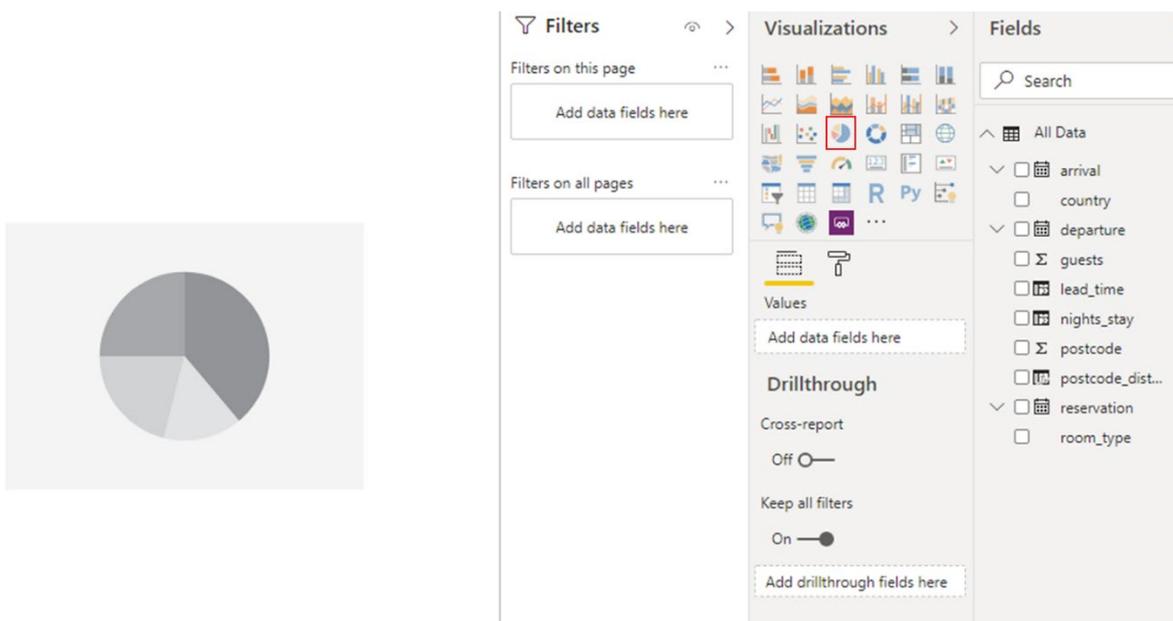
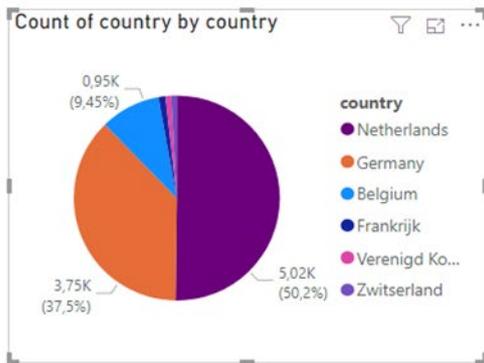
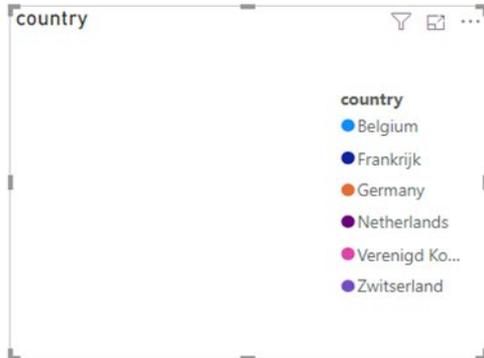


Figure 18. 1<sup>st</sup> step: adding a pie chart.

Now we can select which variable we want to visualise in the pie chart. Firstly we can make it a bit larger as the standard size is a bit small. Simply click the chart and drag an edge. Secondly we click on the empty chart and then on “country”, then the legend will pop up (Figure 19). By clicking and dragging “country” into the “Values” section a filled pie chart will appear. *Power BI* will automatically sort the values in descending order.



Filters on this visual: country is (All)

Filters on this page: Add data fields here

Filters on all pages: Add data fields here

Visualizations: Legend: country

Values: Count of country

Fields: country

Figure 19. 2<sup>nd</sup> step: selecting the variable of interest. “LAND” needs to be in the “Legend” and “Values” fields.

However, we may not like the chart as it currently is. Luckily there are many visualisation options in *Power BI*. Selecting the “Format” button (Figure 20) allows the user to change the figure. The sliders allow elements such as the legend or title to be hidden.

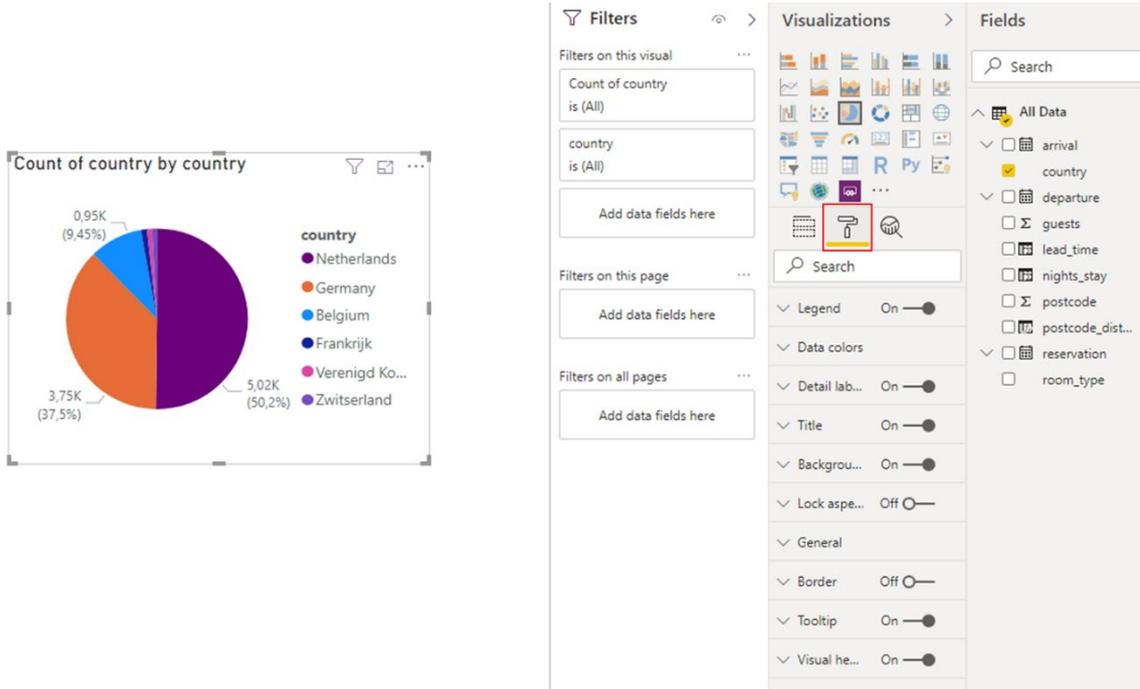


Figure 20. 3<sup>rd</sup> step: selecting the format button.

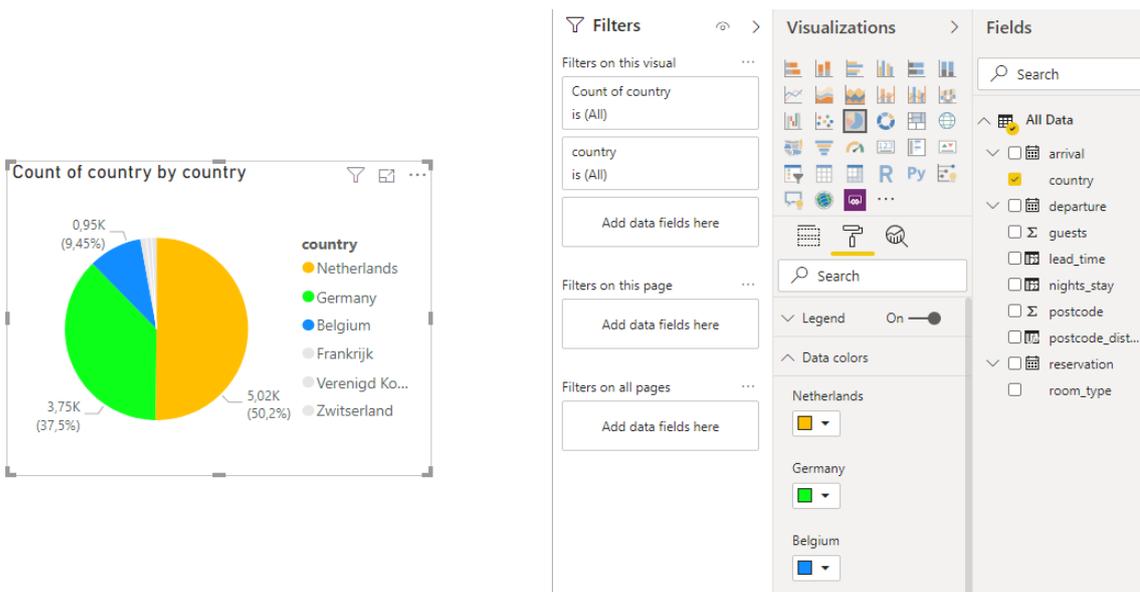


Figure 21. 4<sup>th</sup> STEP: changing the colours.

To change the colours press “Data colors” (Figure 21) and choose which data values you want to change. In this instance we have given the Netherlands, Germany and Belgium different colours as these are the most important countries in this data set. The other countries are negligible so we might as well remove them to make the figure more concise. Select “country” under “Filters” and choose the countries you want to see. Finally we can change the amount of decimal places for the percentage under “detail labels” (Figure 22).

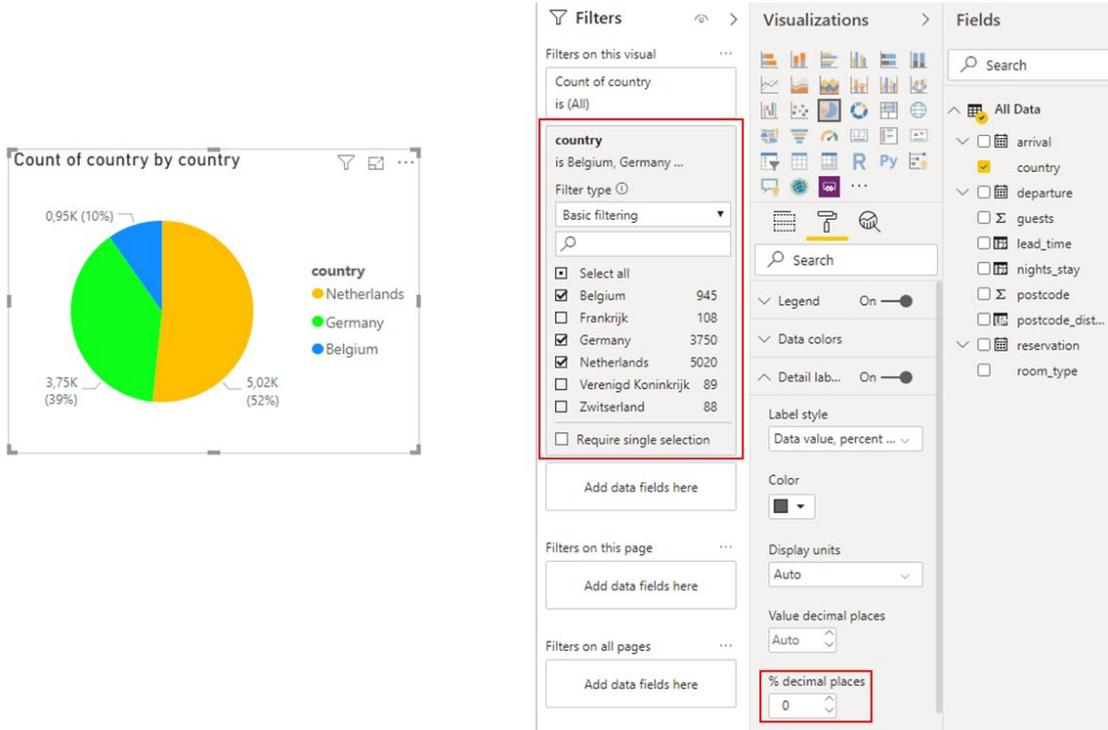


Figure 22. 5<sup>th</sup> step: Touching up the graph. Number of bookings per country. Note that if this were guests the percentages per country would probably change.

Whilst this type of chart might not result in large surprises for a business owner, it will show the most important markets concisely. In this graph all the different years have been lumped together. If we plot the data in time then we might see variations per year. Another common figure is a line chart (Figure 23). Move the pie chart to the left and then create a new line chart. It is also best to enlarge this one.

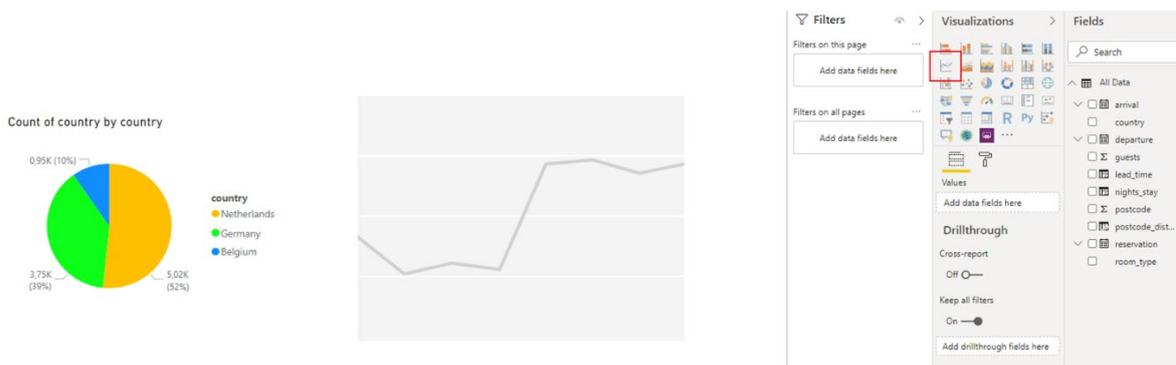


Figure 23. Creating a line chart.

Drag the "arrival" variable to the "Axis" field, "country" to the "Legend" field and "country" to the "Values" field (Figure 24). We only want the numbers per year so remove "Quarter", "Month" and "Day" (Figure 25) and select Belgium, Netherlands and Germany. Finally change the colours to the same pallet as for the pie chart which results in Figure 26. We can see that the number of Dutch reservations dropped noticeably in 2014, but has been recovering since. German and Belgian reservations have remained more steady over time.

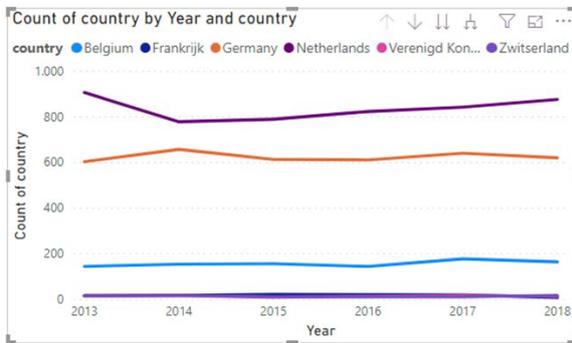


Figure 24. Selecting the right variables for the chart options.

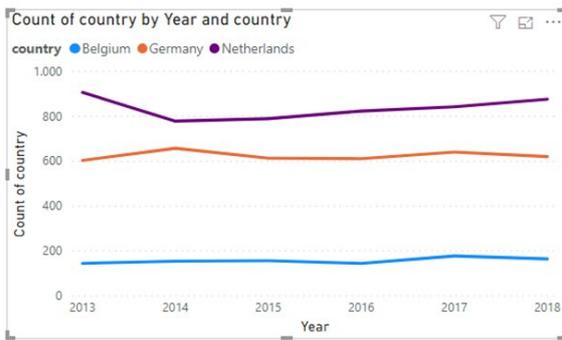


Figure 25. Adjust the line chart.

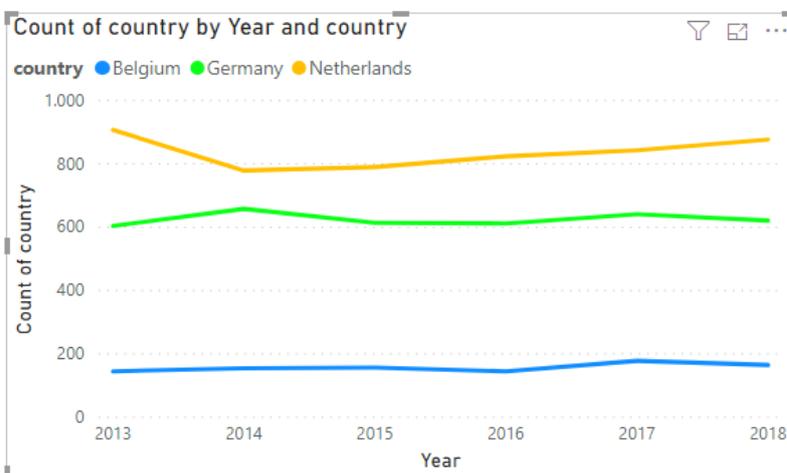


Figure 26. Number of reservations per country and per year.

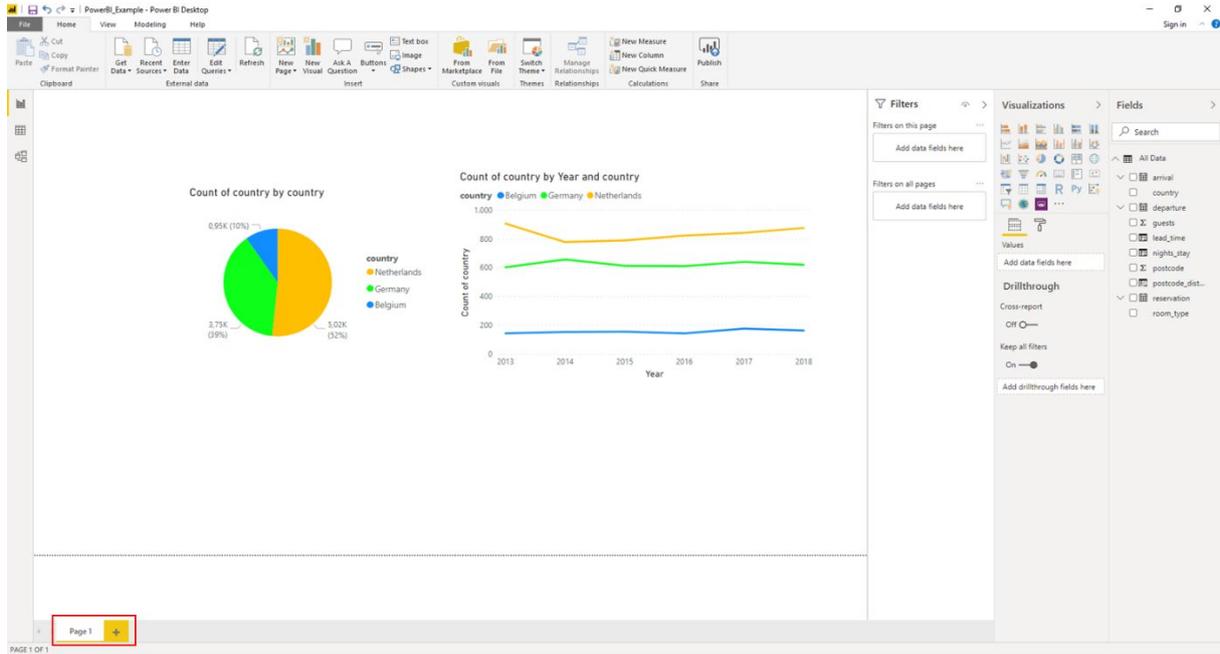


Figure 27. New page.

In the bottom left corner the page name can be adjusted by right clicking on it. Now is also the time to add a new page as we are going to make another type of graph. Name this new page "Postcode".

### 3.2 Postcode District

Building on the previous section we could now ask:

*“Where do my German guests live?”*

For many European countries the first two numbers indicate the postcode district which is usually associated with a city or part of a large city. In the example below most of the German guests of this (fake) accommodation provider come from the district number 76, which is the town of Karlsruhe. The differences between the districts are marginal as this is an artefact of the generated data. In reality the differences between accommodation providers can be stark. Even those that are essentially next to one another! These numbers could be used to see how reliant a business is on a part of a country and even province. This knowledge could then be used to adapt the marketing strategy.

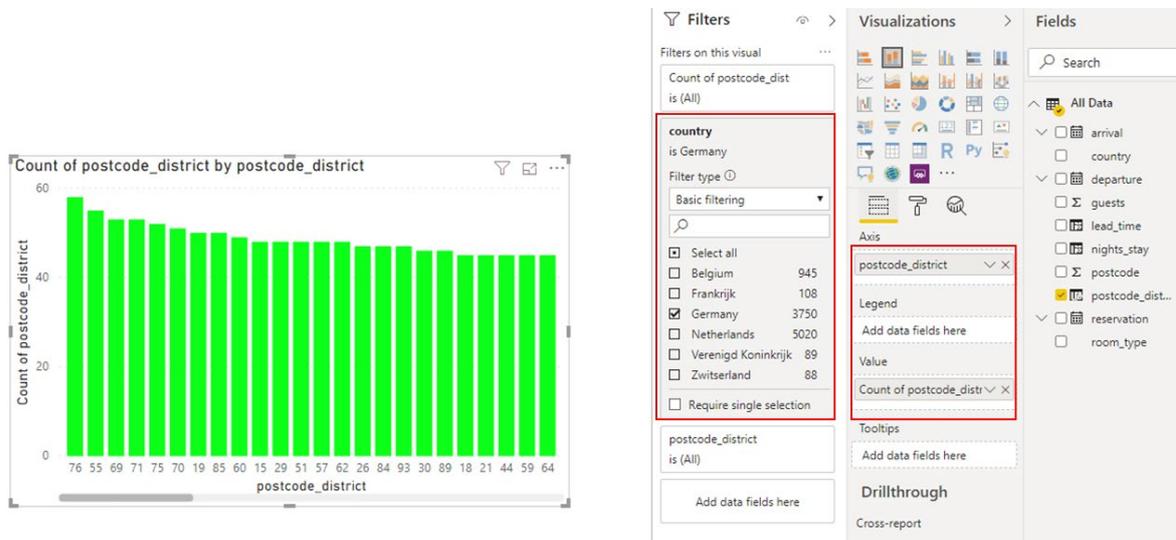


Figure 28. Frequency of German postcode districts plotted as a bar chart.

This image can be made by selecting a vertical stacked bar chart under “Visualizations” and then dragging the variable “postcode\_district” to the “Axis” data field and “Value” data field. We can apply filters to remove erroneous values, such as single digits or blank rows, in the “Filters” section. In this case we only want to analyse the German guests. Drag “country” to “Filters” (Figure 28) and select Germany under the filter “**country** is Germany”. Filters can be applied to one visual, as in this case, entire page or even all pages. Figure 28 shows the numbers for all years in the data set. To look at one year we need to apply another filter. Drag the “arrival” variable to an empty field and then select “Advanced filtering” (Figure 29). The first and last date can then be chosen.

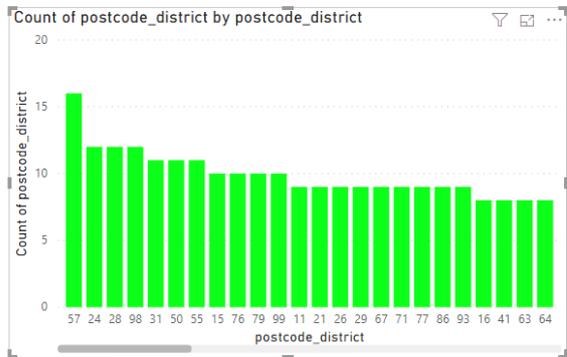


Figure 29. Number of bookings per postcode district for German guests with a date filter.

### 3.3 Lead Time

Lead time is a useful metric to see how far out the guests book ahead. Ideally the guests would book well ahead of their visit. There can be large differences between holidays and nationalities and advertising can be better optimised when you know when a guest books. Because of the large differences in time, in the real world, it is best to chop up the data based on holidays. This requires some more complicated steps than the previous figures and hence we will use “Edit Queries” again.

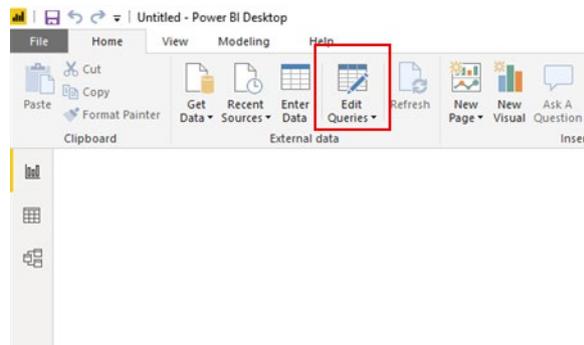


Figure 30. The “Edit Queries” button. This is used to change and manipulate the data.

After opening the “Edit Queries” window, right click the data sheet and press “Duplicate” (Figure 31). This will create a copy of the existing data set. We will first look at reservations for the summer holiday of 2018, so rename it to: “Jul\_Aug\_2018”. As we are only interested in these two months we need to apply a filter to the arrival dates.

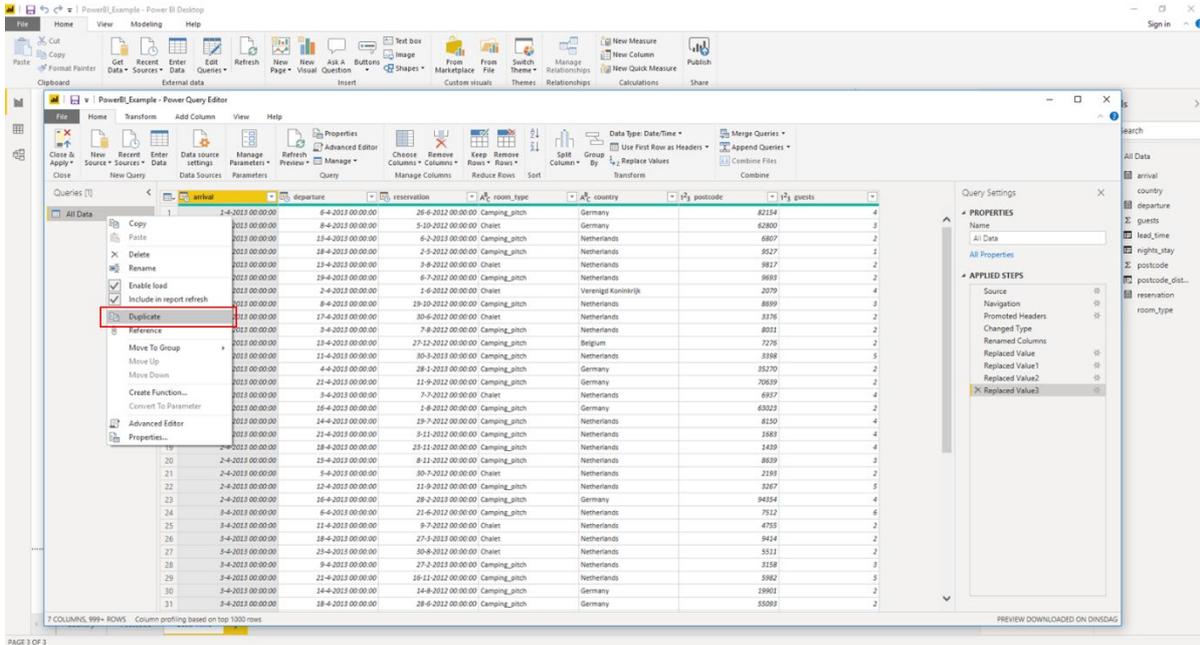


Figure 31. Duplicating the existing data set.

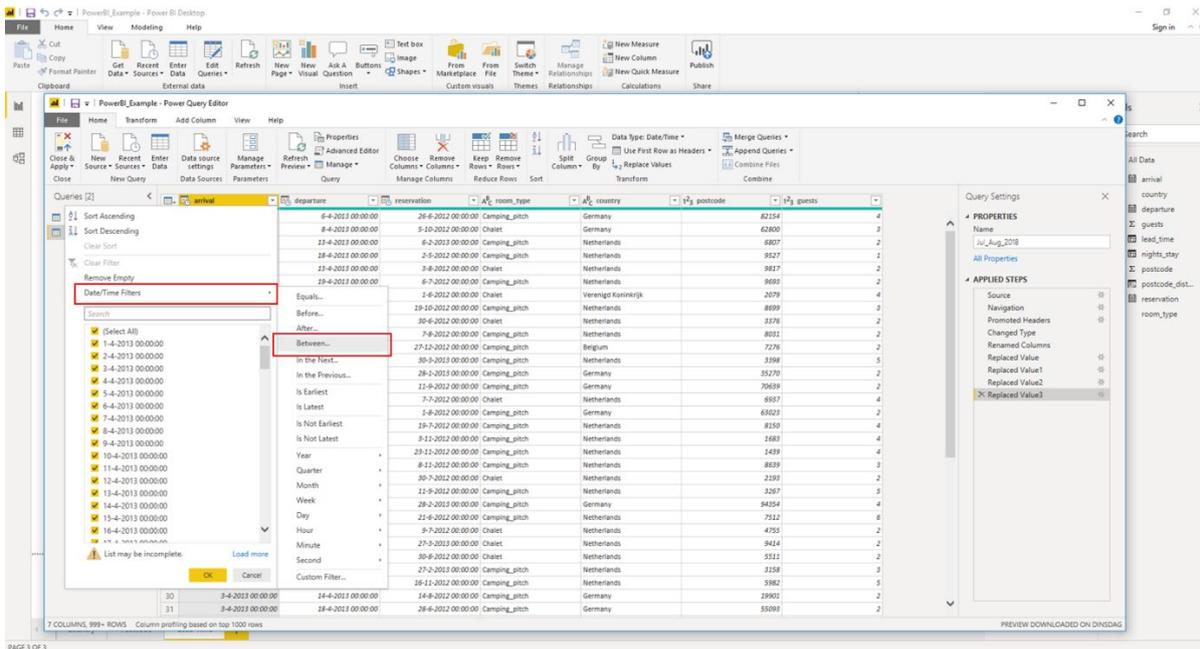


Figure 32. Filtering the date/time values.

Click the arrow down button on the arrival column and select “Date/Time Filters” (Figure 32) and then “Between”. Note that under “Between” Power BI provides a lot of other possible filters for easy selection date/time selection. We will analyse July and Augustus as these two months are the busiest of the year (Figure 33). As you can see the dates have now been filtered.

reservation	room_type	country	postcode	guests	
1-4-2013 00:00:00	26-6-2012 00:00:00	Camping_pitch	Germany	82154	4
1-4-2013 00:00:00	5-10-2012 00:00:00	Chalet	Germany	62800	3
1-4-2013 00:00:00					2
1-4-2013 00:00:00					1
1-4-2013 00:00:00					2
1-4-2013 00:00:00					2
1-4-2013 00:00:00					4
1-4-2013 00:00:00					3
1-4-2013 00:00:00					2
1-4-2013 00:00:00					2
1-4-2013 00:00:00					5
1-4-2013 00:00:00					2
1-4-2013 00:00:00					2
1-4-2013 00:00:00					4
1-4-2013 00:00:00					2
1-4-2013 00:00:00					4
1-4-2013 00:00:00					4
1-4-2013 00:00:00					4
1-4-2013 00:00:00					4
1-4-2013 00:00:00					3
1-4-2013 00:00:00					2

Figure 33. Filtering the summer holiday dates for 2018.

arrival	departure	reservation	room_type	country
1-7-2018 00:00:00	11-7-2018 00:00:00	3-12-2017 00:00:00	Camping_pitch	Netherlands
1-7-2018 00:00:00	13-7-2018 00:00:00	4-10-2017 00:00:00	Chalet	Netherlands
1-7-2018 00:00:00	10-7-2018 00:00:00	12-2-2018 00:00:00	Camping_pitch	Germany
1-7-2018 00:00:00	7-7-2018 00:00:00	21-11-2017 00:00:00	Chalet	Netherlands
1-7-2018 00:00:00	7-7-2018 00:00:00	26-12-2017 00:00:00	Camping_pitch	Germany
1-7-2018 00:00:00	14-7-2018 00:00:00	3-10-2017 00:00:00	Camping_pitch	Netherlands
2-7-2018 00:00:00	11-7-2018 00:00:00	17-12-2017 00:00:00	Camping_pitch	Germany
2-7-2018 00:00:00	15-7-2018 00:00:00	17-10-2017 00:00:00	Camping_pitch	Germany
2-7-2018 00:00:00	9-7-2018 00:00:00	8-6-2018 00:00:00	Chalet	Netherlands
2-7-2018 00:00:00	20-7-2018 00:00:00	13-1-2018 00:00:00	Camping_pitch	Netherlands
2-7-2018 00:00:00	13-7-2018 00:00:00	31-7-2017 00:00:00	Chalet	Germany
3-7-2018 00:00:00	11-7-2018 00:00:00	16-3-2018 00:00:00	Camping_pitch	Netherlands
3-7-2018 00:00:00	23-7-2018 00:00:00	27-3-2018 00:00:00	Camping_pitch	Netherlands
3-7-2018 00:00:00	12-7-2018 00:00:00	14-9-2017 00:00:00	Camping_pitch	Germany
3-7-2018 00:00:00	17-7-2018 00:00:00	9-12-2017 00:00:00	Chalet	Germany
3-7-2018 00:00:00	18-7-2018 00:00:00	17-3-2018 00:00:00	Chalet	Netherlands
3-7-2018 00:00:00	4-7-2018 00:00:00	10-5-2018 00:00:00	Camping_pitch	Netherlands
3-7-2018 00:00:00	8-7-2018 00:00:00	26-9-2017 00:00:00	Camping_pitch	Germany
4-7-2018 00:00:00	8-7-2018 00:00:00	31-5-2018 00:00:00	Chalet	Netherlands
4-7-2018 00:00:00	5-7-2018 00:00:00	27-2-2018 00:00:00	Chalet	Netherlands
4-7-2018 00:00:00	24-7-2018 00:00:00	22-4-2018 00:00:00	Chalet	Germany
4-7-2018 00:00:00	14-7-2018 00:00:00	22-8-2017 00:00:00	Camping_pitch	Germany
4-7-2018 00:00:00	24-7-2018 00:00:00	7-12-2017 00:00:00	Chalet	Netherlands
4-7-2018 00:00:00	17-7-2018 00:00:00	10-9-2017 00:00:00	Camping_pitch	Netherlands

Figure 34. Adding a new column.

For our plot we are going to need new columns. Create a new column (Figure 34). Then fill in the requirements as in Figure 35 and click “OK”. The new column can be seen in Figure 36. Note that the “lead\_time” variable has been identified as a date and that the actions we have just performed have been added to “APPLIED STEPS”.

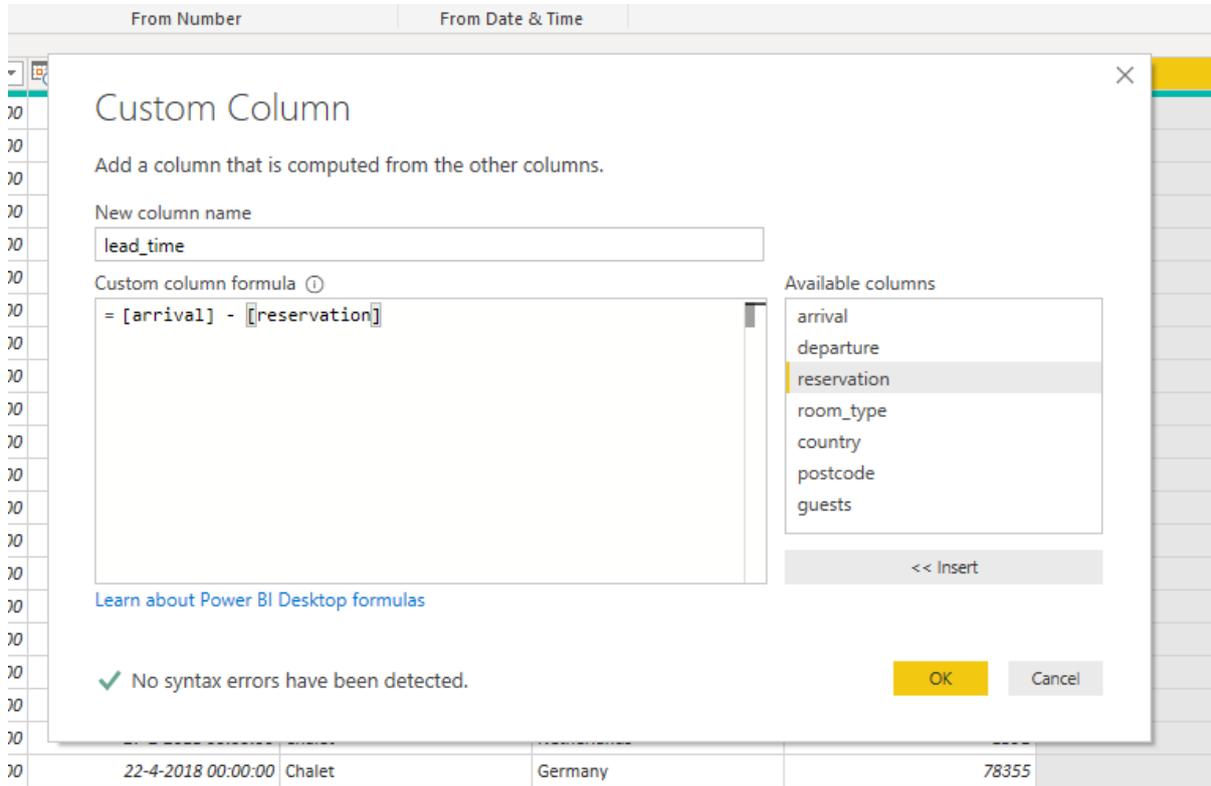


Figure 35. Calculating a lead time column.

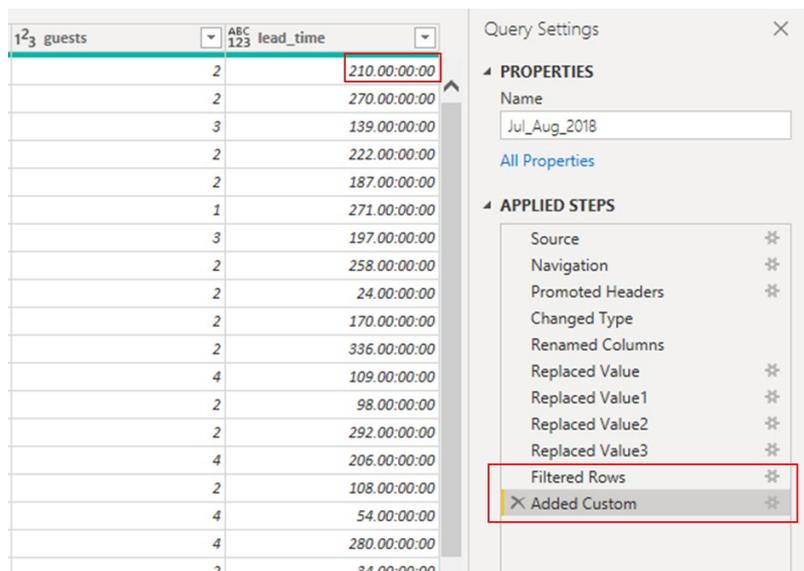


Figure 36. Applied steps and wrong data format.

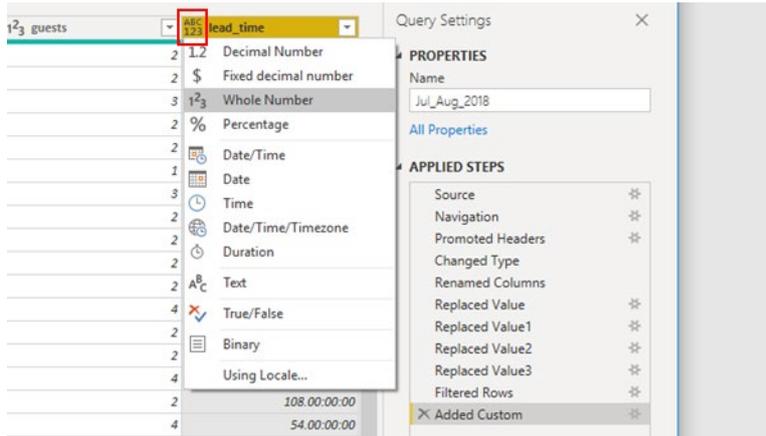


Figure 37. Changing the lead time to a whole number.

There is a problem with the new “lead\_time” column. The values have been identified as a date/time value whilst we would like a whole number. Click “ABC 123” next to the column name and then select “Whole Number”. For our chart we need the lead time to be sorted. Click the down arrow and then select “Sort Descending”.

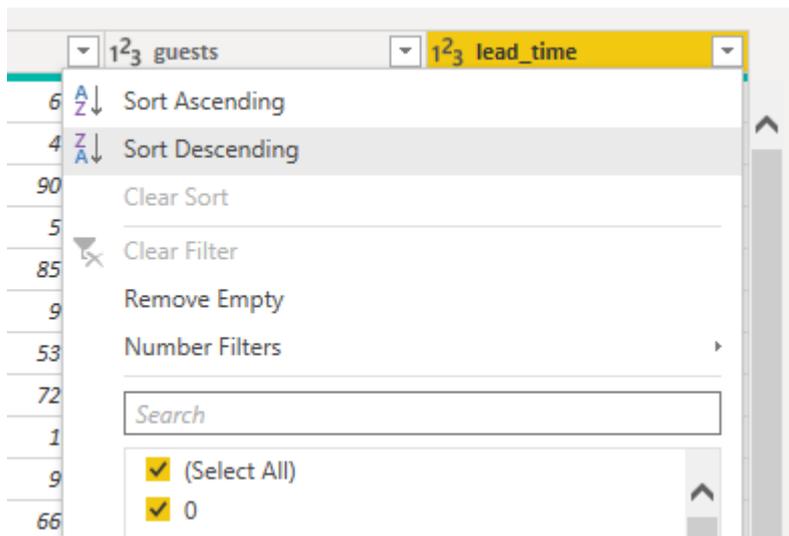


Figure 38. Sorting the lead time column.

Next an index column needs to be created. Click the down arrow (Figure 39) and select starting from 1. Finally click “Close & Apply” in the top left corner to apply these changes. The new data sheet will be visible in the “Fields” section (Figure 40).

PowerBI\_Example - Power Query Editor

File Home Transform Add Column View Help

Column From Examples Custom Column Invoke Custom Function

General

Conditional Column Index Column Duplicate Column

ABC 123 Extract Format Parse From Text

Statistics Standard Scientific Trigonometry Rounding Information From Number

Date Time Duration From Date & Time

Queries [2]

All Data Jul\_Aug\_2018

	arrival	departure	reservation	room_type	country
1	1-7-2018 00:00:00	11-7-2018 00:00:00	3-12-2017 00:00:00	Camping_pitch	Netherlands
2	1-7-2018 00:00:00	13-7-2018 00:00:00	4-10-2017 00:00:00	Chalet	Netherlands
3	1-7-2018 00:00:00	10-7-2018 00:00:00	12-2-2018 00:00:00	Camping_pitch	Germany
4	1-7-2018 00:00:00	7-7-2018 00:00:00	21-11-2017 00:00:00	Chalet	Netherlands
5	1-7-2018 00:00:00	7-7-2018 00:00:00	26-12-2017 00:00:00	Camping_pitch	Germany
6	1-7-2018 00:00:00	14-7-2018 00:00:00	3-10-2017 00:00:00	Camping_pitch	Netherlands
7	2-7-2018 00:00:00	11-7-2018 00:00:00	17-12-2017 00:00:00	Camping_pitch	Germany
8	2-7-2018 00:00:00	15-7-2018 00:00:00	17-10-2017 00:00:00	Camping_pitch	Germany
9	2-7-2018 00:00:00	9-7-2018 00:00:00	8-6-2018 00:00:00	Chalet	Netherlands
10	2-7-2018 00:00:00	20-7-2018 00:00:00	13-1-2018 00:00:00	Camping_pitch	Netherlands
11	2-7-2018 00:00:00	13-7-2018 00:00:00	31-7-2017 00:00:00	Chalet	Germany
12	3-7-2018 00:00:00	11-7-2018 00:00:00	16-3-2018 00:00:00	Camping_pitch	Netherlands
13	3-7-2018 00:00:00	23-7-2018 00:00:00	27-3-2018 00:00:00	Camping_pitch	Netherlands
14	3-7-2018 00:00:00	12-7-2018 00:00:00	14-9-2017 00:00:00	Camping_pitch	Germany
15	3-7-2018 00:00:00	17-7-2018 00:00:00	9-12-2017 00:00:00	Chalet	Germany
16	3-7-2018 00:00:00	18-7-2018 00:00:00	17-3-2018 00:00:00	Chalet	Netherlands
17	3-7-2018 00:00:00	4-7-2018 00:00:00	10-5-2018 00:00:00	Camping_pitch	Netherlands
18	3-7-2018 00:00:00	8-7-2018 00:00:00	26-9-2017 00:00:00	Camping_pitch	Germany
19	4-7-2018 00:00:00	8-7-2018 00:00:00	31-5-2018 00:00:00	Chalet	Netherlands
20	4-7-2018 00:00:00	5-7-2018 00:00:00	27-2-2018 00:00:00	Chalet	Netherlands
21	4-7-2018 00:00:00	24-7-2018 00:00:00	22-4-2018 00:00:00	Chalet	Germany
22	4-7-2018 00:00:00	14-7-2018 00:00:00	22-8-2017 00:00:00	Camping_pitch	Germany
23	4-7-2018 00:00:00	24-7-2018 00:00:00	7-12-2017 00:00:00	Chalet	Netherlands
24	4-7-2018 00:00:00	17-7-2018 00:00:00	10-9-2017 00:00:00	Camping_pitch	Netherlands

Figure 39. Adding an index column.

PowerBI\_Example - Power BI Desktop

File Home View Modeling Help

Clipboard Paste Copy Format Painter Get Sources Enter Data Edit Queries Refresh New Page Add A Visual Question Buttons Shapes Custom visuals From Marketplace From File Switch Theme Manage Relationships New Quick Measure Publish

Filters

Filters on this page Add data fields here

Filters on all pages Add data fields here

Visualizations

Fields

Search

All Data

arrival

country

departure

guests

lead\_time

night\_stay

postcode

postcode\_dist

reservation

room\_type

Jul\_Aug\_2018

arrival

country

departure

guests

Index

lead\_time

postcode

reservation

room\_type

Figure 40. New data set is visible.

We would like to display the results in percentages so we need to create one last column to do that. Add a new column called “percentage\_reservation” (Figure 41). Under the “Data” tab (Figure 42) the column will be visible.

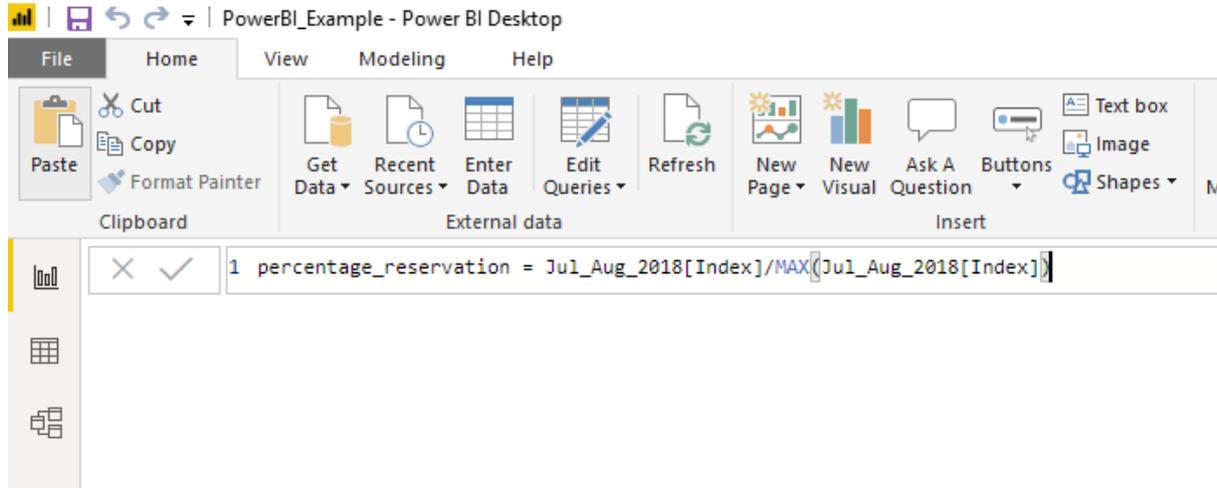


Figure 41. Equation for the variable “percentage\_reservation”.

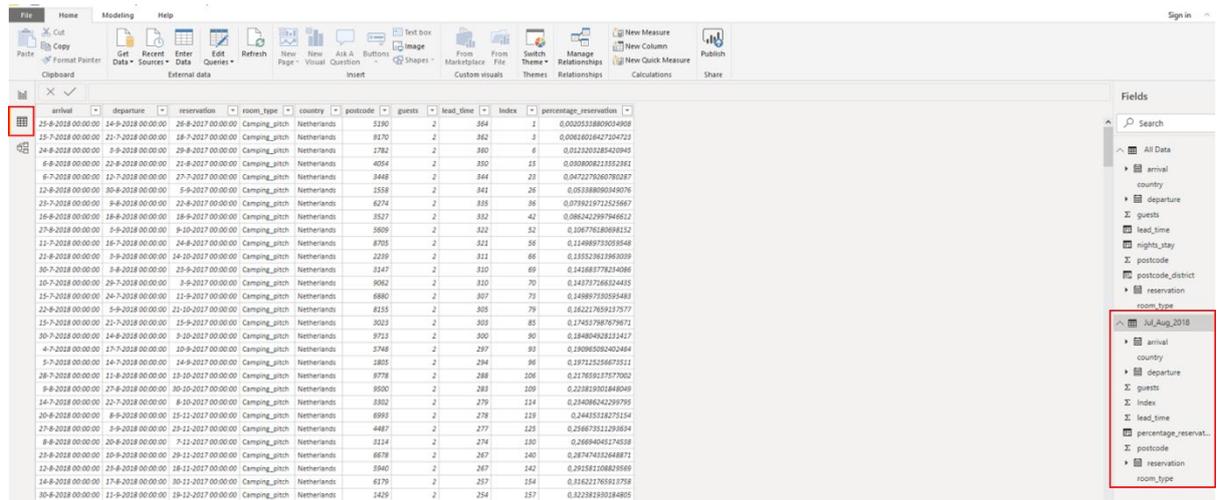


Figure 42. New data set in the “Fields” window.

We want a percentage so select the new column and click the percentage symbol to change the value format (Figure 43). Return back to the report page, select a line chart and fill in the fields as in Figure 44. Now you know how to create a lead time graph!

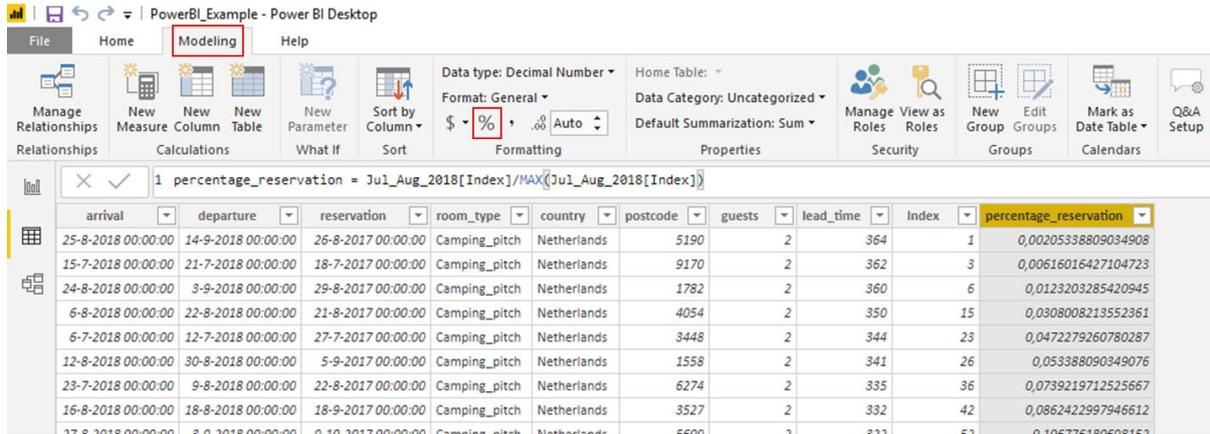


Figure 43. Changing the variable type to a percentage.

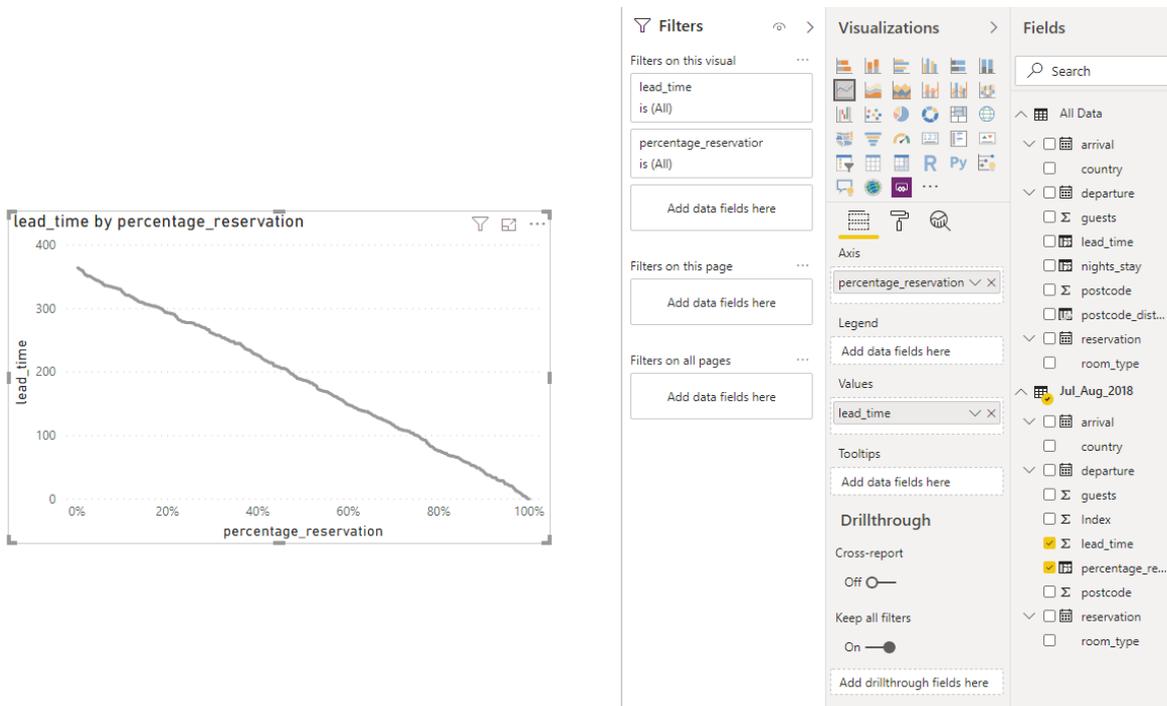


Figure 44. Lead time for all guests.

### 3.4 Lead Time, Comparisons

Lead time becomes more interesting when comparing different nationalities with each other. In this data set all the reservations are generated in the same manner so the differences are too small to be interesting. In reality they can be very big. For instance one group likes to book hundreds of days ahead whilst another will tend to book three weeks or less ahead. For this example we will look at Belgian guests in the same summer period and produce a line chart for the lead time. To do this follow these steps:

- Select “Edit Queries”
- Duplicate the summer data set and call it: “Jul\_Aug\_2018\_Bel” (Figure 45)
- Remove the index column in the new data set
- Filter “country” so that only Belgium remains
- Create a new index column
- Apply & close the new data
- Add a “percentage\_reservation” column to this new data set (Figure 41)
- Create a line chart for the lead time (Figure 44)

reservation	room_type	country	postcode	guests	lead_time	Index
1 5-9-2018 00:00:00	11-9-2017 00:00:00	Camping_pitch	Belgium	4192	2	351
2 5-8-2018 00:00:00	13-8-2017 00:00:00	Chalet	Belgium	6400	4	349
3 25-7-2018 00:00:00	19-8-2017 00:00:00	Chalet	Belgium	7088	5	336
4 27-8-2018 00:00:00	24-8-2017 00:00:00	Camping_pitch	Belgium	8801	3	325
5 15-7-2018 00:00:00	24-8-2017 00:00:00	Camping_pitch	Belgium	1933	2	323
6 10-8-2018 00:00:00	9-9-2017 00:00:00	Chalet	Belgium	4502	2	320
7 20-8-2018 00:00:00	2-10-2017 00:00:00	Chalet	Belgium	5225	2	304
8 29-7-2018 00:00:00	23-9-2017 00:00:00	Camping_pitch	Belgium	3532	4	302
9 1-9-2018 00:00:00	5-11-2017 00:00:00	Chalet	Belgium	2346	4	293
10 19-7-2018 00:00:00	8-10-2017 00:00:00	Camping_pitch	Belgium	8879	2	282
11 24-7-2018 00:00:00	25-10-2017 00:00:00	Chalet	Belgium	1898	5	259
12 21-7-2018 00:00:00	13-11-2017 00:00:00	Camping_pitch	Belgium	4107	5	249
13 20-7-2018 00:00:00	16-11-2017 00:00:00	Camping_pitch	Belgium	3529	2	245
14 1-8-2018 00:00:00	19-11-2017 00:00:00	Camping_pitch	Belgium	7694	3	245
15 3-8-2018 00:00:00	30-11-2017 00:00:00	Chalet	Belgium	5327	3	240
16 5-8-2018 00:00:00	21-11-2017 00:00:00	Chalet	Belgium	2234	2	239
17 4-9-2018 00:00:00	11-1-2018 00:00:00	Chalet	Belgium	8876	2	231
18 28-8-2018 00:00:00	8-1-2018 00:00:00	Camping_pitch	Belgium	7190	2	229
19 12-9-2018 00:00:00	11-1-2018 00:00:00	Chalet	Belgium	4190	2	225
20 2-9-2018 00:00:00	14-1-2018 00:00:00	Camping_pitch	Belgium	8889	1	218
21 1-8-2018 00:00:00	23-12-2017 00:00:00	Camping_pitch	Belgium	4477	1	214
22 15-7-2018 00:00:00	7-1-2018 00:00:00	Chalet	Belgium	9548	4	186

Figure 45. A new summer data set for Belgian guests.

The final result should look like the graph in Figure 46. The filters in the “Edit Queries” window could be used to look at different countries and/or mix in the different room types. A lot of different lead time graphs are possible in a data set that contains these variables. Figure 47 shows different booking patterns that have been seen in real data sets. For some holidays different nationalities might show the complete opposite behaviour.

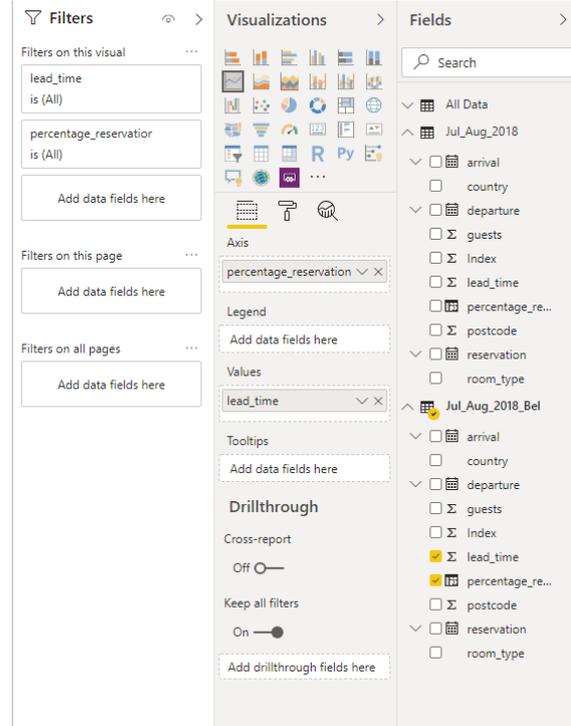
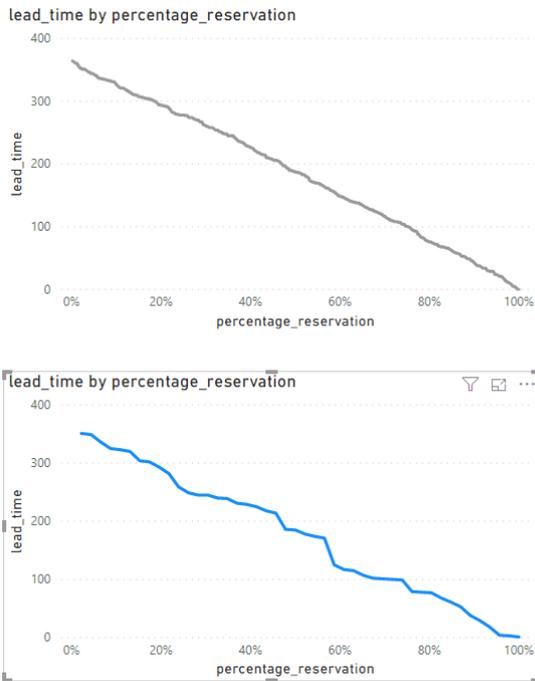


Figure 46. Lead time for all guests (top) and Belgian guests (bottom).

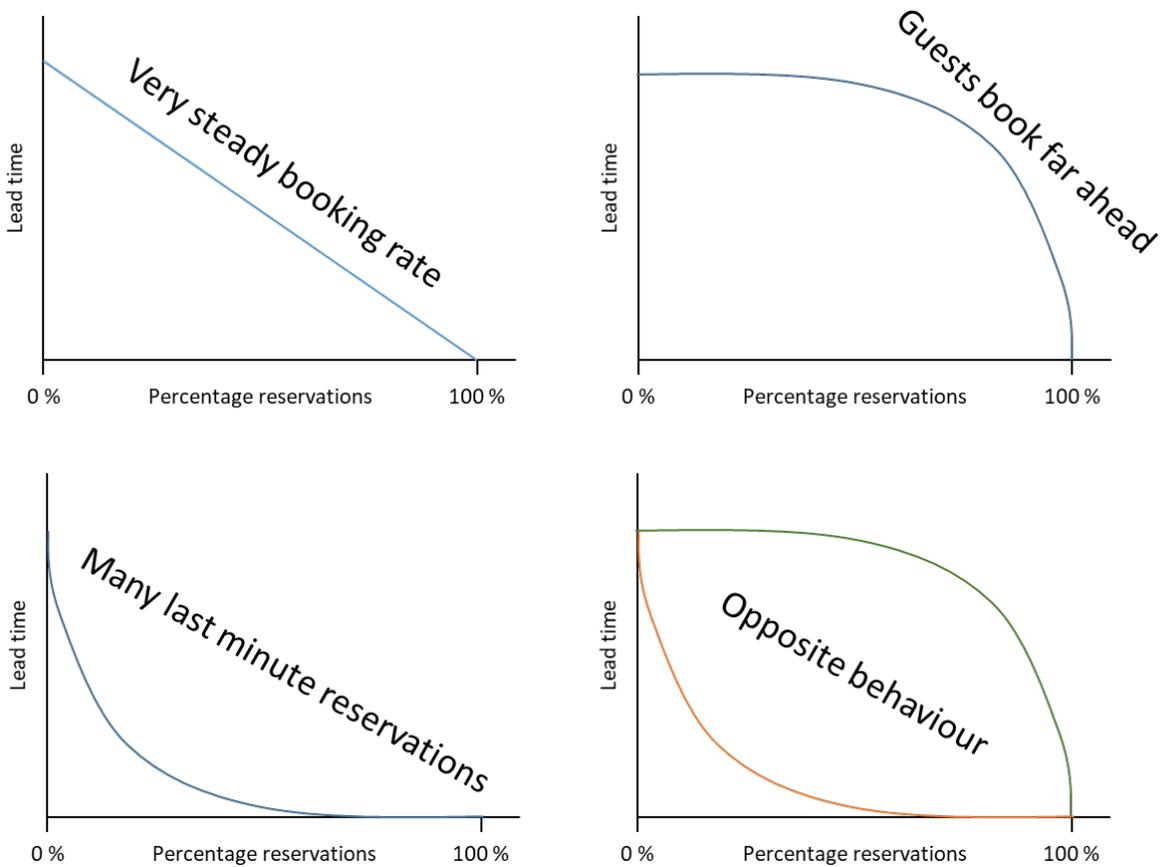


Figure 47. Different type of reservation behaviour. The colours in the bottom right schematic indicate two countries.

## 4. Dashboard

Most dashboards are essentially a collection of the most important graphs that are updated as the data are updated. In the free version of *Power BI* it is not possible to make “true” dashboards. However we can make something that is visually similar. In this case an overview can be made of graphs that have been made in the previous chapter (Figure 48). Charts can be arranged in any way the user wants. Text boxes can be added and key numbers can be added in their own box. The colour of the background can also be changed.

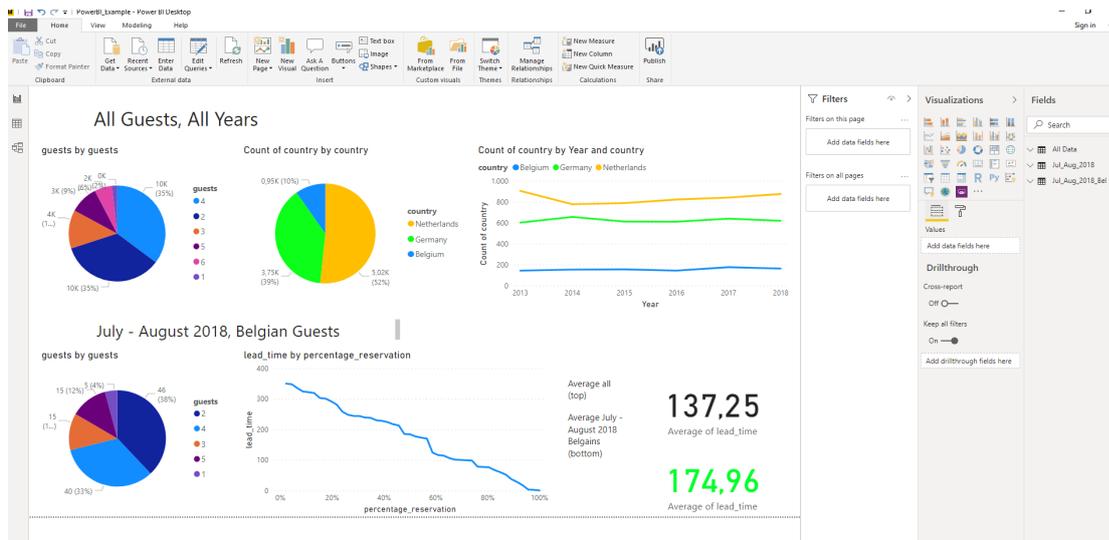


Figure 48. Dashboard overview.

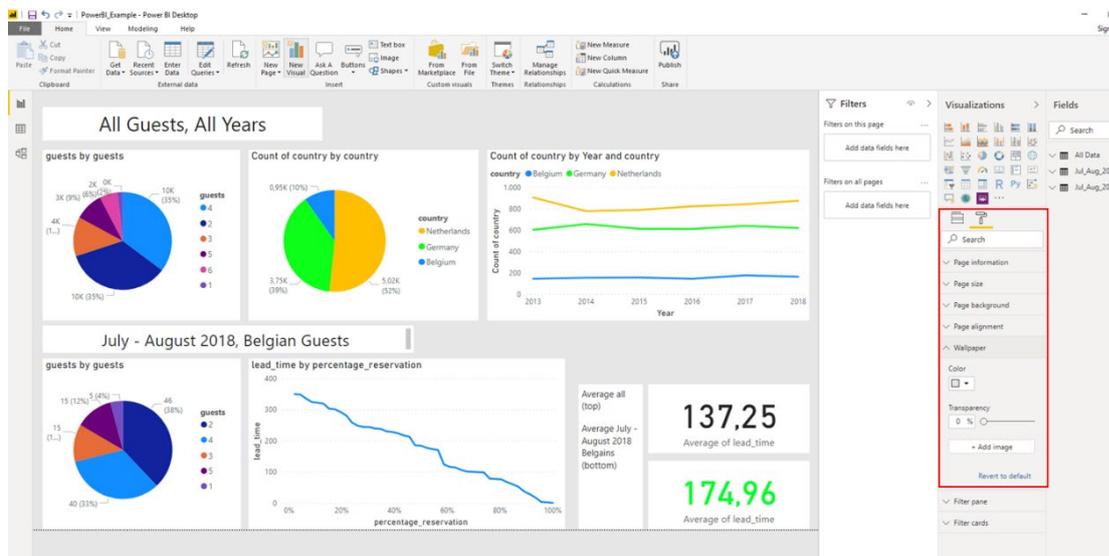


Figure 49. Changing the background colour of the page.

We would like more contrast between our graphs and a white background so we can change it to grey to give them more pop (Figure 49). Make sure to deselect any graphs before changing the colour. To add a block with an important number, or KPI, (Figure 50) click “Card” under “Visualizations” and select “lead\_time”. Click the down arrow under “Fields” to select the average. The colour can be changed in the same way as for graphs.

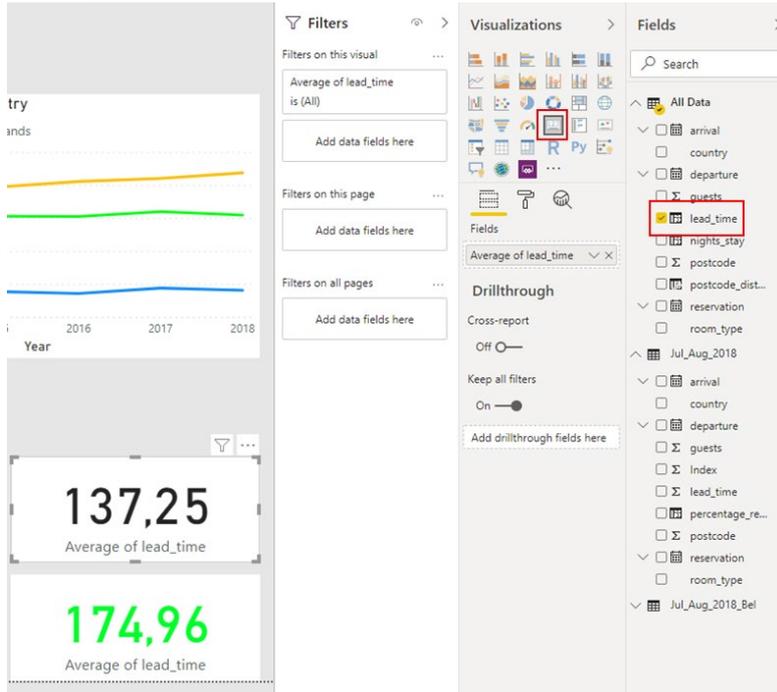


Figure 50. Adding a KPI box.

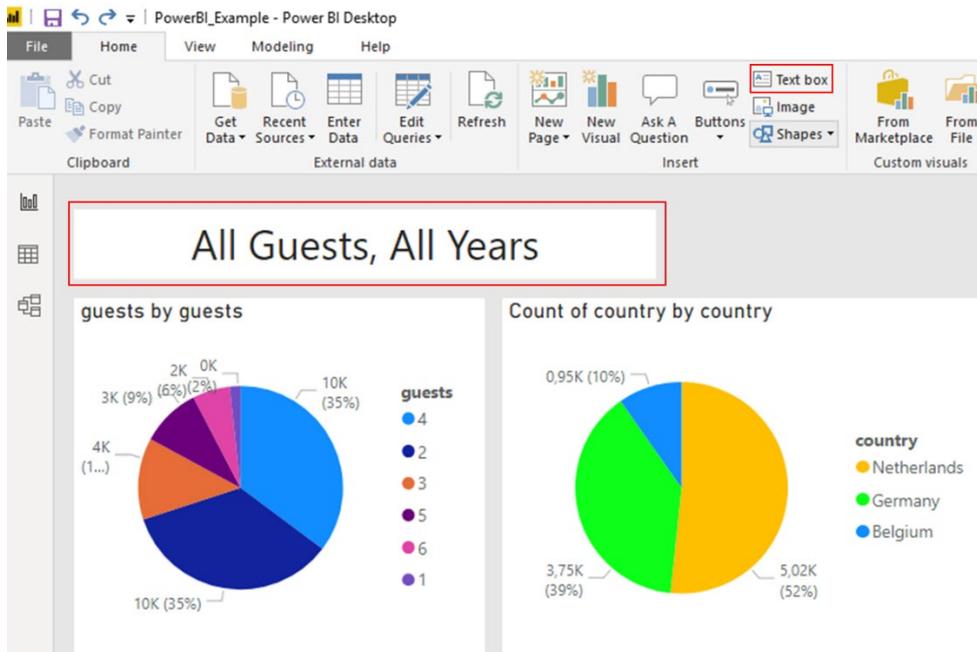


Figure 51. Adding a text box.

Many examples of dashboards can be found online and tools such as *Power BI* allow for a lot of visual freedom.

## 5. Information Sources

This manual provides some examples of what can be done to visualise booking data in *Power BI*. This manual is by no means exhaustive and is meant to provide a starting point for data analysis. There is quite some support for *Power BI* which makes learning more about the software easier. Multiple YouTube channels contain examples and instructions on new features, but also how to get started. There is a dedicated *Power BI* channel as well.

- “Power BI” channel: <https://www.youtube.com/user/mspowerbi>
- “Guy in a Cube” channel: <https://www.youtube.com/channel/UCFp1vaKzpfvoGai0vE5VJ0w>
- “Avi Singh – PowerBIPro” channel: <https://www.youtube.com/user/ModernExcel>

Technical support for *Power BI* can be found here: <https://powerbi.microsoft.com/en-us/support/>  
Which contains extensive documentation on functions and common processes. There is also a forum for asking questions: <https://community.powerbi.com/>

For a discussion on which business intelligence tool to use, one can read the following article:  
<https://technologyadvice.com/blog/information-technology/power-bi-vs-tableau/>