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UNIV.-PROF. DR. AXEL SCHWICKERT

Schwickert, Axel; Schramm, Laura; Cimiotti, Alessa;
Schneider, Paula; Saborowski, Stella

Business Intelligence with Tableau – Reader of the WBT Series

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Authors: Schwickert, Axel; Schramm, Laura; Cimiotti, Alessa; Schneider, Paula; Saborowski, Stella.

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Abstract: This working paper serves as a reader for the WBT series “Business Intelligence with Tableau”, which is available online on the “E-Campus Wirtschaftsinformatik”.

In the WBT series, the most important functions of the BI software “Tableau”, with the data of the company Corn-Factory, will be explained. It is shown how data is imported into Tableau and how it is linked there. Furthermore, readers will learn how the data can be displayed graphically and examined in more detail by drilldowns. Finally, the WBT series covers how obtained information can be prepared as a presentation and published.

Keywords: Business Intelligence, Tableau, BI Software, Data Analysis, Tableau Online

A About the Classification of the WBT Series

The WBT series is aimed at those interested in the area “Business Intelligence with Tableau”.

For your self-study via the WBT, you must have Internet - either on your own PC, on the PCs in the JLU University Computer Center, in the JLU libraries or the PC pool of the faculty.

B The Web-Based Trainings

The topic has been broken down into learning units and is taught through a series of Web Based Trainings (WBT). With the help of the WBT, the material can be worked through in self-study. The WBTs build on each other and should therefore be completed in the following order.

WBT No.	WBT Name	Duration
1	Data Chaos at CornFactory	90 Min.
2	First Steps in Tableau - Connecting Data Sources	60 Min.
3	Introduction to Data Analysis via Drag & Drop	60 Min.
4	Refining Results and Generating Forecasts	60 Min.
5	Geographical Data Analysis and Drilldown	60 Min.
6	Reporting with Dashboards and Stories	90 Min.

Tab. 1: Overview of the WBT Series

The contents of the individual WBT will be shown below in this document. All WBT are available online at all times. You can work through each WBT as often as you wish. Each WBT contains:

- Teaching the learning material,
- interactive exercises on the learning material and
- final tests on the learning material.

C Notes on the Exercises

In each WBT, there are exercises that are intended to give you practical experience of the theoretical contents of the corresponding topic area.

To be able to perform and practice the shown tableau functions yourself, you need the free student license of Tableau. Please download this license to your PC.

Please follow these steps:

1. Open the page https://www.tableau.com/academic/students.

   If the page is not accessible, search for “Tableau for students” on the start page www.tableau.com/ and open that page.

2. Click on the button “Get Tableau for free”.
3. Register with your university e-mail address and follow the download steps.
4. Save and install the software on your PC.

You also need the database of the CornFactory for the analysis. You can download it in WBT 2 on slide 8.

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1 Business Intelligence: Basics

1.1 Intro: Data Chaos at CornFactory

1.1.1 Welcome to CornFactory GmbH!

Mrs. Controlée:

Welcome to CornFactory GmbH!

My name is Coralie Controlée, I am a controller at CornFactory GmbH.

My task is to support Matthias Sommerkorn, CEO of CornFactory GmbH, in all strategic decisions by always being informed about all figures and the economic situation of the company.

CornFactory is a fairly young, medium-sized retail company based in Berlin. The company specializes in the production of healthy food, especially corn-based products.

Fig. 1: CornFactory GmbH

The product range currently consists of three products:

1. “Pasta Puro“ – Tagliatelle made from corn flour based on an original Italian recipe.
2. “Tortello Salmone“ – Corn tortellini filled with salmon and walnuts.
3. “Mizza“ – The healthy pizza made of corn.

Fig. 2: CornFactory’s Product Range

1.1.2 The Problem in a Nutshell

- Mr. Sommerkorn, CEO of CornFactory GmbH, is not very pleased with the last quarterly report.

  In order to be able to take strategically useful counter-measures and optimize business processes, he needs a precise data analysis that provides information about the problems of the company.

  He instructs Mrs. Controlée to prepare a fitting list of the causes and possible trends in order to be able to identify them.

- Mrs. Controlée, Controller of the CornFactory, has significant difficulties in preparing the data from the CornFactory for the compilation and analysis.

  The individual departments store their data in different systems, e.g., ERP systems, CRM systems and Excel tables.

  In order to be able to use and analyse this data, it must first be merged, revised and standardised. This is very time-consuming and error prone.

  Mrs. Controlée has been busy for days maintaining data and tables and cannot meet the deadline for completing the list. Therefore, she is looking for a technical solution to support her in data analysis.

- Mr. Protec, IT Manager of the CornFactory, sees Business Intelligence software as the solution to get the data chaos under control. He teaches the basics of Business Intelligence and the BI software tableau.

- Ms. Supporto, Tableau Consultant, teaches the BI software tableau training and will introduce you to some important tableau functions.

1.2 Using Business Intelligence against Data Chaos

1.2.1 What is Business Intelligence (BI)?

The term Business Intelligence - short “BI” - is still relatively young. Therefore, there is no universally valid definition to date.

The term “intelligence” is derived from the Latin “intellegere” = “to understand”, “inter” = “between” and “legere” = “to read”.

BI thus describes the process of gaining knowledge from business activities. To do this, data must be read, understood and put into context.

Therefore, BI has the task:

- To gain important insights for operational decision-making processes
- from a large amount of data by
  - collecting,
  - processing,
  - analyzing
  - and presenting
  - business-relevant information and data in a comprehensible form.

A BI software supports these tasks.

Fig. 3: The Task of Business Intelligence

1.2.2 How exactly does BI work?

Data sources: First, relevant data of the company is collected. The data can come from various data sources, such as CRM and ERP systems or Excel files.

Data storage: In order to be able to share the collected data from different sources, the ETL process (“Extract, Transform, Load”) unifies the data and stores it in a large database, the so-called “Data Warehouse” (DWH).

Presentation: Now, the unified data can be analyzed and presented by the OLAP process ("Online Analytical Processing"). BI software enables you, for instance, to create and visualize data analyses, trend forecasts or daily reports.

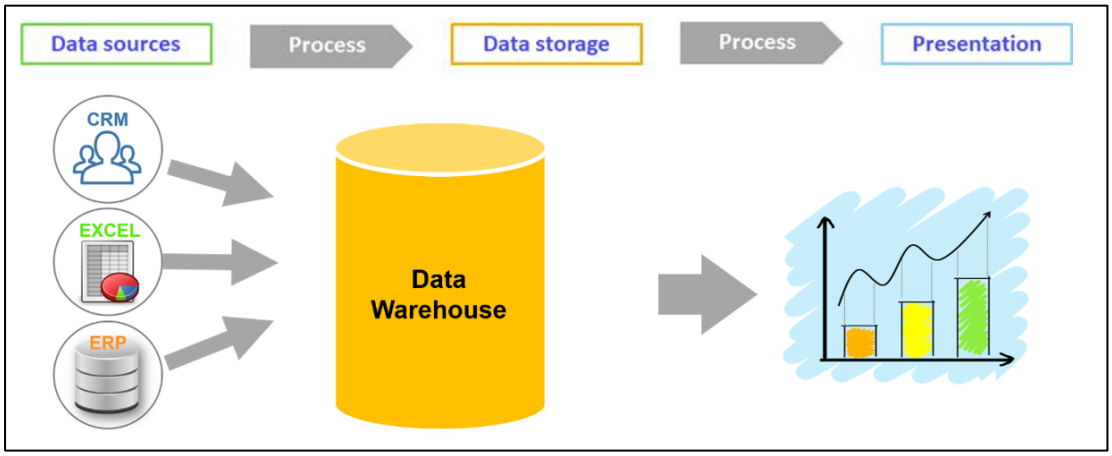

Fig. 4: Functionality of BI

1.2.3 Why BI? How can BI help with Data Chaos?

BI provides fast and precise information on the following questions:

- What is the current situation of the CornFactory (ACTUAL situation)?
- Where exactly do the deviations occur? For example, the discrepancy between production and sales at the CornFactory (through BI analysis processes)?
- What should we strategically do? By recognizing trends, goals and measures can be derived (target status).

This results in the following added value for companies:

- More informed, presumably better decisions can be made based on up-to-date information.
- Companies can react quickly to market changes and deviations (e.g. the discrepancy between production and demand at the CornFactory).
- Thereby, the effectiveness of business activities is increased.
- The competitiveness and overall success of the company is increased by a knowledge advantage.

With BI, companies such as the CornFactory, can get a grip on unstructured data chaos and thus generate knowledge from data.

1.2.4 Fields of Application in a Company

The BI software mainly supports the controlling department, for example, to perform analyses of sales, costs and revenues. However, BI can also provide important information in other areas.

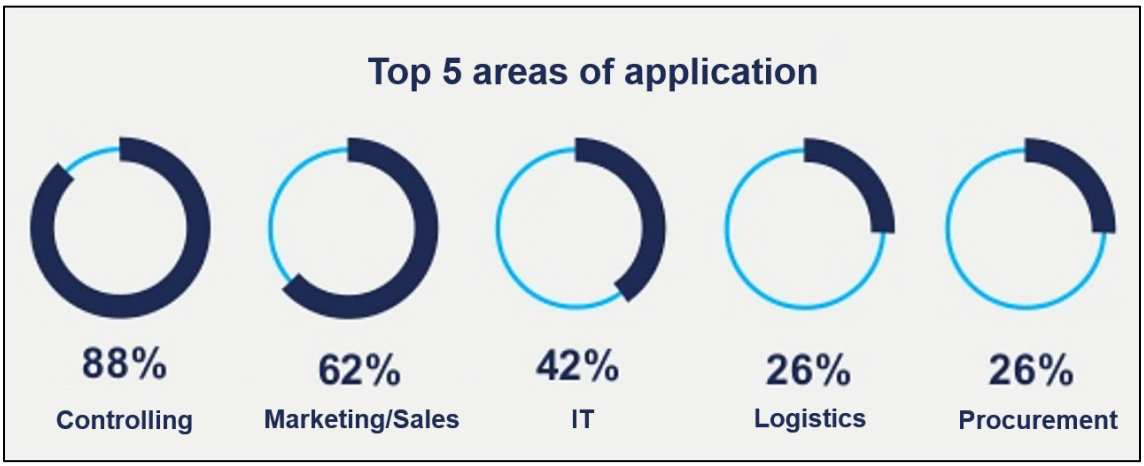

Fig. 5: Application Areas of BI in a Company

Example Marketing and **Sales:** Recognising customer or sales potential by carrying out analyses of buyer behaviour, sales and marketing channels or with regard to the product range and competitors.

Example IT: Improving the performance of the IT infrastructure by performing analyses of system capacity and utilization, response times or error rates of applications.

Example Logistics: Optimization of logistics processes by performing analyses of inventory, logistics costs or capacity utilization.

Example Procurement: Increasing efficiency in procurement by conducting analyses of procurement and supplier management.

1.2.5 Requirements for the Success of BI

BI is not a package solution, but an analysis tool. For a successful BI, several prerequisites must therefore be fulfilled:

- **BI does not replace operational application systems, Excel & Co.**

  BI is a data analysis tool, not a data collection system. Since you cannot create data in BI systems, all information and data records must still be entered and maintained in operational application systems (databases, CRM, ERP, Excel, and so on).

- **BI is not the same as a data warehouse.**

  A BI software is not an all-rounder, but the analysis tool “on top”. It helps you to gain insights from existing data. The data warehouse functionality must be ensured, if necessary, it must be additionally purchased.

- **BI must be performed by qualified users.**

  BI analyses and visualizes the data YOU want. You should therefore know which data relationships you want to examine and which commands are used to achieve useful results. Therefore, it is important that users are properly trained to use the full potential of BI.

1.2.6 Pros and Cons of BI

In summary, the pros and cons of using Business Intelligence software can be summarized as follows.

Pro-arguments:

- Immediate detection of weak points in a company through daily updated analyses.
- Strategic and operational decision support through forecasts and the identification of trends.
- Increased efficiency through fast reaction to deviations and market fluctuations.
- Increase of competitiveness and business success through data transparency.
- Individual application possibilities: supported in all areas of a company.

Contra-arguments:

- Planning effort for the introduction of a new system.
- Investment costs for software, maintenance, training and possibly other technical requirements.
- Training period of the users is taking away working time for the daily business.
- BI does not replace operational application systems. Thorough data maintenance in operational systems is mandatory.
- BI is not a “full solution”. Pre-systems (CRM, ERP etc.) and IT structures (ETL, Data Warehouse) are necessary.

No generally valid recommendation can be made for the introduction of BI software in a company. Every company should carefully consider the pros and cons and decide individually whether the use of a Business Intelligence software makes sense for the individual company.

1.3 Introduction of the BI Software Tableau

1.3.1 Why Tableau?

Leading BI software products include Microsoft Power BI, Qlik Sense and Tableau software. The latter is the recommendation of Mr. Protec. Below, he will explain why:

Tableau LLC has been around since 2003 and is considered a pioneer in the field of visual data processing and evaluation.

Among the strengths of the software tableau are:

- Interactive functions,
- design and visualization options for almost all data sources,
- intuitive operation without programming experience and
- good support of mobile applications.

Tableau also reinvests 30 percent of its revenue in further development. This means that Tableau puts companies in a good long-term position.

1.3.2 Intro: Training Day 1 - What to Expect?

Ms. Supporto:

Good morning Mr. Protec, good morning Mrs. Controlée,

I'm very happy that you've chosen Tableau.

In the next few days, I will be your instructor and will get you ready for data analysis. Let's get started right away!

Firs,t get yourself familiar with the user interfaces of Tableau.

1.3.3 The Home Screen of Tableau

When you start the software Tableau, you will first be taken to the home screen.

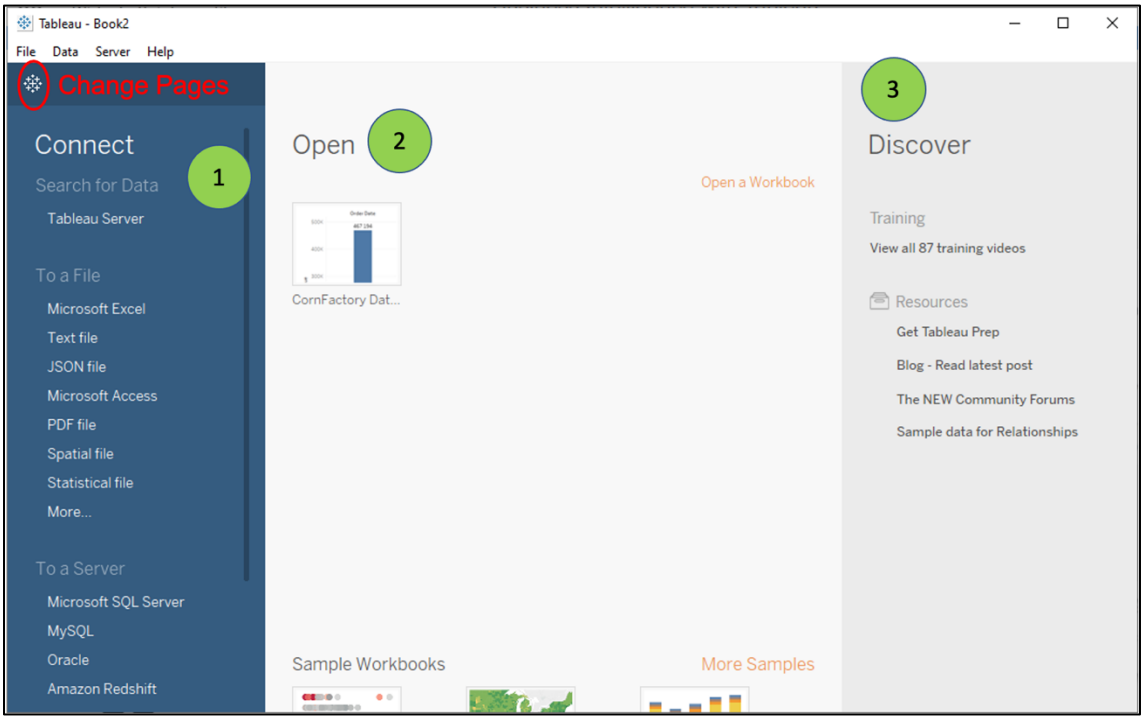

Fig. 6: The Home Screen of Tableau Desktop 2018.1.

The individual sections are explained below:

Tableau symbol: You can switch between the home screen and the work area at any time using the tableau icon highlighted in red.

1 Connect

You can have Tableau analyze different data sources, for example:

- Documents and files (connection “To a File”).
- Data on a server (connection “To a Server”).
- Already existing analyses or databases (connection “Saved Data Sources”).

2 Open

Under the “Open” section you can...

- Open already created folders and
- view sample folders including dashboards and tableau analyses for orientation.

3 Discover

In this section, you will find:

- Video tutorials and training material for your own further education,
- the weekly “Viz of the Week” (most popular visualizations) as a suggestion and
- links to the Tableau community, such as forums, news and blog posts.

1.3.4 The Data Selection Interface of Tableau

Once you have opened a file, further files can be added in the data selection interface and first settings can be made.

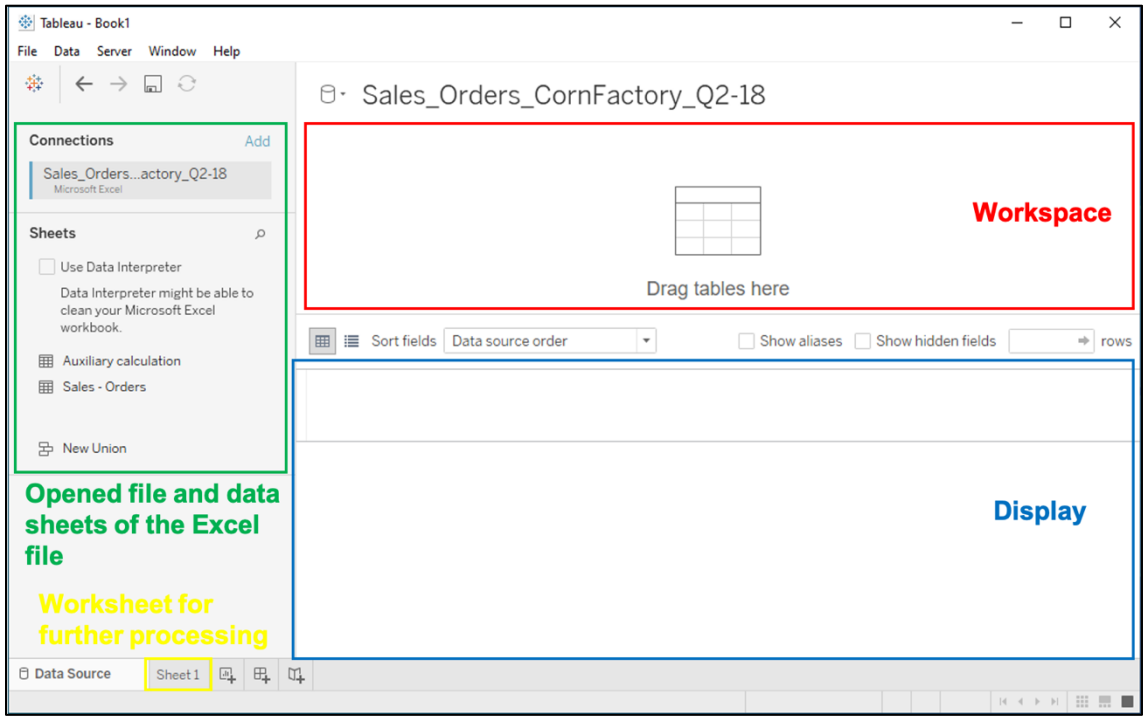

Fig. 7: The Data Selection Interface of Tableau

The individual sections are explained below:

Green: The left navigation displays the opened data sources and their individual data sheets. You can now select which data sheets are to be used for the analysis.

Red: The work surface shows which data sheets are connected to Tableau and how they are linked to each other. To connect a data sheet with Tableau, drag and drop it into this area. Further data sources can be added using the marked “Add” button. Tableau automatically creates a link between the files, which can later be manually adjusted.

Blue: The display now shows the content of the connected data sheets to roughly check whether the data was transferred correctly. It is also possible to make initial calculations and adjustments, e.g., changes of the data type.

Yellow: Tableau automatically generates an empty worksheet for the analyses. When all pre-settings have been made, you can navigate to the analysis area of Tableau by clicking on “Sheet”.

The following figure shows what the data selection interface looks like with open and linked data sources.

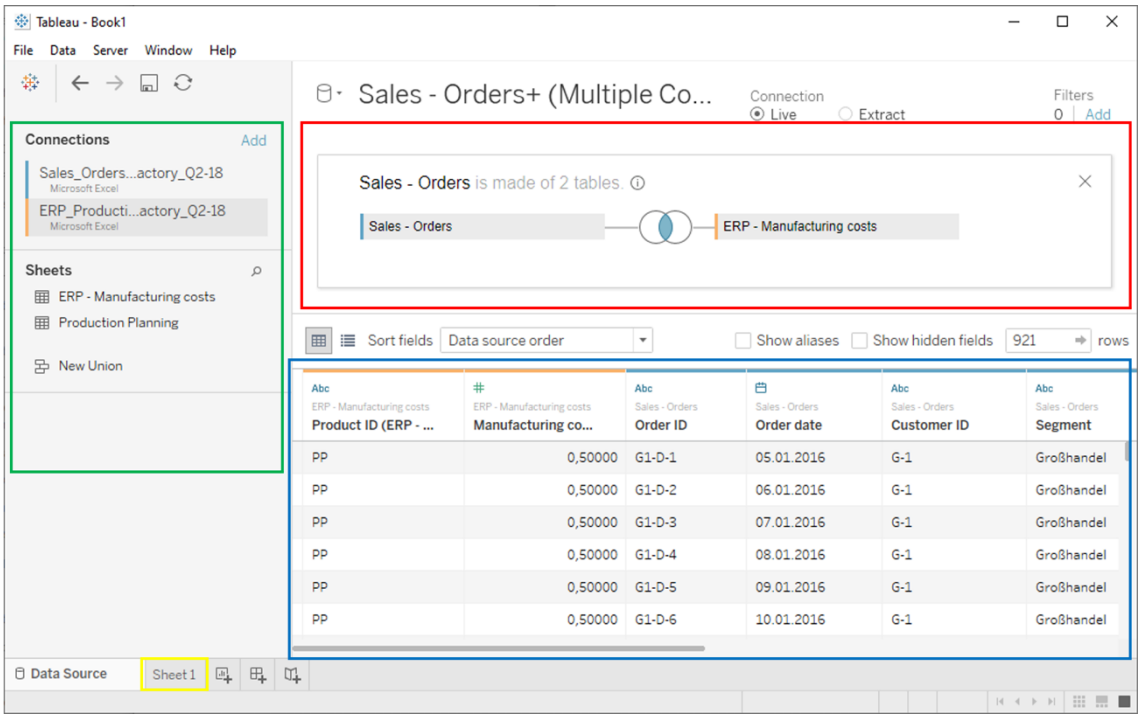

Fig. 8: The Data Selection Interface with Opened Files

1.3.5 The Analysis Area in Tableau

Click on “Sheet 1” to open the analysis area of Tableau.

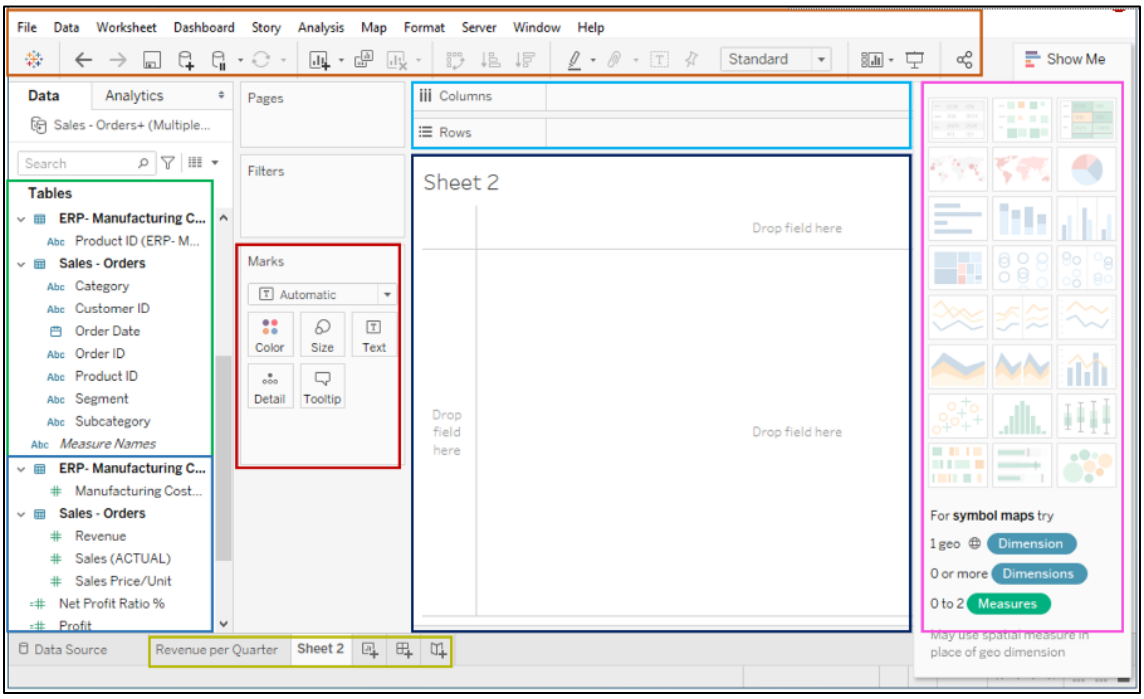

Fig. 9: The Analysis Area in Tableau

The individual sections are explained below:

Grass green: These data fields correspond to the columns of your data sources. “Dimensions” are data that contain information, such as a date or text. You usually generate the labels of rows or columns in Tableau.

Light blue: These data boxes correspond to the columns of your data sources. “Measures” are data fields that contain numerical values, such as profit or sales. You generate the value fields, e.g., bars or lines. Measure values can be aggregated by dimension, for example, sales per month.

Yellow: Similar to Excel, you can switch between your “worksheets” here.

Red: Using the “Marks” tab you can, for example, color your results or display detailed information.

Turquoise: Into the “container”, you drag & drop the data fields you want to analyze correlations for.

Orange: Similar to Microsoft Office programs, the general navigation is located here. Here, you will find standard functions, similar to Microsoft Office programs.

Purple: “Show Me!” provides you with various visualization suggestions for your data analyses.

Dark blue: Your data analyses are displayed in the “visualization” section.

The following figure shows what the analysis area looks like when data analyses are complete.

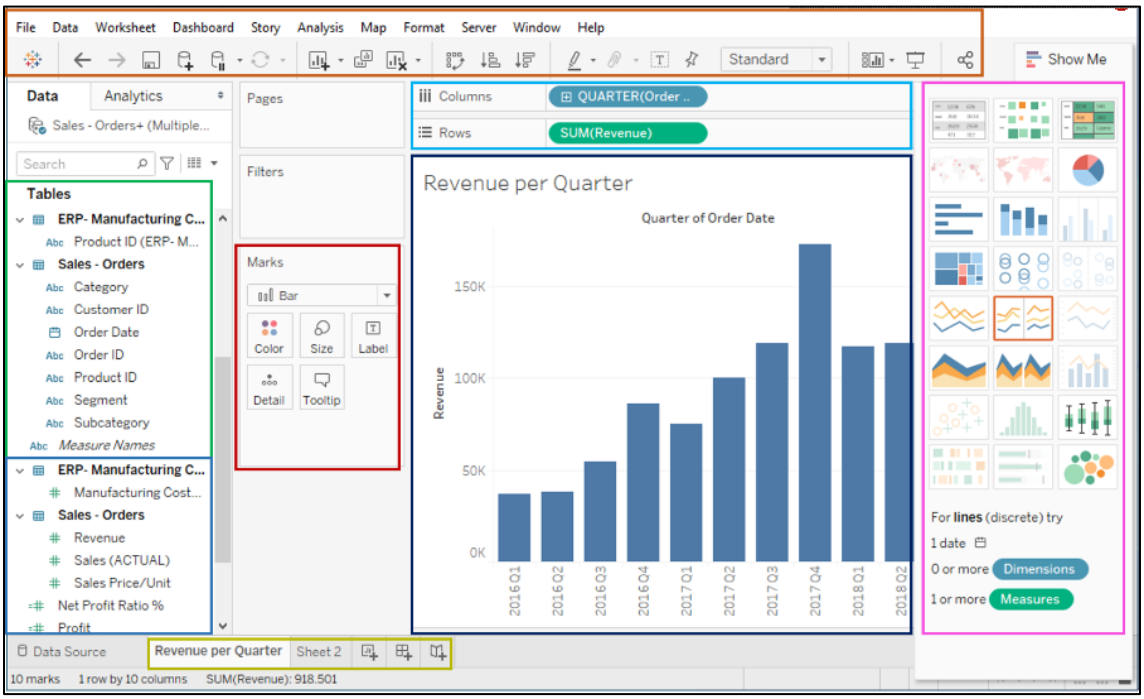

Fig. 10: The Analysis Area with a Completed Analysis

1.4 Final Test 1

Test your knowledge. Tick the right answer options.

No.	Question	True	False
1	The problem of the CornFactory is that after company growth, the resulting data volumes can no longer be understood properly, making it difficult to see where and why the existing discrepancy between production and sales arises.		
2	The goal of BI is to generate important insights for operational decision-making processes from a large amount of data by		
	• Collecting,		
	• Preparing,		
	• Maintaining,		
	• Analyzing,		

	• Presenting business-relevant data in an understandable form.		
3	BI is only a very effective controlling tool and has no purpose for other business divisions.		
4	BI provides daily updated analyses and automatic reports with a push of a button and enables the identification of trends, even with large amounts of data.		
5	When using a Business Intelligence system, other systems, such as ERP, CRM or SCM can be abolished.		
6	Thanks to BI, more informed decisions are possible, deviations and market changes can be responded to quickly, thereby increasing the efficiency of the CornFactory. This leads to improved competitiveness and business success.		
7	A BI software eliminates the tiresome maintenance of data and can be easily operated by anyone, as it is self-explanatory.		
8	Tableau is one of the leading BI software and shines above all with intuitive operation and outstanding visualization options.		
9	Which statement is **false**? The advantages of BI include the fact that ...		
	• Complex data can be analyzed on a daily basis and automatically generated as a report.		
	• Weak points, e.g. regional sales differences are detected.		
	• Trends can be identified, and forecasts and measures can be derived from them.		
	• The business becomes smarter.		
	• Strategic and operative decisions of the management and also of the specialist departments are supported and thus improved by solid information.		

Tab. 2: Final Test 1

2 First Steps in Tableau – Connecting Data Sources

2.1 Intro: Training Day 2 – What to expect?

Ms. Supporto:

Welcome to your second day of training for the software Tableau!

As of today, it will be practical. You will learn what to consider when selecting data sources and how to upload, connect and adjust data sources in Tableau.

Let's get right to it!

2.2 What to Consider When Selecting Data Sources

2.2.1 Data Quality for the Analysis

For Tableau to be able to carry out correct analyses, the database must be correct.
The data sources should for analysis in Tableau should:

- **Be preferably "untreated":**

  Tableau performs calculations with your data. Therefore, your data basis should consist of detailed data.

  Your data should therefore not be aggregated or pre-processed. Cross-tabs, for example, are already processed data and are therefore rather unsuitable.

  Remember: Tableau does the analysis work for you. You do not have to do this work in Excel.

- **Be correctly recorded in the previous systems:**

  It is important that the data has been entered correctly in the previous systems. Tableau works with the data provided.

  Tableau is not a data collection system and does not replace it.

  Tableau examines, interprets and visualizes your data.

  Remember: garbage in - garbage out.

- **Have a linking point when several data sources are connected:**

  If you want to connect several data sources with each other, they should have a connection to each other.

  So that these data sources can be linked together in a useful way, both data sources need the same linking point.

For example, address data about the customer from the CRM system can only be linked to the order data from the ERP system if both data sources have the same customer ID.

Note: If you want to prepare your own data sources yourself, take a look at the TableauPrep tool from Tableau. It can help you with data preparation.

2.2.2 Suitable Data Sources for the Analysis

Tableau makes it possible to connect different data sources with each other and analyze them together.

Below is a selection of data sources that can be connected to Tableau.

Data types:

- Microsoft Excel files
- Text or PDF files
- ERP files (e.g. from SAP)
- CRM data (for example, from Salesforce)

Data sources:

- Your local computer
- Tableau server
- Cloud server (e.g. Dropbox)
- ERP and CRM server
- Google Analytics

2.3 Uploading, Connecting and Adjusting Data in Tableau

Note: A Video is available in the WBT to demonstrate the following Tableau functions. In this video, you will learn how to upload data sources correctly into Tableau and how to make important adjustments, corrections and calculations to the data before the analysis starts.

2.3.1 Upload a Data Source to Tableau

Before you can analyze your data, Tableau needs access to your data sources.

First upload your data to Tableau. Tableau calls this step “Connect“.

Example: To analyze the sales development of the CornFactory, you first need the order data from sales. The data is kept in an Excel sheet.

To upload the file to Tableau, follow these steps:

- On the Home screen, under “Connect to a file”, click “Microsoft Excel“.
- Open the file “Sales_Orders_CornFactory_Q2-18” by double-clicking.
- This opens the data selection screen for Tableau.
- Now draf the required data sheet “Sales -Orders” with the mouse button pressed down (via Drag & Drop) into the work area.
- Check whether the data fields were transferred correctly into Tableau.

2.3.3 Modifying Data Types

All fields in a data source have a data type, e.g., “date”, “number”, “character string”. If the transfer is incorrect or if you want to make adjustments, you can change the data type as follows:

- Click on the “data type icon” of a field, for example “Abc” or “#”.
- Select a new data type from the drop-down list.

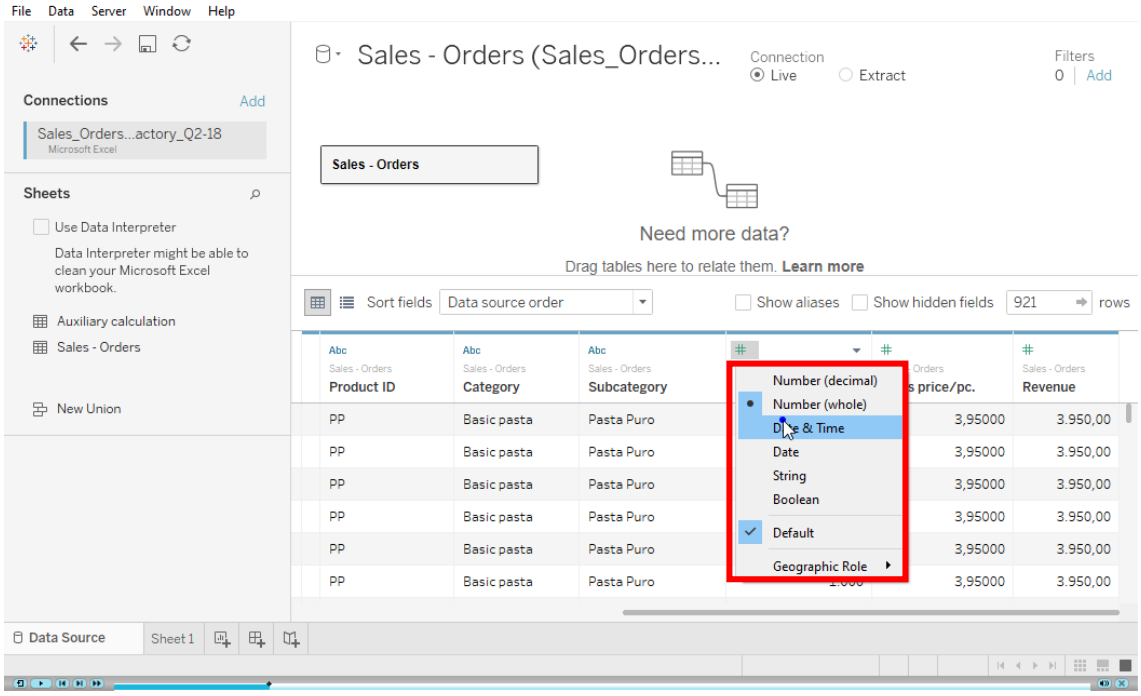

Fig. 11: Changing Data Types

2.3.4 Linking Multiple Data Sources

To calculate the profit, you also need the cost of goods manufactured from production. This data is stored in the ERP system.

To add a new file and link it to the existing one, follow these steps:

- Click on “Add” in the left navigation next to connections.
- Open another file and drag & drop the required data sheets into the workspace.
- Tableau automatically creates a join between the data sources.

You can change the join type by clicking on the ”join icon“.

There are different types of joins to choose from:

- Select “Inner” if the generated table should only contain values for which there is a match in both data sources (Sales and ERP).
- Select “Left” if the table should contain all values from the left data source (Sales), but only the data from the right data source (ERP) that has a match. This is applied mirrored for the right link as well.
- Select “Full Outer” if all values of both data sources should be included.

You then define the “Join Clause”. It specifies the data field via which the data sources are connected. It is important here that both data sources have the same join option.

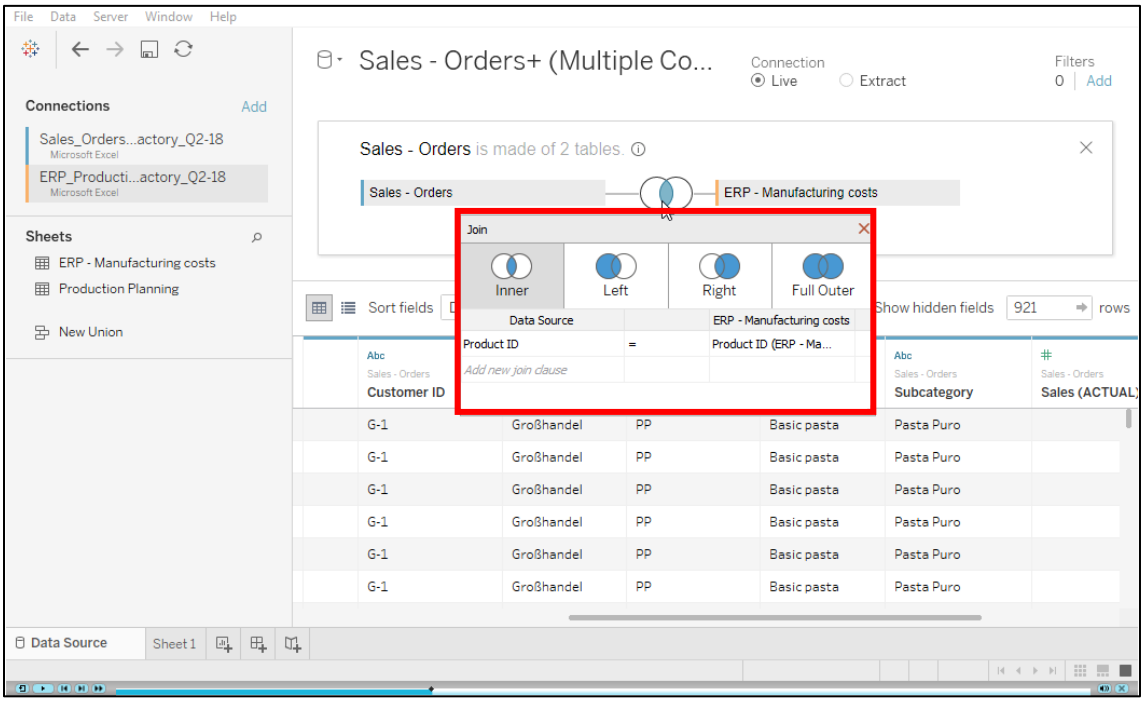

Fig. 12: Change of “Join Type” and “Join Clause”

2.3.5 Calculating Data Fields

With the data on sales prices and manufacturing costs, we can now calculate the profit.

Tableau allows you to perform calculations using simple formulas. To do this, carry out the following steps:

- Open the drop-down menu of the data field.
- Click on “Create Calculated Field”.
- A window will open.
- Choose a suitable heading for your calculation and enter a desired calculation formula. Use the formula notation of Excel.
- Always make sure that the calculation is valid. If it is, click on “Apply” and “OK”.

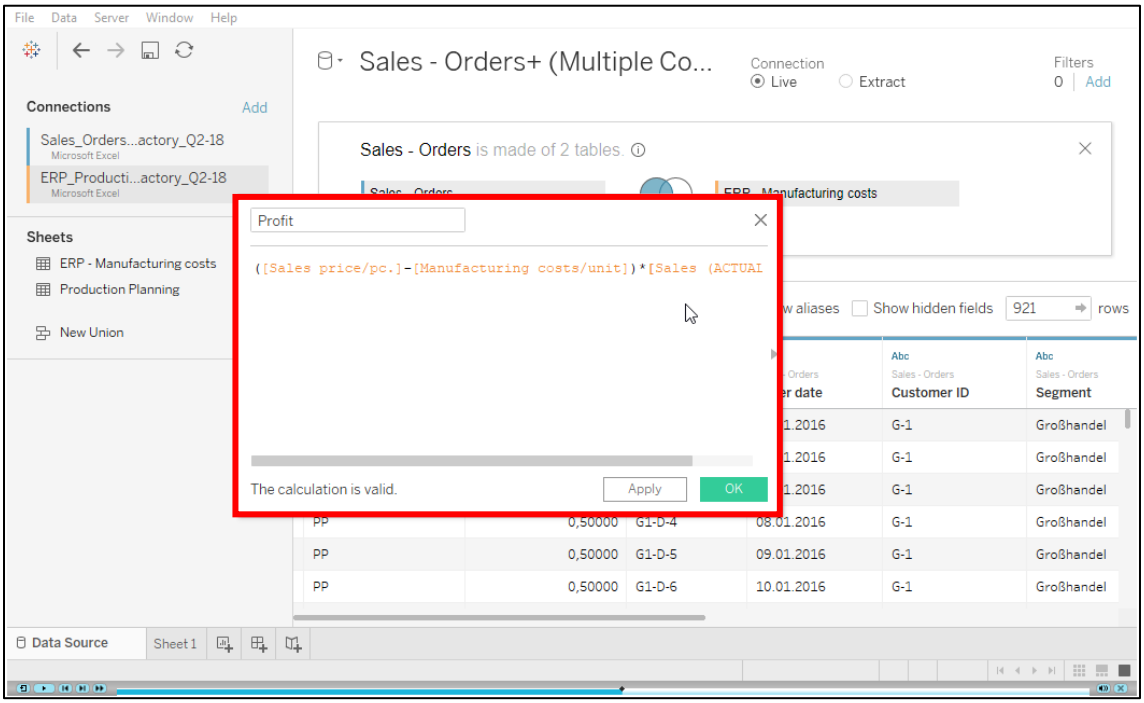

Fig. 13: Calculating Data Fields

2.3.6 Selecting the Data Connection

You can load your data sources as “extract” directly into Tableau or establish a “live connection” to your data sources.

Live data connection:

A “live connection” provides a real-time connection to your data sources whenever you work in Tableau.

This has the advantage that your reports automatically adapt when you change data or add new data to your data sources.

It is important that the data sources are not renamed or moved to another location.

Extract data connection:

With the “extract connection”, your data is uploaded directly into Tableau and saved as a workbook on your PC.

If you expand or change your data source, you must update it manually.

The advantage is that your data can be accessed at any time and work can be carried out quickly even with a poor network connection.

Note: For our training purposes we select an “extract connection”. This way, we are safe from network problems and can work fast.

For the daily analysis tasks for controlling purposes, a “live connection” is recommended. This ensures that your data is up-to-date.

2.4 Exercise: It‘s Your Turn!

2.4.1 Exercise “Data Sources”

After you have watched the video, you should now perform the steps shown in the Software Tableau:

1. Upload your data sources on Tableau.
2. Establish an appropriate join between the data.
3. Create the calculation “Profit” and “Return on Sales”.
4. Open your worksheet.

2.4.2 Final Test 2

Test your knowledge. Tick the correct answer options.

No.	Question	True	False
1	The Business Intelligence software “Tableau” can only analyze Excel files.		
2	Tableau allows you to analyze and visualize several, different data sources simultaneously.		

3	Tableau can establish connections to the following data sources...		
	• Data from cloud servers (such as Dropbox).		
	• Data from Excel tables (xslx files).		
	• Data from text and PDF files.		
	• Data from CRM systems (such as SAP, Salesforce).		
	• Data from Google Analytics.		
4	A “left-sided join” of two data sources in Tableau means that all data values of the left data source are transferred to the common table. From the right data source, however, only those data values that match the left data source are transferred.		
5	The data of the data source are always transferred correctly into Tableau, so that a check for correctness is not necessary.		
6	If your data is not transferred correctly to Tableau, the data type can be adjusted very easily. For example, the data types “Number”, “Date”, “String” are available.		
7	Which statements are true?		
	• When connecting to your data sources, you can choose between a "live connection" and the "extract connection”.		
	• With the Extract Connection, data source extracts are uploaded to Tableau and saved. This enables Internet-independent working.		
	• With a live connection, Tableau makes a direct connection to the data sources. Updates and changes are immediately and automatically transferred to Tableau.		
8	Which statement is **false?** The data for analysis in Tableau should ...		

	• Have a common join parameter when several data sources are joined.		
	• Already contain calculations and be prepared as a cross tab.		
	• Be as “raw” as possible, preferably simple line parameters with corresponding line values.		

Tab. 3: Final Test 2

3 Introduction to Data Analysis via Drag & Drop

3.1 Intro: Training Day 3 - What to Expect?

Mrs. Supporto:

Welcome to the third training day for the software Tableau!

Today, we will start with the data analysis. I will show you how you can examine and visualize your data in seconds using drag & drop.

Let‘s get started!

3.2 Creating a Visualization via Drag & Drop

Note: A video is available in the WBT to demonstrate the following Tableau functions. In this video, you will learn how to analyze and visualize the data of the CornFactory. To do this, you will first learn the basic operation of the BI software Tableau.

3.2.1 Basic Drag & Drop Operation

In Tableau, analyses can be created by dragging and dropping data fields into the “Rows” or “Columns” containers.

Example: First, you want to find out about the development of revenue in the years 2016 to 2018.

- To do this, drag the “Order Date” data field from the sales file into the container columns. Tableau automatically generates the labels of the years in the columns and the placeholders “Abc” for the unknown values.
- Now, drag the field “Revenue” from the measures into the container rows to fill the placeholder “Abc” with values.
- **Note:** If you accidentally dragged the wrong data field into the analysis, it can be easily removed. To do this, drag the data field back out of the container.

Tableau automatically adds up the revenue values from the data source and assigns them according to years. Tableau then automatically creates a suitable representation, in this case a line chart - in seconds.

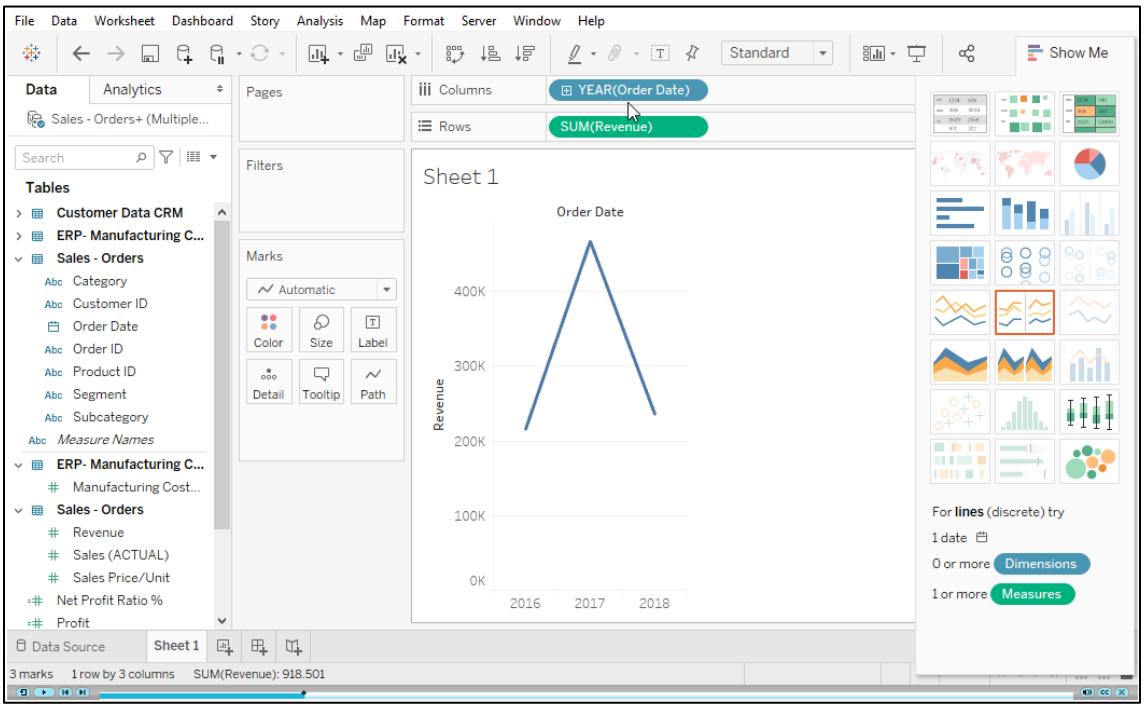

Fig. 14: Basic Drag & Drop Operation

Now, the display format can be individually adjusted.

3.2.2 Changing the Diagram Type

The automatically generated display format (here: line chart) can be changed at any time.

- To do this, open the drop-down menu in the “Marks” tab and select your preferred chart type.

3.2.3 Visualization with “Show Me!“

In the “Show Me!” tab you will find a selection of ready-made visualizations, e.g., “High-light tables”, “Stacked Bars” and “Horizontal Bars”.

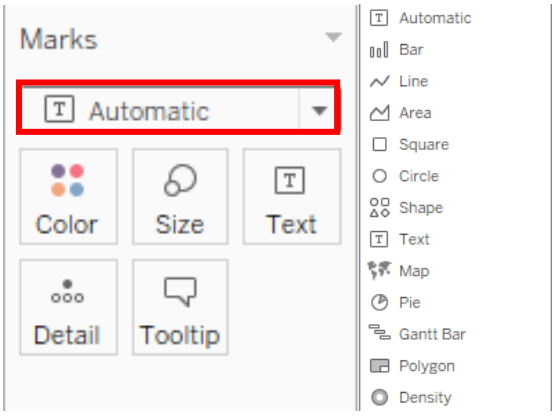

Fig. 15: Changing the Diagram Type

- Click on the visualization “Horizontal Bars”.

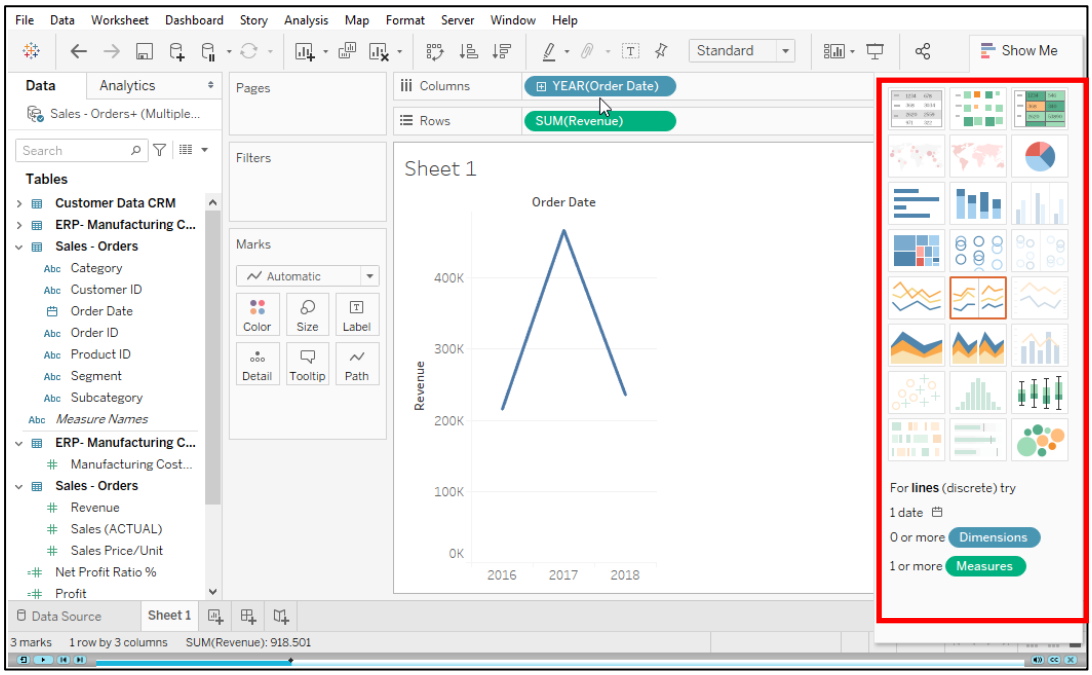

Fig. 16: Visualizations with “Show Me”

The greyed-out panels are further visualizations, but for these we need additional data fields. We will get to this later.

3.2.4 Swap Columns and Rows

- By clicking on the “Swap Symbol” in the navigation bar, columns and rows can be swapped.

Example: The display in horizontal bars is somewhat unclear. By clicking on the “Swap Symbol”, the bars are now displayed vertically.

Fig. 17: The “Swap Symbol“

3.2.5 Adding Mark Labels

You can display the exact numerical values within your visualization.

- To do this, click on the “T-symbol” in the navigation bar to activate “mark labels”.

Fig. 18: The “Marker Labels Icon”

3.2.6 Renaming of Title and Worksheet

The title of your analysis and worksheet can be renamed as desired.

- Double-click on the title field and the worksheet.

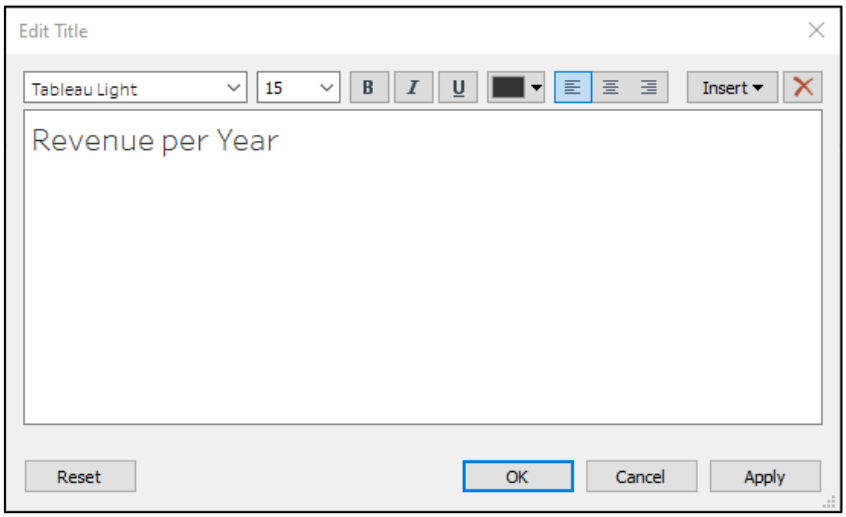

Fig. 19: Renaming the Sheet

Congratulations! Your first visualization is finished.

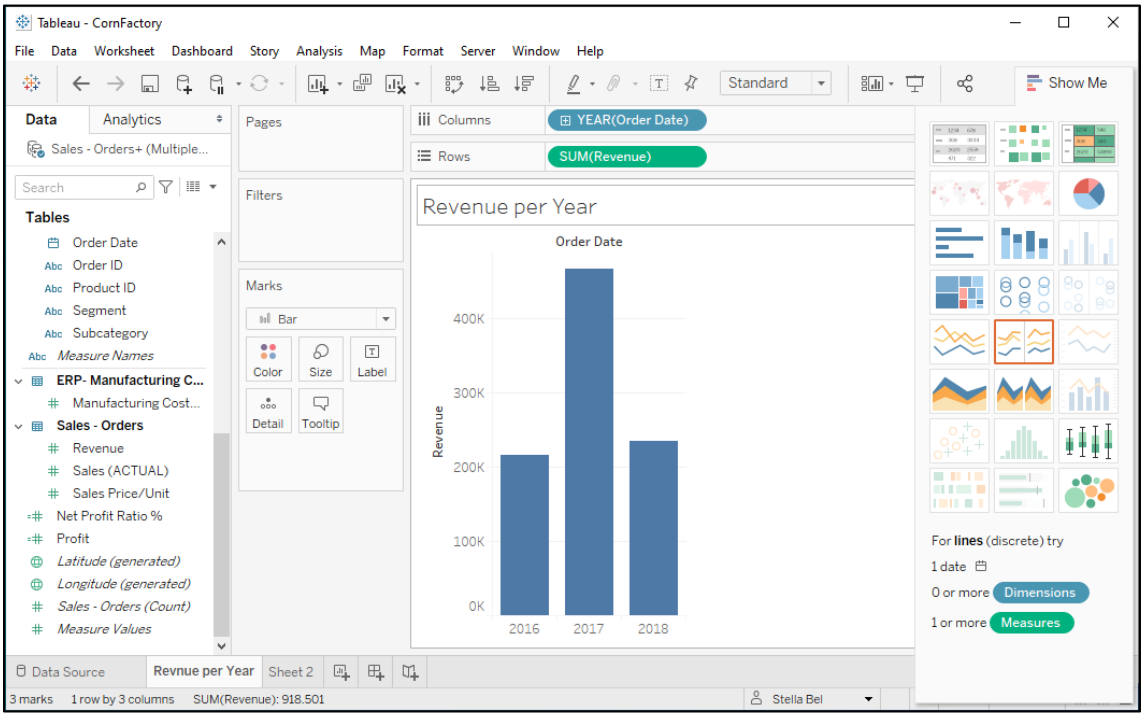

Fig. 20: The Visualization “Revenue per Year”

3.3 Refining the Analysis Visualization

Note: A video is available in the WBT to demonstrate the following Tableau functions. In this video, you will learn about other Tableau functions for data analysis and how you can further refine your visualization.

Example: You now know how much revenue the CornFactory has generated in the years of 2016, 2017 and 2018. So far, only the revenues from the first two quarters have been included in 2018. The annual revenue is therefore not comparable. You would therefore like to examine the revenue per quarter and the individual months.

In addition, you do not yet know whether revenue will increase for all products or whether only certain products will sell better. You would like to investigate this as well!

3.3.1 Add a Date Level

- To do this, click on the small “+” in the “YEAR” data field. Tableau automatically adds the data field “QUARTER”.

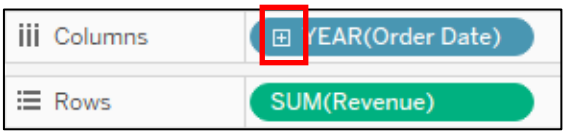

Fig. 21: Add a Date Level

3.3.2 Changing the Date Level

- Open the drop-down menu in the “QUARTER” data field and change the “Quarter” selection to “Month”.

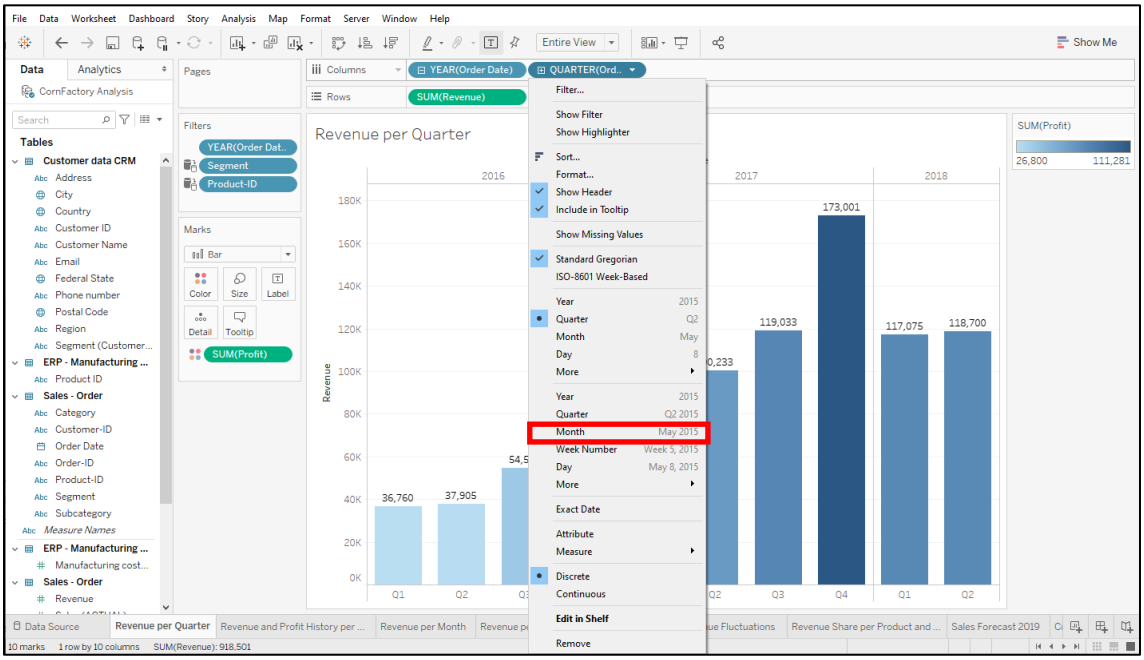

Fig. 22: Changing the Date Level

3.3.3 Duplicate the Visualization

You now want to examine the visualization in more detail. However, the visualization “Revenue per Month” should be kept. Duplicate your visualization.

- Click on the “Duplicate Icon” in the navigation bar.

Fig. 23: The “Duplicate Icon”

3.3.4 Detailing the Analysis

You can further refine your analysis by adding more data, for example, by adding the products.

- To do this, drag & drop the data field “Product Name” onto the rows container next to the data field “Sales”.

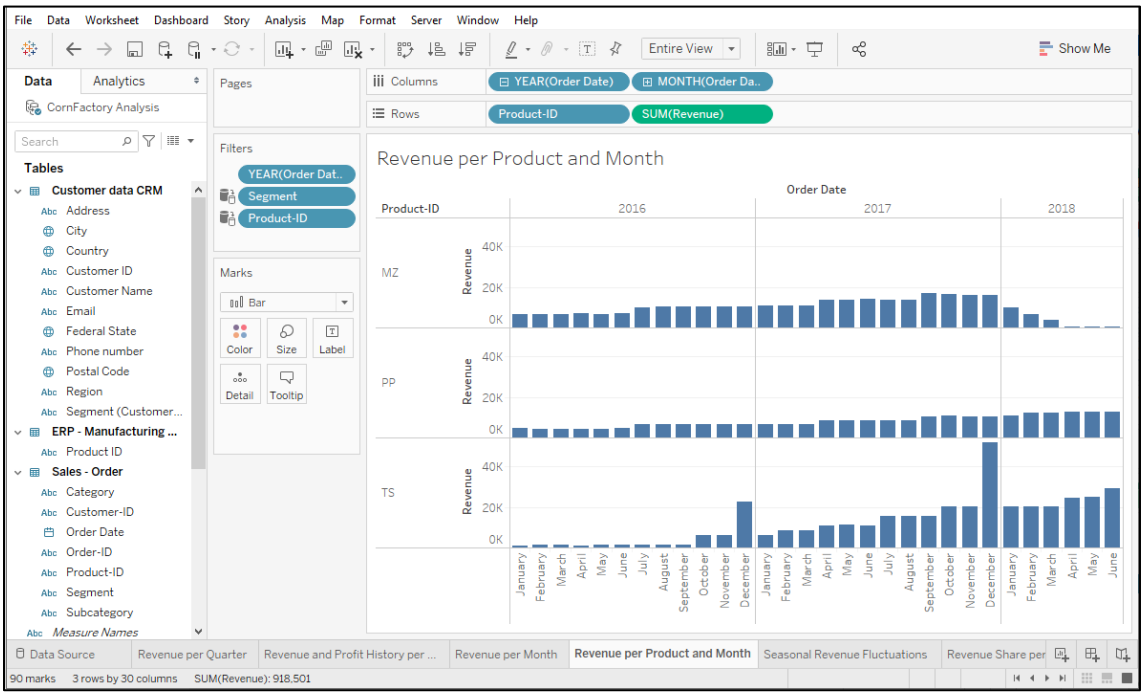

Fig. 24: Detailed Analysis by Product

3.3.5 Changing the Display Using the “Marks” Tab

Using the “Marks” tab, you can change the appearance of your analysis.

Example: You would like to know the share of the products in the total revenue. Each product should be assigned its own color.

- To do this, drag the data field “Product name” from the rows container to “Color” within the tab “Marks”.

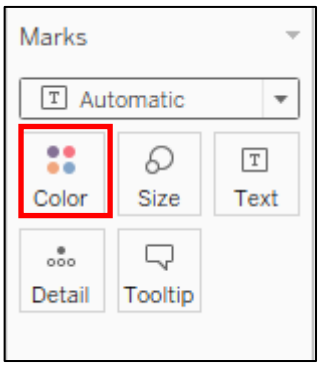

Fig. 25: Functions of the “Marks” Tab

A whole new visualization!

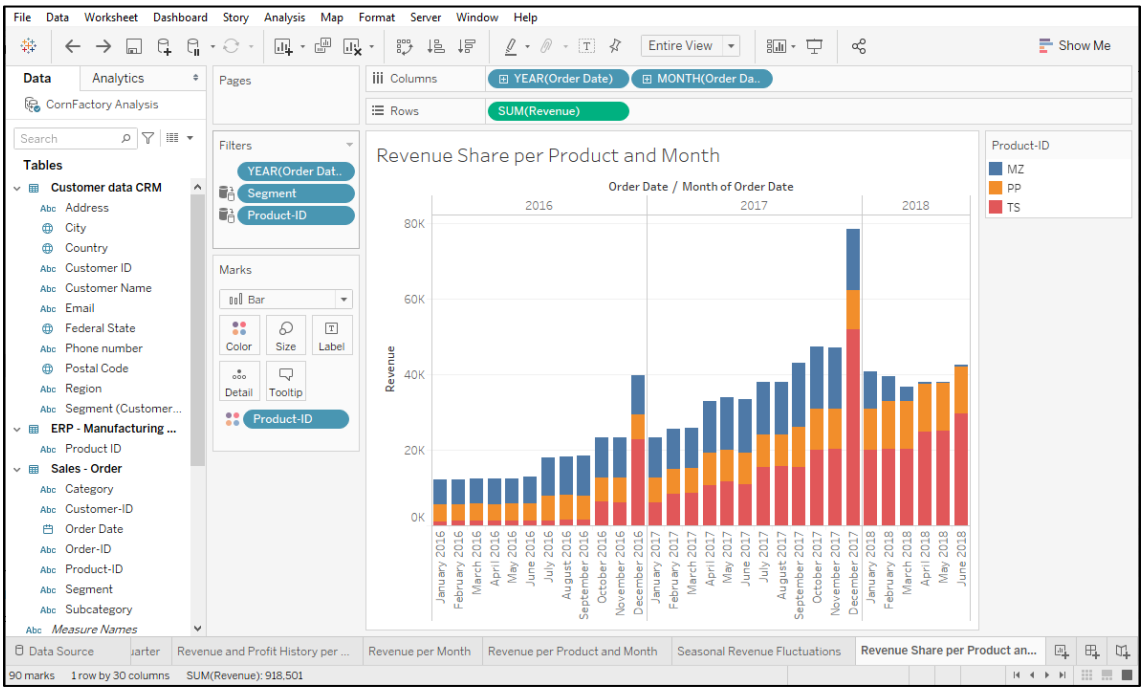

Fig. 26: The Visualization “Revenue Share per Product and Month”

Stacked bars show at a glance the revenue share of the products in the total revenue per month. Each product was assigned a color. A color legend was created at the same time. This was done automatically.

3.4 Exercise: Your Turn!

3.4.1 Exercise “Data Analysis by Drag & Drop”

After you have watched the video, you should now perform the steps shown in the Software Tableau:

1. Create the worksheet “Revenue per Quarter”.
2. Analyze the “Revenue per Month” in another worksheet.
3. In another worksheet, examine the “Turnover per Product and Month”.
4. Now, in another worksheet, visualize the “Share of Turnover per Product and Month”.

3.4.2 Final Test 3

Test your knowledge. Tick the correct answer options.

No.	Question	True	False
1	Tableau can analyze a maximum of two data fields simultaneously, such as revenue per quarter. The analysis of several measures or dimensions is not possible.		
2	Individual data fields (measures or dimensions) can be removed or added to the analysis at any time.		
3	The following visualization types can be selected manually in Tableau...		
	• Bar chart		
	• Lines		
	• Pie charts		
	• Automatic adjustment		
	• Area charts		
4	Tableau only calculates the total sums, e.g., the total turnover of the CornFactory from 2016 to 2018. The numerical values per year or month must be calculated by the user. Unfortunately, Tableau cannot help here.		
5	The data fields in the rows and columns and their arrangement can be swapped as desired. This allows the visualization to be changed as desired.		
6	Dimensions represent information values, like a date or a name. They usually generate the labels of the columns or rows (e.g., “Year” or “Product Name”).		
7	Measures have the following characteristics...		
	• They represent numerical values.		
	• They are automatically added together to form totals (for example, total revenue).		
	• They usually generate the diagrams within the analysis visualization.		

8	“Show Me” provides you with a selection of visualization options. However, there are many more visualizations that can be created individually.		

Tab. 4: Final Test 3

4 Refining Results and Making Forecasts

4.1 Intro: Training Day 4 - What to Expect?

Ms. Supporto:

Welcome to the fourth training day for the software Tableau!

Today, I will show you how you can color and further refine your analyzed data. You will also learn how to create forecasts and filter result details.

Let's start right away. Let's start refining!

4.2 Refining the Visualization and Highlighting the Key Points

Note: A video is available in the WBT to demonstrate the following Tableau functions. In this video, you will learn how to use the Tableau function "Colors" to highlight important results and further refine your visualization. You will create new visualizations and gain further insights.

Example: You have already created some visualizations in Tableau. But, everything is very plain. You should change this quickly to get a quick overview of the huge amount of data.

4.2.1 Adding a Color Mark

Now, you know the revenue, but you do not know how profitable your products are. You can also add new information to your analysis as colored marks, e.g., coloring the bars according to the amount of profit.

- Go to the worksheet "Turnover per Quarter".
- Drag the "Profit" data field onto "Color" in the Marks tab.

Tableau automatically generates a color legend and colors the bars according to the amount of the profit. In the "Marks" tab, the data field "SUM(Profit)" is listed as "Color".

However, not only the colors, but also additional information about the profit were added.

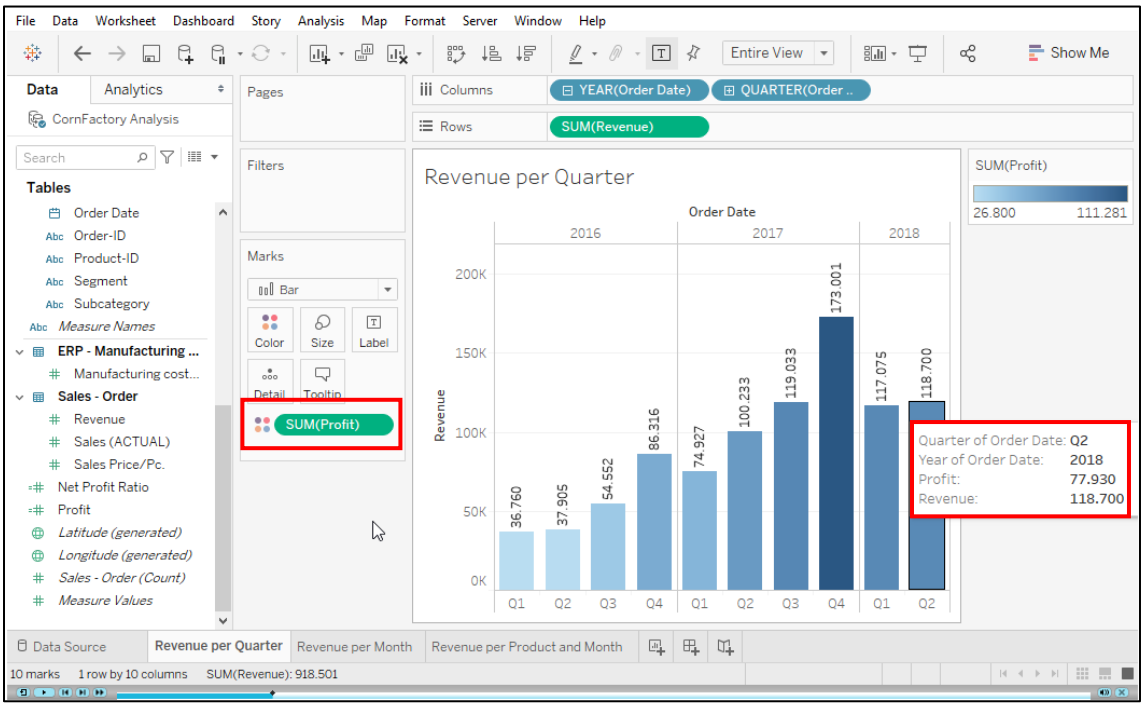

Fig. 27: Adding a Color Mark

Note: Other data fields can also be integrated into the visualization using this feature. For example, in order to be able to distinguish the products better, drag the data field “Product Name” onto “Color” in the “Marks” tab. Each product will then appear in a different color.

4.2.2 Adding a Detail Mark

Using the “Marks” tab, you can also add information as a detail, which only becomes visible when you hover the cursor above the bars.

- To do this, drag the “Return on Sales %” data field from the data area onto “Detail” in the Marks tab.

4.2.3 Changing the Color Legend

The color legend can be individually adjusted in Tableau. There are also numerous predefined color combinations available.

- Go to the worksheet “Revenue per Month“.
- Double-click on the marked color legend (right).
- Open the drop-down menu and select, for example, “Green-Gold”.

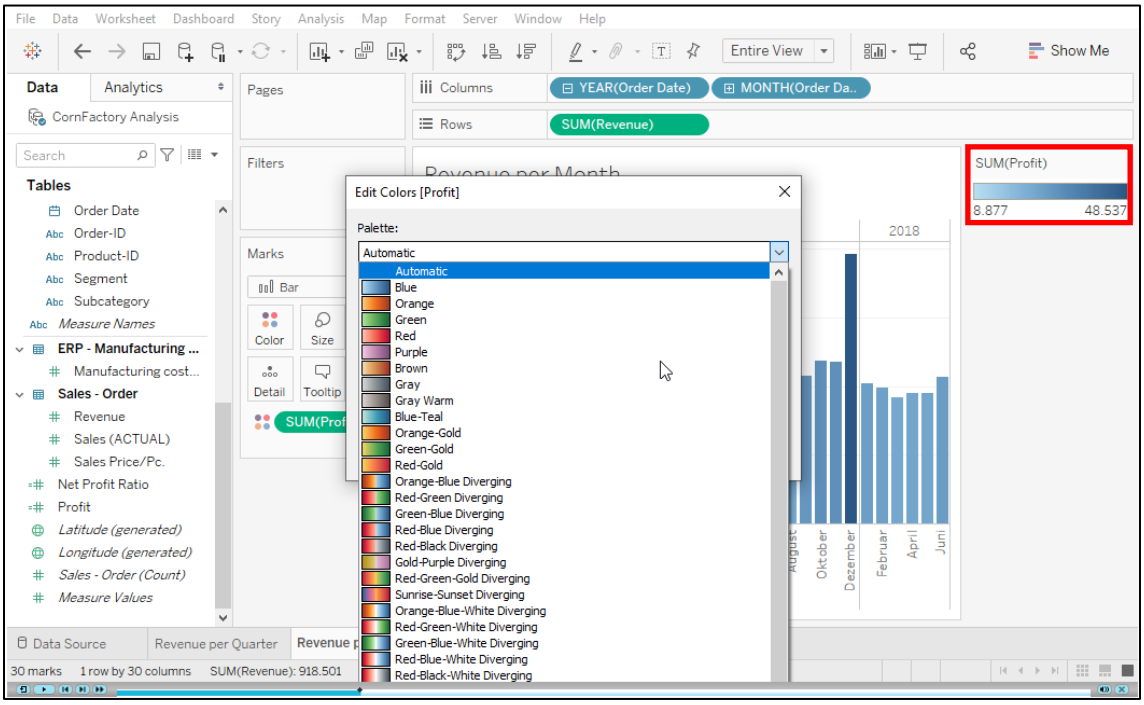

Fig. 28: Changing the Color Legend

4.2.4 Creating a Line Chart with “Show Me”

We would also like to see the product revenues in a direct comparison. Let’s see what “Show Me” has in store for us.

- Duplicate the worksheet “Revenue per roduct and Month” and rename the title and worksheet to “Seasonal Revenue fluctuations”.
- Click on “Lines (Continuous)” in the “Show Me” tab. Tableau generates a line chart of the products with a single mouse click.

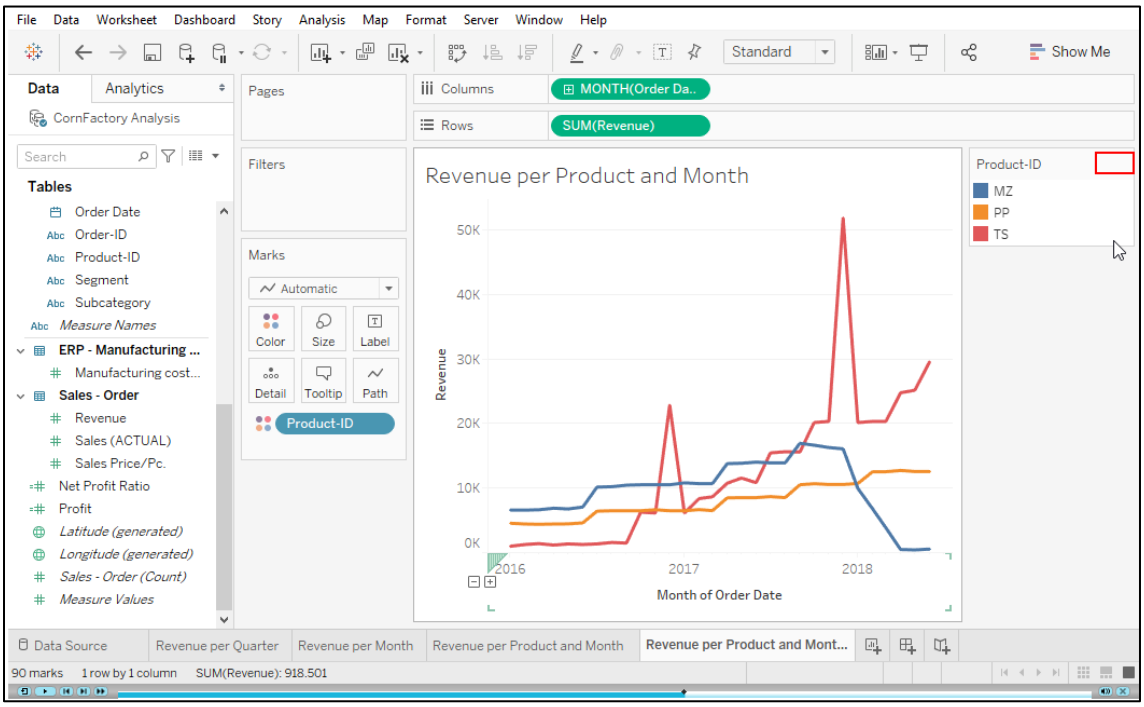

Fig. 29: Creating a Line Chart with “Show Me“

4.2.5 Changing Individual Colors

The individual colors of the products can now be adjusted manually.

- Click on the drop-down menu and select “Edit Colors”.
- Choose a different color for each product.

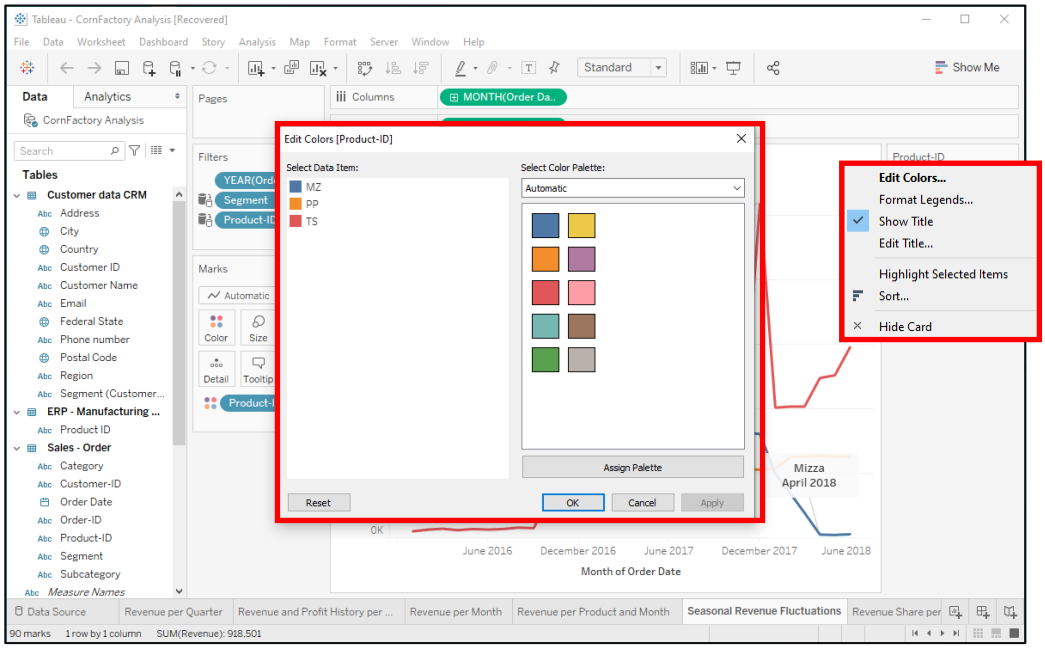

Fig. 30: Changing Individual Colors

4.2.6 Annotating Certain Points

You can annotate important aspects of your visualization (here: on the line chart).

- To do this, right-click on a desired spot on the line chart and select “Annotate”.
- Assign a meaningful annotation to the point and click “OK”.
- Place the annotation in a suitable place.
- Repeat the steps for other important areas in the visualization.

Now, you can quickly extract the most important insights from the graphic.

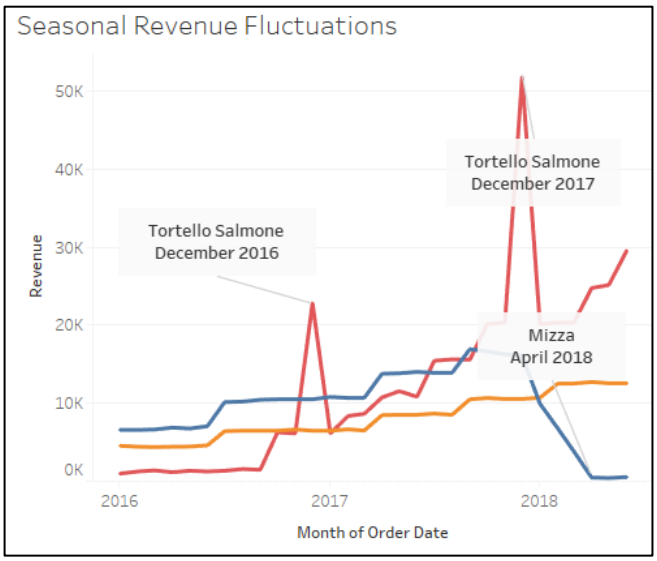

Fig. 31: Annotating Certain Points

4.3 Creating Forecasts and Filtering Results

Note: A video is available in the WBT to demonstrate the following Tableau functions. In this video, you will learn how to focus on results using the Tableau function “Filter” and thus concentrate on important details.

You will also learn how to calculate forecasts in Tableau and thus gain important new insights for sales planning.

Example: The revenue and profit development were very informative. However, we currently have no information about sales, i.e., the products actually sold.

In order to be able to plan production, we now analyze the sales volume and have a sales forecast calculated.

4.3.1 Replacing Data Fields

- Duplicate the worksheet to create a new analysis and keep this visualization.
- Rename the duplicated worksheet to “Sales Forecast 2019”.
- Now replace the revenue with the sales volume. To do this, drag and drop the data field “Sales (ACTUAL)” from the data area into the container rows and the revenue from the container into a neutral area.

You can see: Sales of Mizza are plummeting. The demand for Tortello Salmone and Pasta Puro, however, is increasing.

What quantities are you now expected to produce in the coming months? Let Tableau calculate a sales forecast for you. That works? Yes!

4.3.2 Creating a Forecast

In the category “Analytics”, Tableau offers the possibility to add trend lines, averages, forecasts and more. You will create a forecast like this in the following.

- In the Data Area, click on the tab “Analytics”.
- Now, drag and drop the “Forecast” box into the visualization as usual and see what happens.

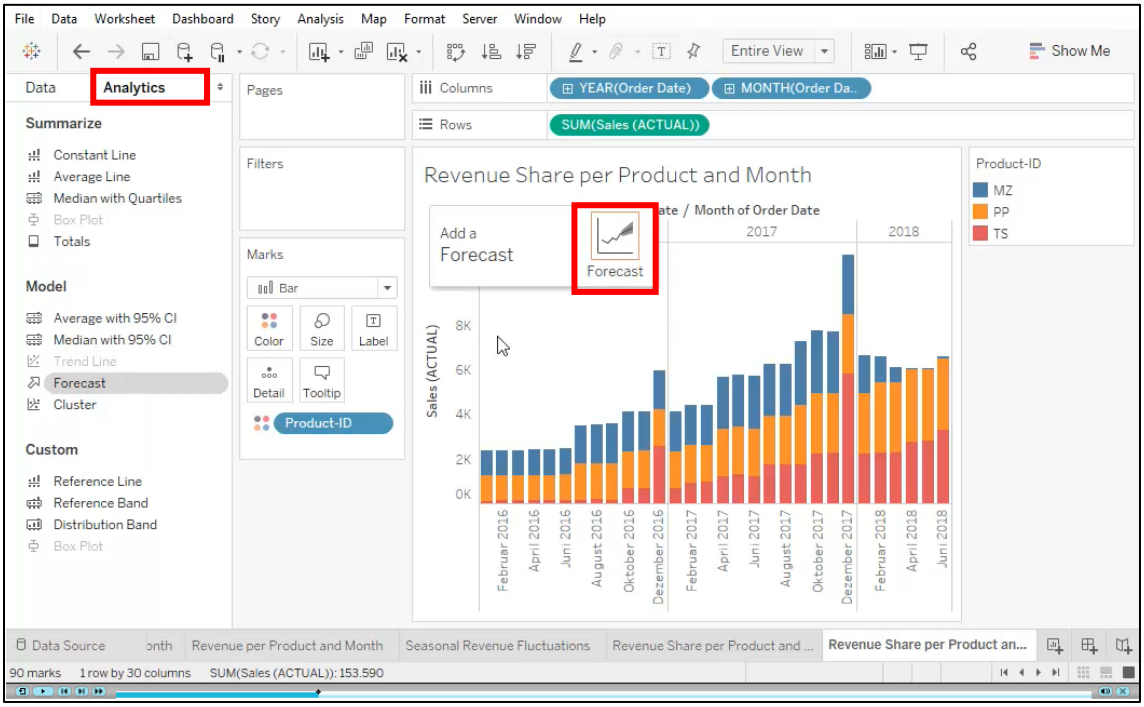

Fig. 32: Creating a Forecast

Now, the following visualization shows the sales and forecasts of all products of the CornFactory.

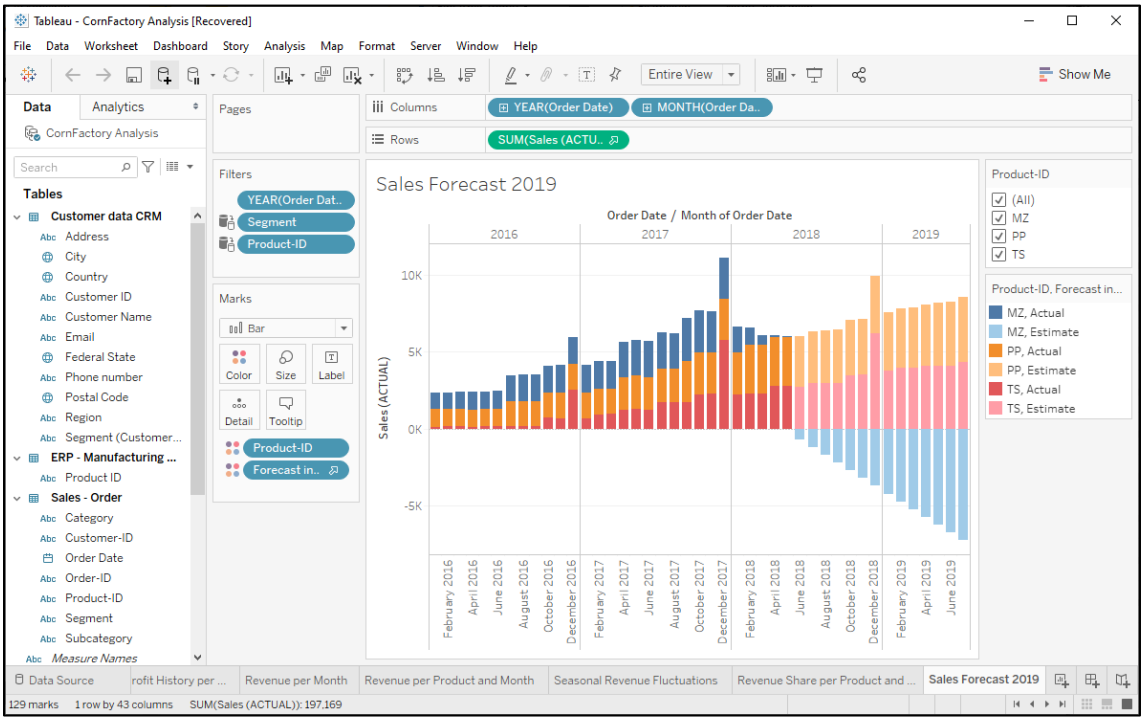

Fig. 33: The Visualization “Sales Forecast 2019“

Tableau calculated a forecast for the next year from the sales trends of the past years.

Tableau uses the exponential smoothing method. Simply put, forecasting algorithms try to find a regular pattern in existing measures and time series that can be continued in the future. The pale bars represent these estimates.

Note: Due to this calculation method, the sales appear negative, which of course would not happen in real life.

This is a lot of information at once - you can easily lose track. We would now like to only display the sales with forecast for the product Mizza. This is possible with the Tableau function “Filter”.

4.3.3 Adding Filters

With this function, values can be hidden or displayed in the visualization. To focus on individual detailed results.

Create a filter for “Product”.

- Right-click in the data area on the product name data field and select “Show Filter”.

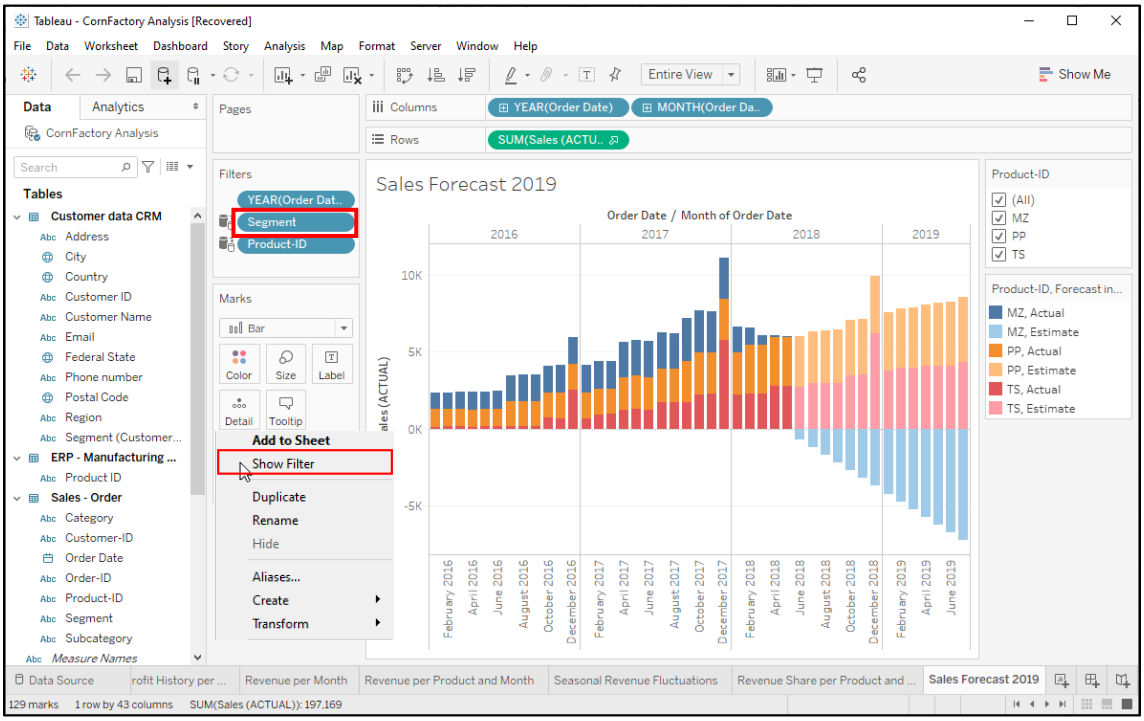

Fig. 34: Adding a Filter

The filter “Segment” was added. The navigation menu appears on the right side. By removing and setting the check marks, you can now focus on the individual products.

This visualization gives us a good overall impression of the sales trend. For concrete production planning, however, we need concrete numerical values.

4.3.4 Creating a Highlight Table from the Forecast

Create a highlight table and customize it.

- Duplicate the worksheet.
- In the “Show Me” tab, click on “Highlight Table”.
- Use the “Swap” icon to swap columns and rows to get a vertical visualization.
- Drag the data field “Product Names” from the container “Rows” into the container “Columns”. You can do this as usual by drag & drop.
- Color the visualization to “Red-Green-Gold Diverging”, so that the numerical values can be distinguished more clearly. You already know how to do this.
- Rename your visualization to “Crosstab (Sales Forecast 2019)”.

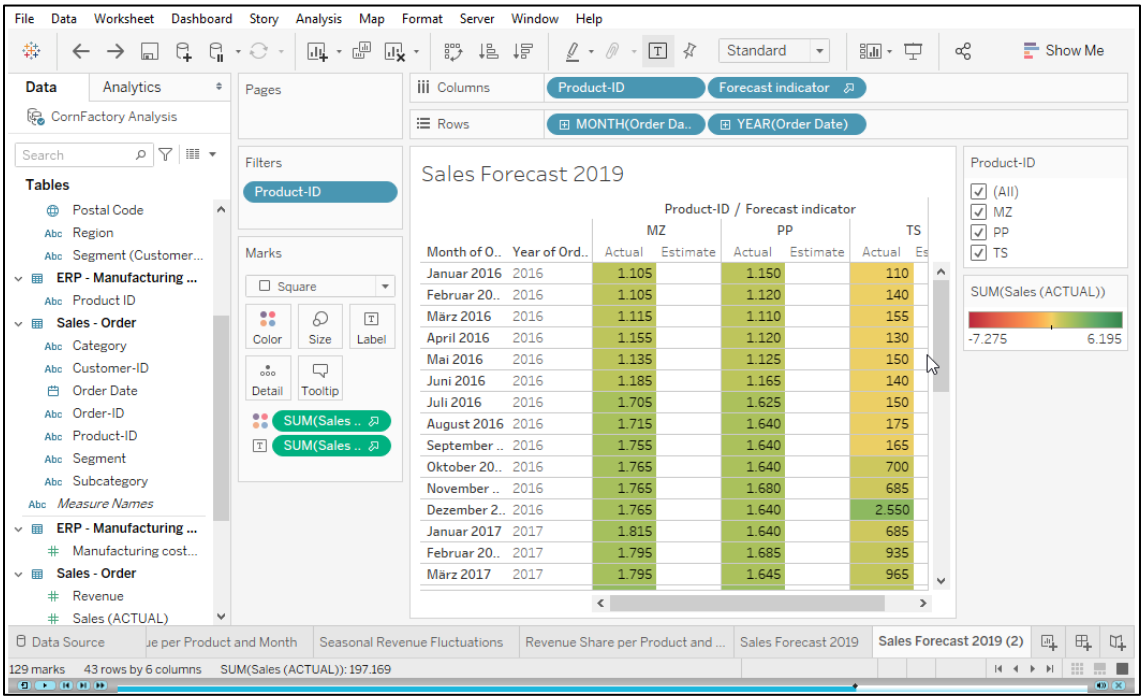

Fig. 35: The “Crosstabs (Sales Forecast 2019)” Visualization

4.4 Exercise: Your Turn!

4.4.1 Exercise “Refinement and Forecasts“

After you have watched the video, you should now perform the steps yourself in the Software Tableau:

1. Refine your existing visualizations using the color function. Note: profit, products and lines.
2. Create a sales forecast and add a filter for the products.
3. Try yourself in the creation of filters and the possibilities of coloring.

4.4.2 Final Test 4

Test your knowledge. Tick the correct answer options.

No.	Question	True	False
1	Using the “Marks” tab, individual measures or dimensions can be added to the visualization as details, text labels or coloring.		
2	The coloring of values in the visualization has the purpose...		
	• Of emphasizing important things.		

	• Of making data points quick and easy to find.		
	• Of focusing on certain details.		
	• Of structuring the large amount of data.		
3	Tableau has pre-set color combinations, e.g., "Green-Gold". Individual color requests can unfortunately not be implemented.		
4	Tableau offers the possibility to have trend lines, averages, forecasts and more calculated and added to the visualization.		
5	With filters, you can exclude values in the visualization or display them separately, e.g., a single product.		
6	Which statement is false? The purpose of adding filters is to...		
	• Focus on separate results.		
	• Hide bad numbers.		
	• Create structure and visibility in the data set.		
7	To change the color depending on the amount of profit, drag the “Profit” measure into the “Color” box in the “Marks” tab. You can now see the profit amount based on the color tone.		
8	Tableau uses the exponential smoothing method to calculate forecasts. Forecasting algorithms try to detect a regular pattern in the existing time series that can be carried forward into the future.		
9	What recommendation can you make for production planning?		
	• No adjustments are necessary in production planning. Everything should continue as before.		
	• According to the forecast sales volume, the CornFactory should concentrate only on the product Pasta Puro and remove all other products from its selection.		
	• The sales forecast for the product Mizza is quite poor. Production should therefore be discontinued.		

Tab. 5: Final Test 4

5 Geographical Data Analysis and Drilldown

5.1 Intro: Training Day 5 – What to Expect?

Ms. Supporto:

Welcome to the fifth training day for the software Tableau!

Today, I will show you how you can use the Tableau maps to examine your data geographically and "Zoom In" on individual details. Let's see if there are really regional differences in sales. Let's get right to it!

5.2 Creating a Map from Geographical Data

Note: A video is available in the WBT to demonstrate the following Tableau functions. In this video, you will learn how to use the Tableau functions "Maps" to explore and visualize geographical data in a map visualization.

Example: You already know that there are different sales trends for the products of the CornFactory and that there are seasonal sales fluctuations. But, is this the same in all regions? You can find out now,

5.2.1 Creating a New Worksheet

Create a new worksheet to retain the existing visualizations.

- Click on the "Sheet Icon" at the bottom right of the footer of Tableau.

Fig. 36: Creating a New Worksheet

5.2.2 Creating a Map Visualization

For the creation of a map visualization, we need geographical data. Tableau automatically recognizes these data types in our data sources and marks them with the data type symbol of a globe, such as the data field "Country".

- Double-click on the geographical data field "Country".
- Double-click on the "State" data field to add it to the map view.
- Add the measure "Revenue" by double-clicking on it.

Tableau recognizes data with geographical information and automatically creates a map visualization of Germany, divided into its 16 federal states. In the containers columns and

rows, the corresponding longitude and latitude appear, e.g., to distinguish countries and federal states.

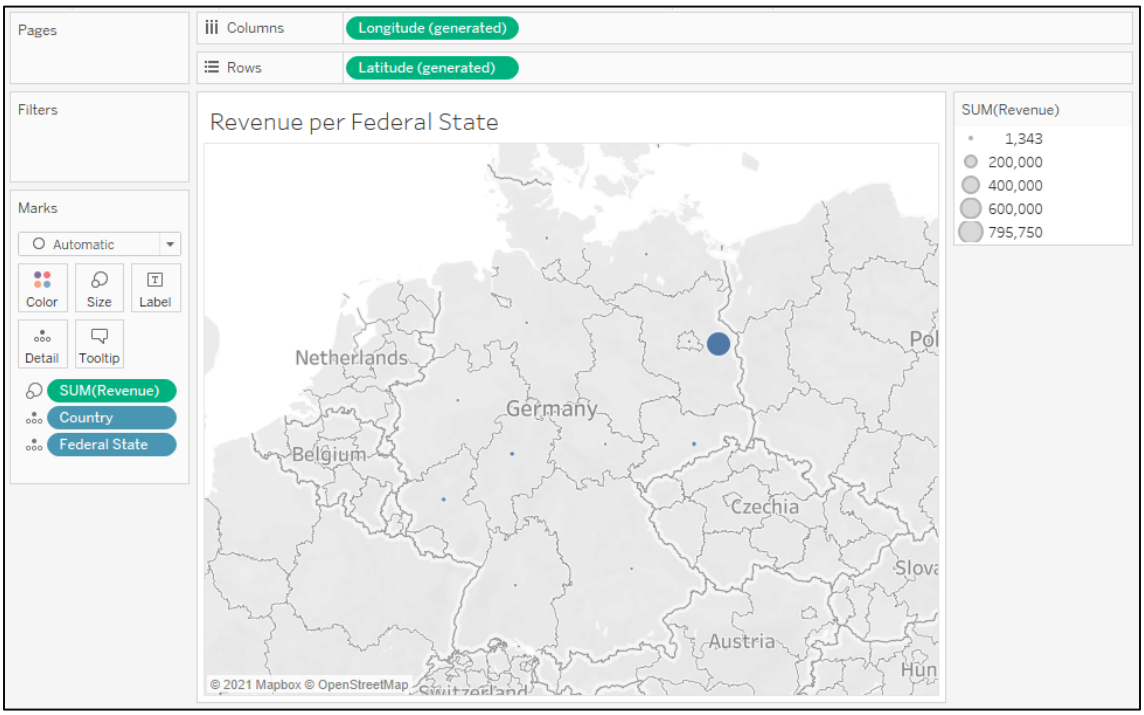

Fig. 37: Creating a Map Visualization

First, blue dots appear as placeholders for the federal states for which data sets are available. After adding the revenue, Tableau adjusts the placeholder points according to the size of the revenue.

Now, most of the dots are quite small... Change that,

5.2.3 Changing the Character Size

- Click on “Size” in the “Marks” tab and move the slider until you like the size of the points.

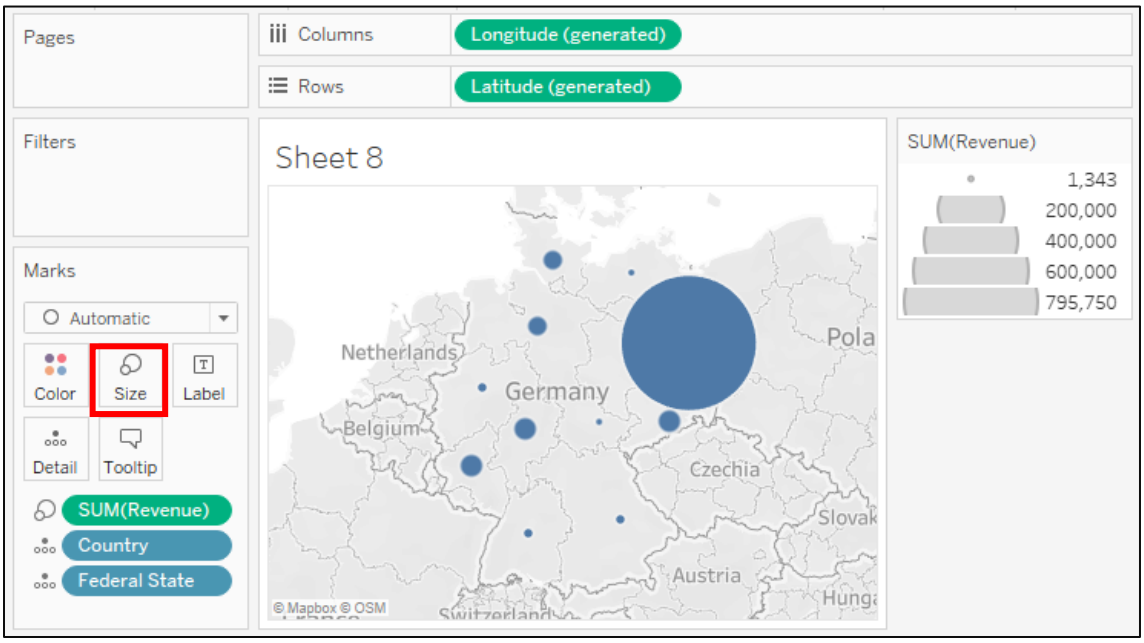

Fig. 38: Changing the Character Size

5.2.4 Changing the Map Display with “Show Me”

The dots are now more visible, but the small dots are still disappearing. Change the appearance of the map using the “Show Me” function.

- Click on the colored map visualization under “Show Me”.

5.2.5 Consideration of an Outlier in the Coloring

We already know that Brandenburg generates by far the highest revenue. Take a look at the color scale. It ranges from 1.343 € to 809.888 € in turnover. I suspect that Tableau colors all other values red in comparison to the “outlier” Brandenburg - although they may not be that bad. Change that.

- Double-click on the color key and select “Red-Green-Gold diverging”.
- Click on the “Advanced” button in the same window to manually adjust the color scale.
- Since the revenue of 809,888 € is an outlier, adjust the end value of the color scale to 50,000 €.
- Click on “Apply” and “OK”.

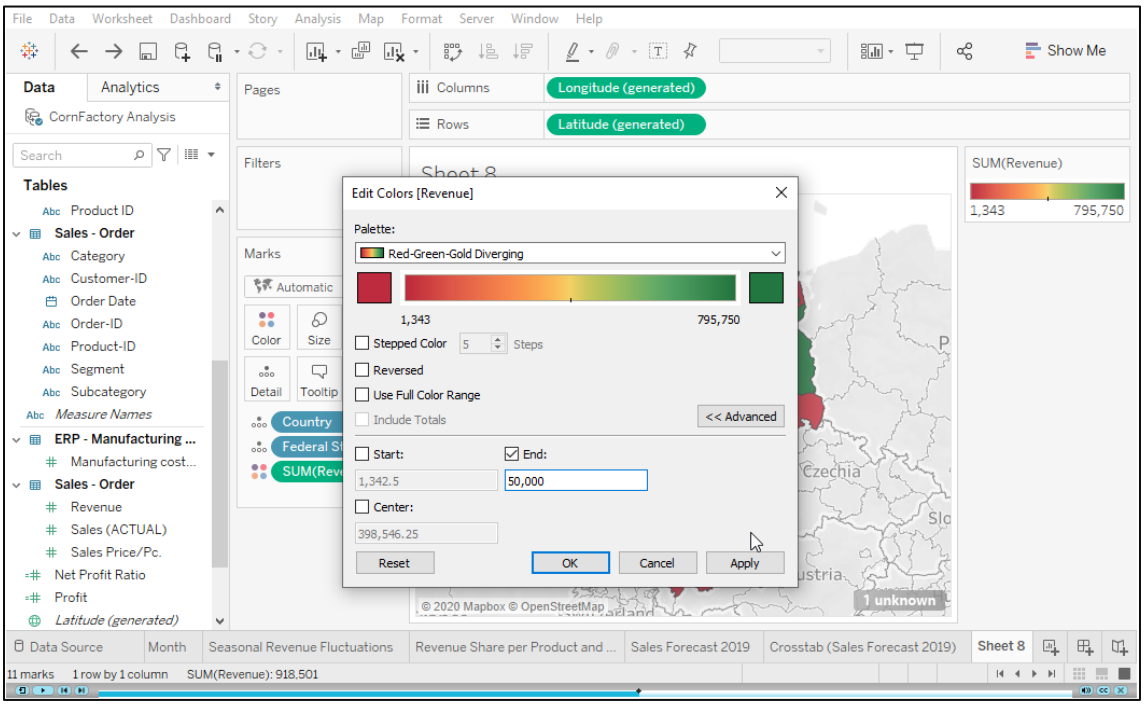

Fig. 39: Consideration of an Outlier in the Coloring

This looks great now. You can now see at a glance which are the regions with the lowest turnover (red), in which regions a reasonable turnover is generated (yellow) and still see that Brandenburg is by far the federal state with the highest turnover (green).

Note: This example shows how important it is that you, as a user, know what exactly you want to show in your visualization. You should also follow your analyses carefully in order to be able to identify distorting facts, such as the sales outlier in our case.

Remember: Tableau is only your supporting tool.

5.2.6 Further Adjustments of the Map Visualization

You already know the following functions:

- Adding the Mark Label.
- Changing the font size by clicking on the “Label” button in the “Marks” tab.
- Adding an annual filter to see the regional sales development of the last years.
- Renaming your map visualization to “Sales per State”.

5.2.7 Correcting an Error in the Data Set

Wait a minute, did you notice the info message on the map? It means that a record was not recognized.

Check and fix the problem.

- Click on the info message “1 unknown”.
- Select “Edit Locations”. Here you go: The state was not recognized due to a spelling mistake.
- Click on the red “Not recognized field” and accept the correction suggestion from Tableau.
- Click on “OK“.

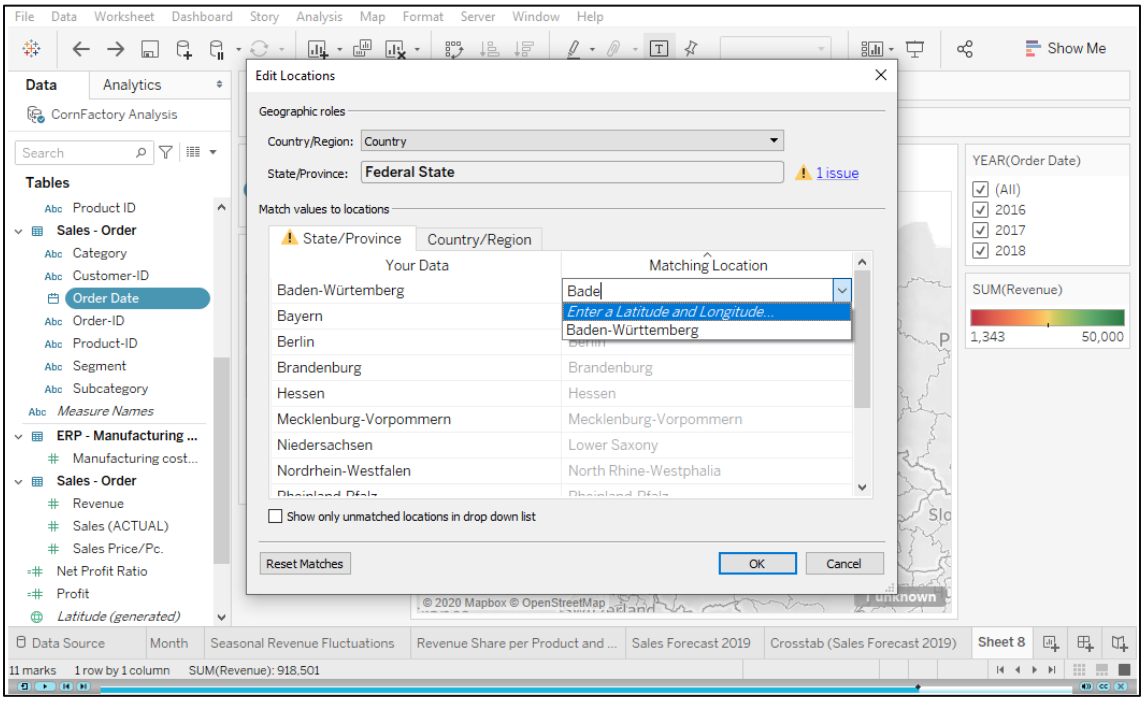

Fig. 40: Correcting an Error in the Data Set

Now, also the federal state Baden-Württemberg appears in color. In the grey federal states, no sales have been generated so far.

The map visualization is now ready. Do not forget to save.

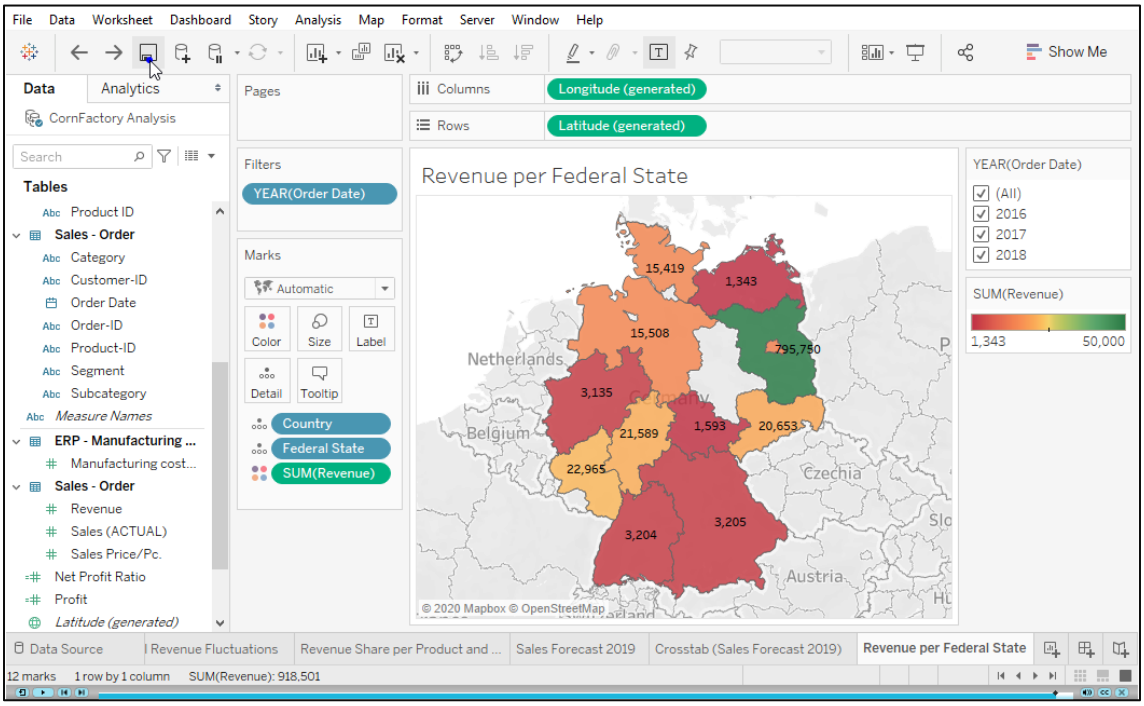

Fig. 41: The Map Visualization “Revenue per Federal State”

5.3 Drilldown into the Result Details

Note: A video is available in the WBT to demonstrate the following Tableau functions. In this video, you will learn how to use the Tableau function “Drilldown”, which means to “investigate more deeply”, to “zoom” into the results of the map visualization and thus to investigate them more thoroughly.

5.3.1 Refreshing Data Sources

Before zooming into the details, you should check your data accuracy.

Why would you do that?

Since you selected an “extract connection” in the beginning, the data is uploaded and saved directly in Tableau. Corrections and changes to the data source are not updated automatically, they must be made manually.

That’s what you will do now.

Note: Pay attention to the federal state Berlin.

- Click on your data source in the footer.
- Click “Refresh” next to the selected extract connection.

Tableau now accesses your connected data sources and compares them with the data sources that were uploaded to Tableau at the beginning of the training. If a deviation is detected, the data records are updated.

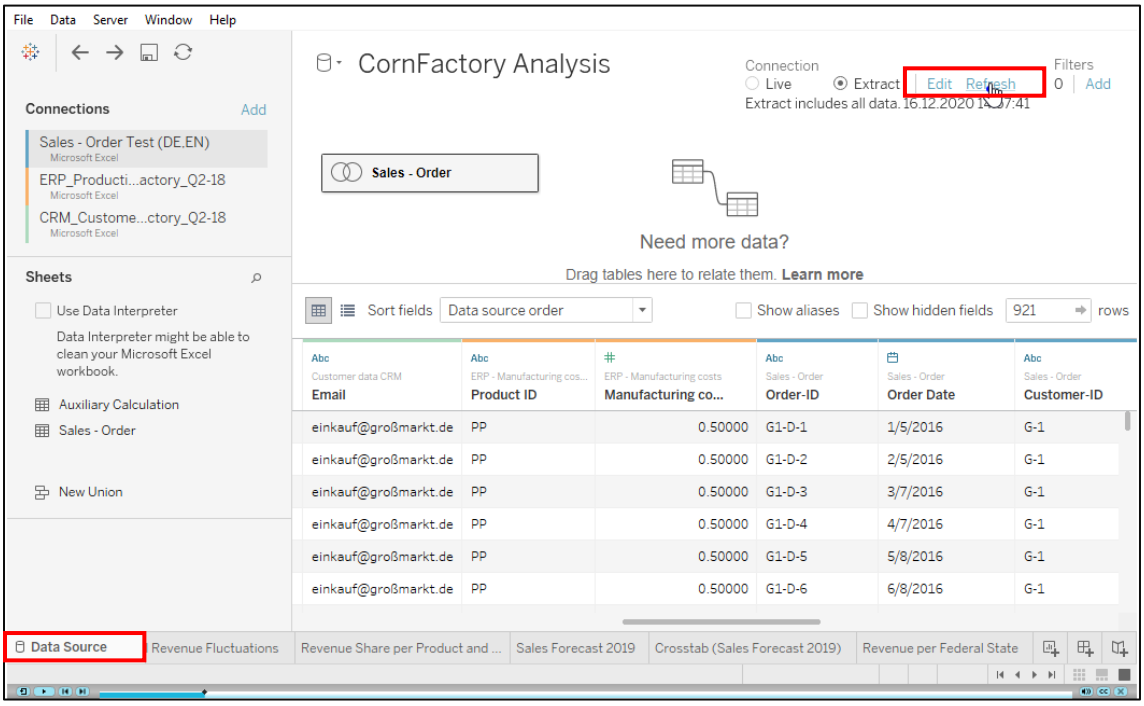

Fig. 42: Refreshing the Data Sources

Have a look at what happened in your map.

Right. Sales figures are now available for the federal state of Berlin and it has been colored. This also makes sense, because the CornFactory opened its first store in Berlin. The reason was a faulty data record in the CRM system.

So, the data is updated - back to the drilldown.

5.3.2 Drilldown into the Regions with Weak Sales

The “Map Function” gives you a general overview of the regional sales differences. But, what is the situation in detail in the federal states with weak sales? You will now find out.

- Duplicate your map visualization.
- Mark the weak (red) federal states with the Ctrl + Alt key pressed.
- Now right-click on the marked federal states and select “Keep only”.

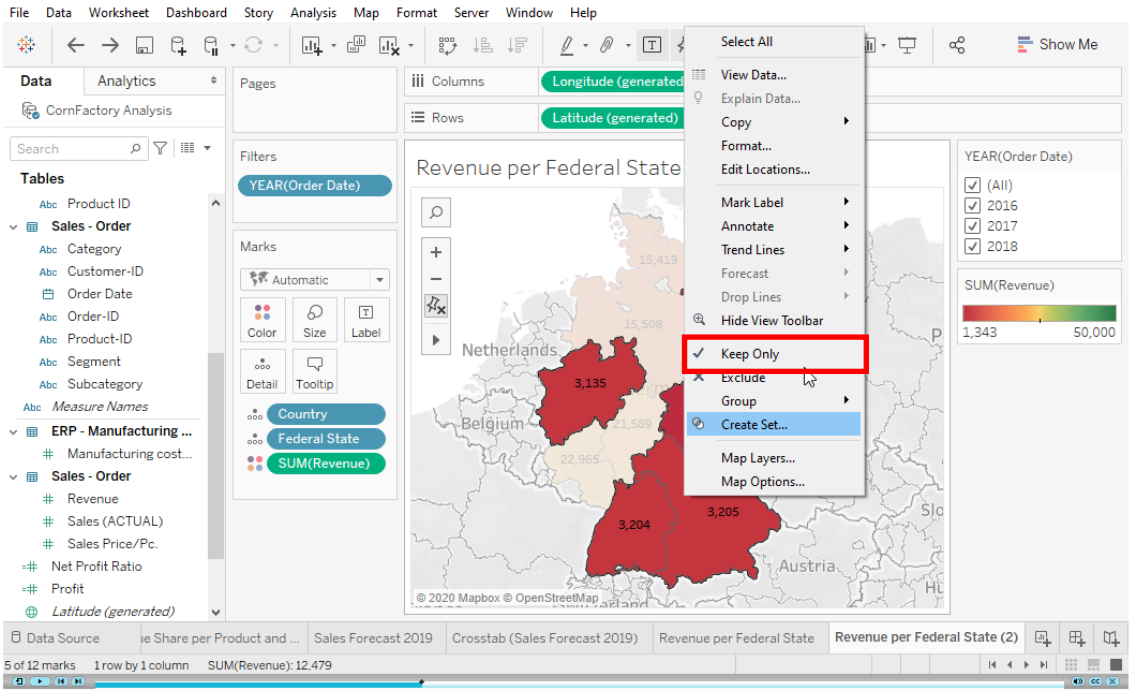

Fig. 43: Selecting the Data for the Drilldown

What happened? Tableau separates the selected federal states. All other federal states were excluded from the analysis and appear grey.

Now, you can drill down on your selection, i.e., explore the low-turnover federal states more thoroughly, for example, in a bar chart.

- Open the “Show Me” tab and select “Horizontal Bars”.
- Adjust the visualization. You have already learned to use the functions.
    - Remove the data field “Country”.
    - In addition to the federal states, you can also display the cities. Use the “+“ in the data field “State“.
    - Add information about the customers to see which customer segment generates which revenue.
    - To do this, drag the data field “Segment” into the container “Rows”.
    - Rename the visualization to “Drilldown Low Revenue States”.

You now know a possible reason for the low turnover in the focused federal states: so far, there are only eCommerce customers there, no retail or wholesale customers to whom we could sell higher quantities.

Do you already know how the turnover is divided between the three products? No? Then find out.

- Drag the “Product Name” data field into the “Marks” tab and drop it on “Color”.

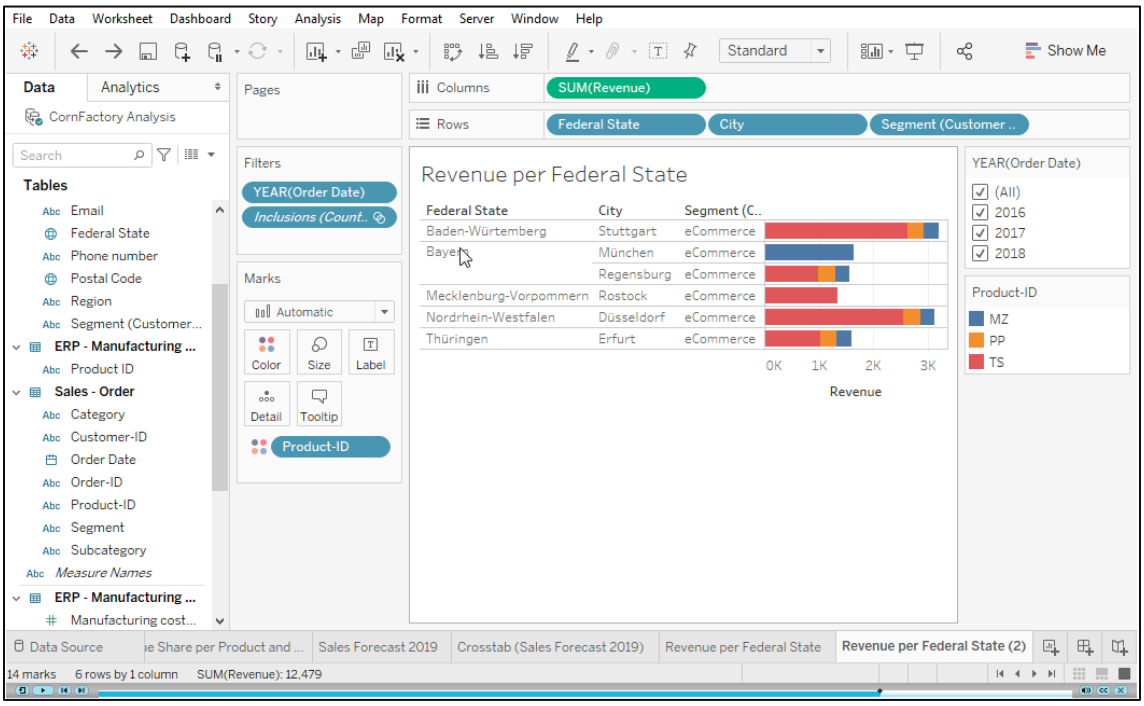

Fig. 44: The Visualization “Drilldown Low Revenue States”

Your drilldown is now complete.

You also want to transfer the insights from the customer structure to your map visualization.

- Add a filter for “Segment” to your map visualization (sales per state) by right-clicking and then explore the customer structure.

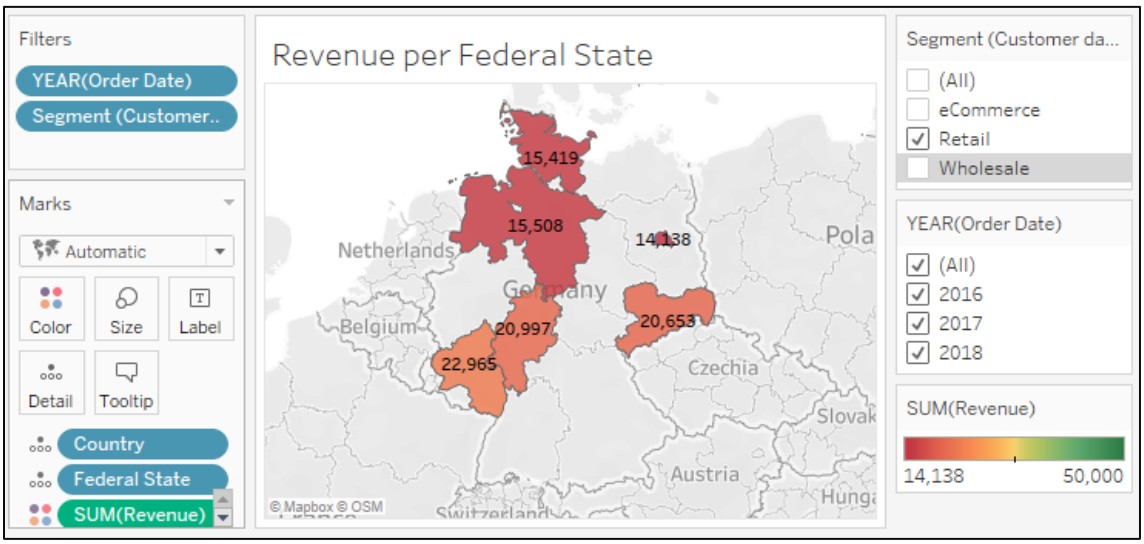

Fig. 45: Exploring the Customer Structure in the Map Visualization

Comment: You have made some discoveries about the situation of the CornFactory. Of course, the analyses and “Drilldowns” can still be continued by exploring other details or

figures. You have learned all the necessary basics. You are welcome to try out the software in more detail.

5.3.3 Creating a Backup

You should also export your file as a “Packaged Workbook” for backup purposes. Better safe than sorry.

- Click on the “File” menu tab in the header.
- Select “Export Packaged Workbook“.
- Save your file to the desired location.

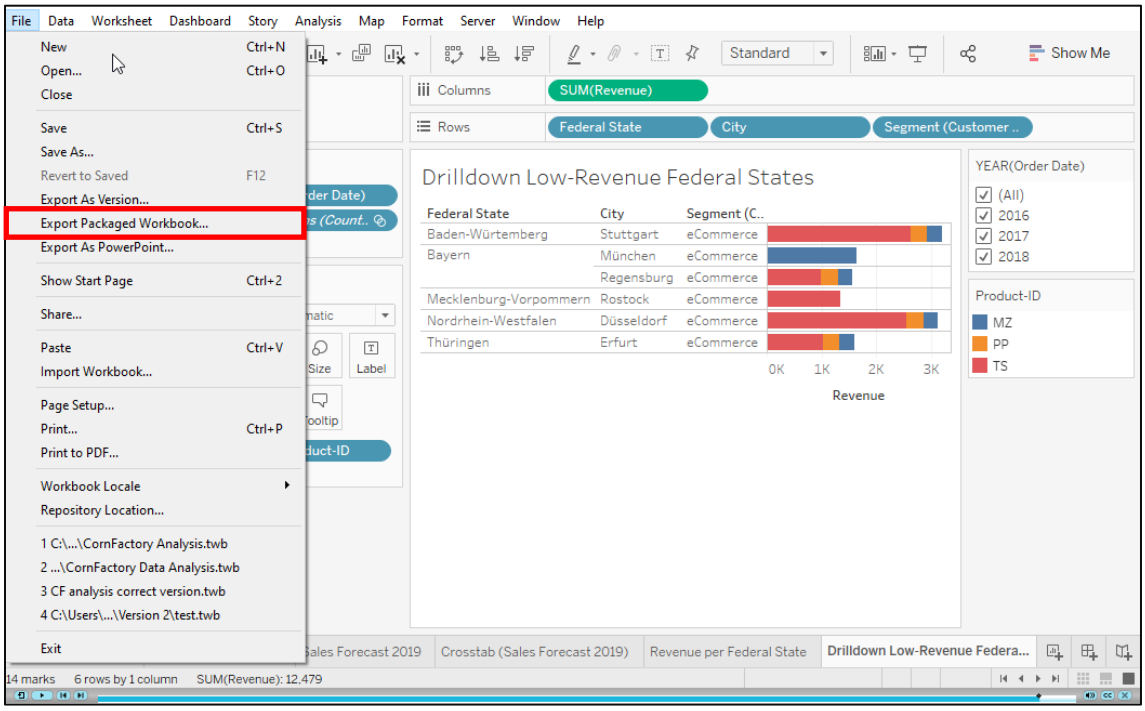

Fig. 46: Creation of a Data Backup

5.4 Exercise: Your Turn!

5.4.1 Exercise "Geographical Data Analysis“

After you have watched the video, you should now perform the steps shown in the Software Tableau:

1. Create a map visualization and examine your revenue in Germany per federal state.
2. Duplicate the card. Zoom in on the low revenue regions.
3. On the map and in the drilldown, analyze the customer structure (segment).

5.4.2 Final Test 5

Test your knowledge. Tick the correct answer options.

No.	Question	True	False
1	The Tableau function “Maps” is used to examine data with geographical information.		
2	"Show Me" unfortunately does not offer any visualization suggestions for the map visualization. There is only one map visualization available.		
3	Which is not a suitable data field for a geographical analysis?		
	• Postcode		
	• Country		
	• Order date		
	• City		
4	The "Marks" tab allows you, for example, to manually adjust the color tones and size of the shapes used to display data values (e.g., points) in the map visualization.		
5	The Tableau function "Drilldown” means to "Zoom" into certain details to explore them even more thoroughly. An example: Only the regions with weak sales are examined more closely in order to identify possible causes and optimization potential.		
6	Tableau recognizes data with geographical information and marks them with the data type symbol of a globe.		
7	The creation of a map visualization in Tableau is very complex. Programming knowledge is also required.		
8	Which statement is **false**? The following statements can be made for the CornFactory after a geographical data analysis:		
	• There are federal states in which no revenue has yet been generated.		
	• There are no regional sales fluctuations.		

	• Brandenburg is by far the federal state with the highest revenue.		

Tab. 6: Final Test 5

6 Reporting with Dashboards and Stories

6.1 Intro: Training Day 6 – What to Expect?

Ms. Supporto:

Welcome to the sixth and last training day for the software Tableau!

Today, I'll show you how to create dashboards from your key insights, combine them into a story and share them with others.

We will start with the preparations for creating the dashboards.

Let‘s get started!

6.2 Dashboard Preparation and Review

Note: A video is available in the WBT to demonstrate the following Tableau functions. This video uses the Tableau functions discussed so far to create additional visualizations. This will help you review and reinforce what you have learned and prepare the visualizations for dashboard creation.

In addition, you will learn how to make simple table calculations in Tableau, for example, how to determine the percentage of sales in relation to total sales.

Example: You have already gained some insight into the development of sales, seasonal fluctuations and regional differences in sales. However, you do not know how sales are distributed among the customer segments in percentage terms.

You will find that out.

6.2.1 Execution of a Quick Table Calculation

The following table visualization shows a ranking of the customers according to their sales volume. First create a suitable table visualization.

- Open a new worksheet.
- Drag and drop the data field “Segment” into the container “Rows”.
- Then drag the “Sales (ACTUAL)” data field in the “Marks” tab to “Labels”.
- Drag and drop the data field “Product Name” into the container “Rows” and place it to the right of the data field “Segment”.

This is where the “Quick Table Calculation” comes in, which in this case calculates the percentage of total sales.

- Open the drop-down menu of the data field “SUM(Sales (ACTUAL)” within the tab “Marks”.
- Click on “Quick Table Calculation”. You now have several calculations to choose from, which Tableau provides by default.
- In this case select “Percent of Total”.

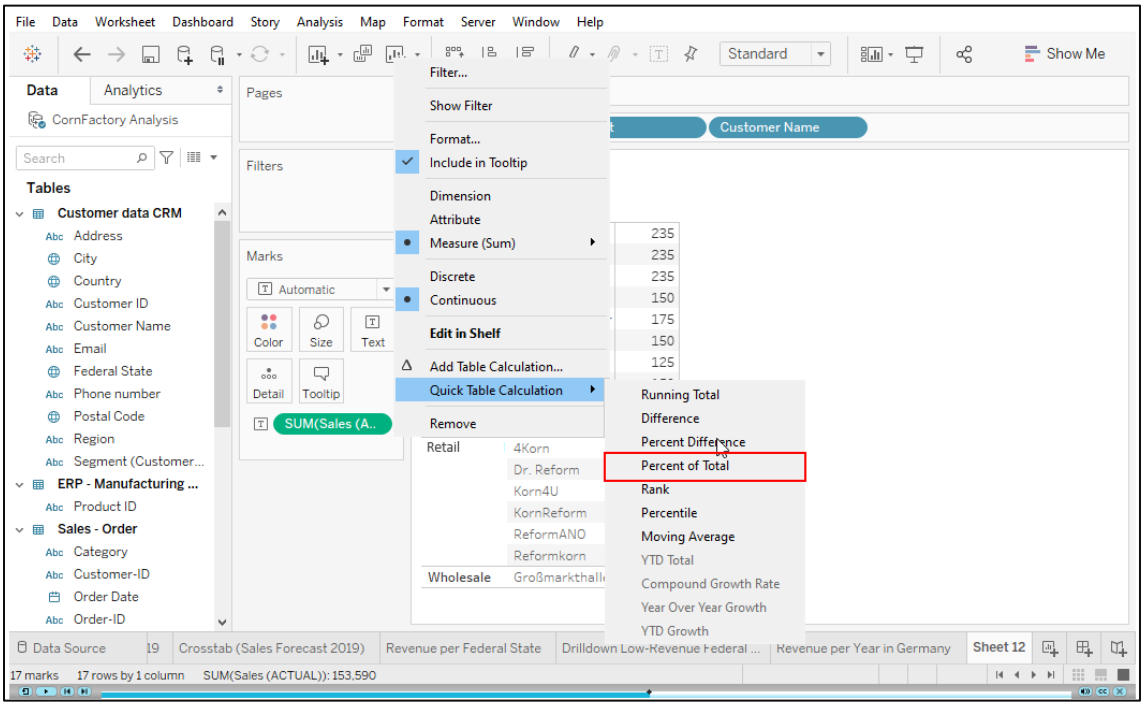

Fig. 47: Execution of a Quick Table Calculation

6.2.2 Customization of the Table Visualization

Now, adjust your table with the functions you have already learned.

- Color the numerical values according to the height of the sales. To do this, drag the “(Sales (ACTUAL)” data field in the “Marks” tab to “Color”. Remember to include the outlier “Wholesale” in the coloring.
- Use the “Marks” tab to change the chart type to “Square”.
- To additionally see the actual sales figures, select the “Text Table” representation in “Show Me”.
- Due to the selection of the standard table, our coloring has been lost. Repeat the coloring and chart type change quickly.
- For a better overview, widen the graphic. To do this, simply drag the right edge of the graphic in width.

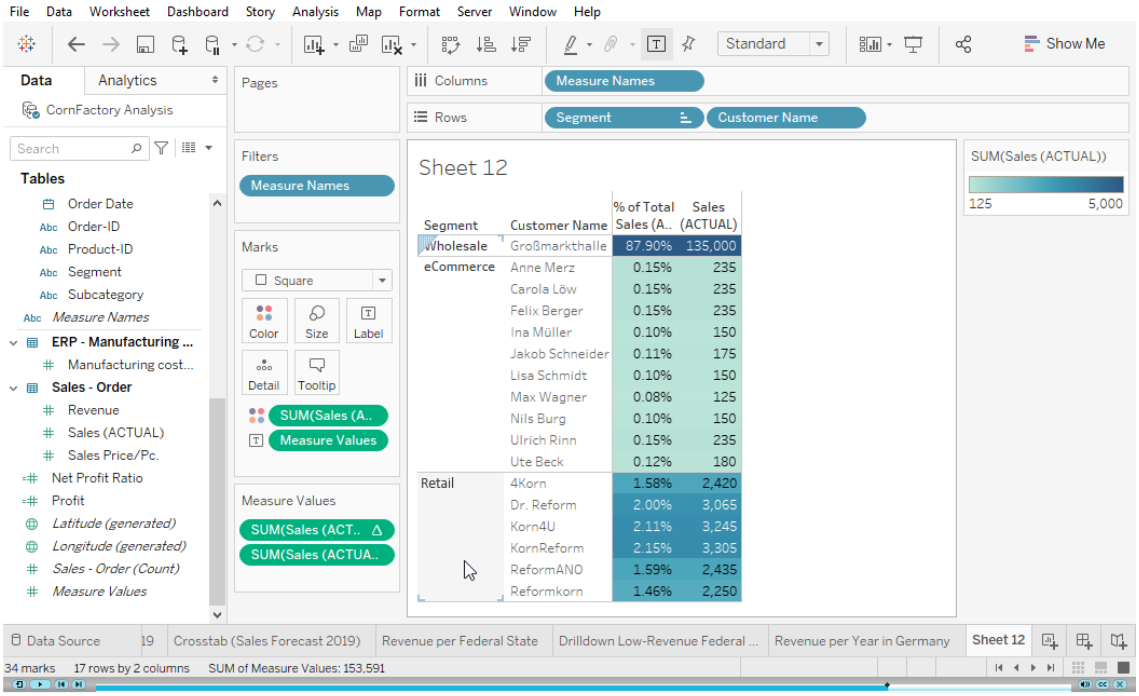

Fig. 48: Adjusting the Text Table

6.2.3 Changing the Order in the Table Visualization

We would now like to create a ranking of the segments by sales volume.

- Simply re-arrange the segments using drag & drop. Drag and drop the wholesale segment up in the table and the eCommerce segment down.

6.2.4 Sorting Numerical Values

The row values should also be sorted in descending order according to the amount of sales, so that we get a customer ranking.

- Click on the “Sort Icon” in the navigation bar.

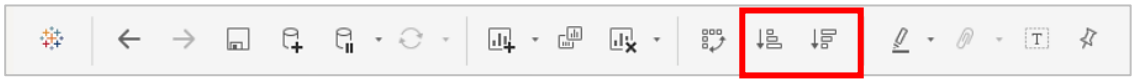

Fig. 49: The “Sort Icon”

6.2.5 Editing the Alias

Edit the “Alias”, i.e., the column caption, so that the complete title appears.

- Right-click on the column header and select “Edit Alias”.

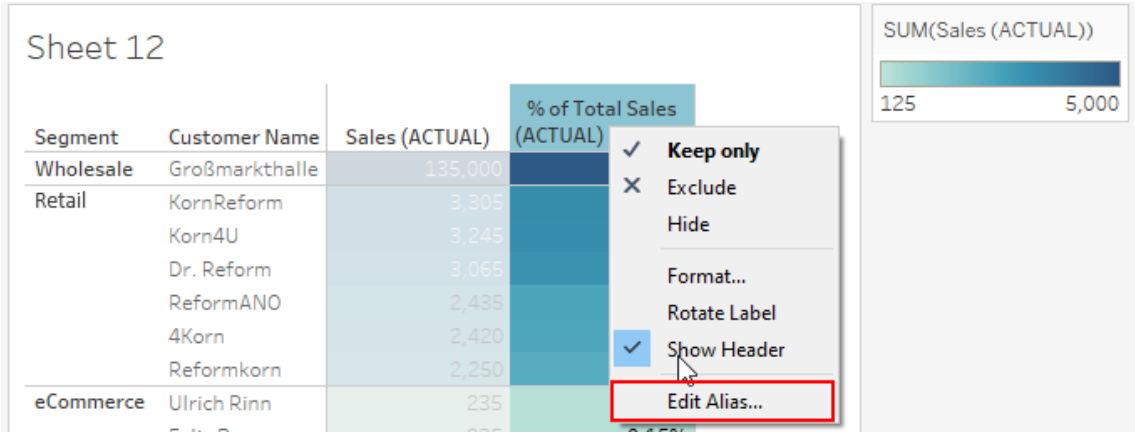

Fig. 50: Editing the Alias

Your visualization is now ready.

Note: The video creates additional visualizations that are used to create the dashboards.

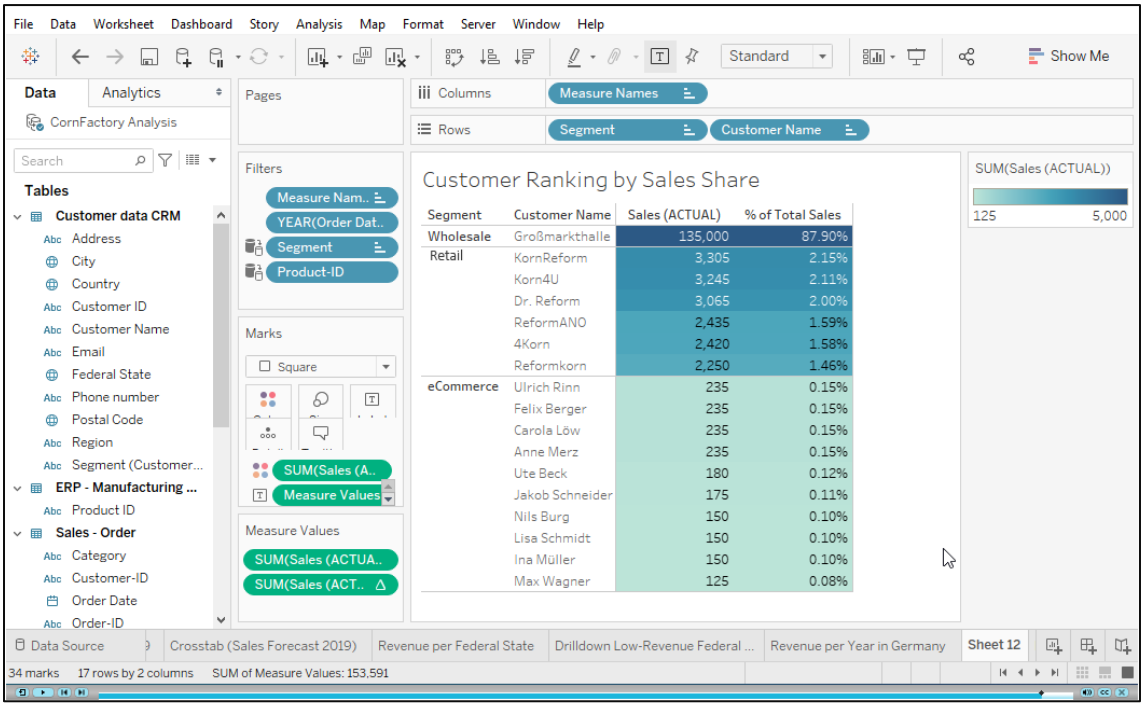

Fig. 51: The Visualization “Customer Ranking According to Sales Share”

6.3 Creating Dashboards

Note: A video is available in the WBT to demonstrate the following Tableau functions. In this video, you will learn how to create so-called “Dashboards” from your most important insights.

Dashboards are “Bulletin Boards”, on which you combine multiple visualizations to display a particular subject matter.

6.3.1 Opening a Blank Dashboard Mask

Create your first dashboard. It should present a general overview of the current situation of the CornFactory from 2016 to 2018.

- You can open an empty dashboard mask by clicking on the “Dashboard Icon” in the footer.

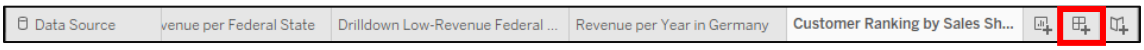

Fig. 52: The “Dashboard Icon“

In the left navigation bar, your created visualizations are listed.
These can now be added to the dashboard by double-clicking or drag-and-drop.

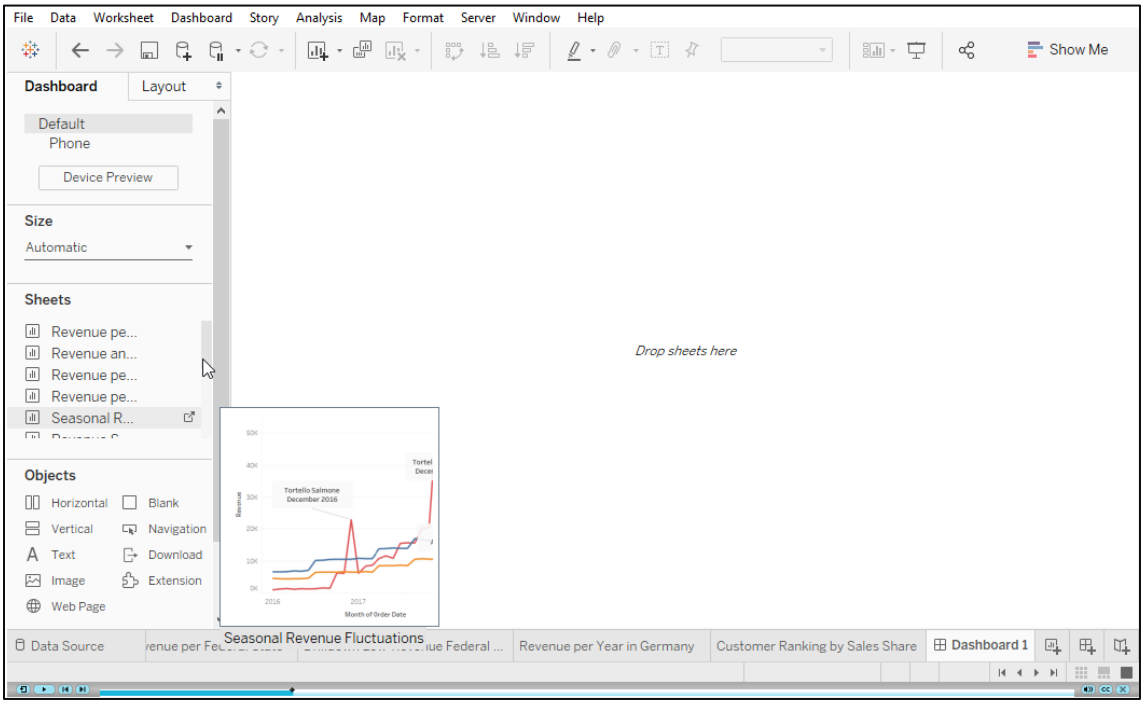

Fig. 53: The Blank Dashboard Mask

Before creating the dashboard, let’s first change the display size of the dashboard.

- In the left navigation bar, open the drop-down menu in the “Size” box.
- Select “Automatic”. Tableau automatically adjusts the visualization to the screen size.

Now create your first dashboard.

- Add the visualization “Sales per Year in Germany” by double-clicking.
- Now drag and drop the visualization “Sales and Profit History” into the dashboard and position it below the map visualization
- Also place the visualization “Revenue per Federal State” below left of the map. Tableau uses grey fields to show you where the visualization can be placed.

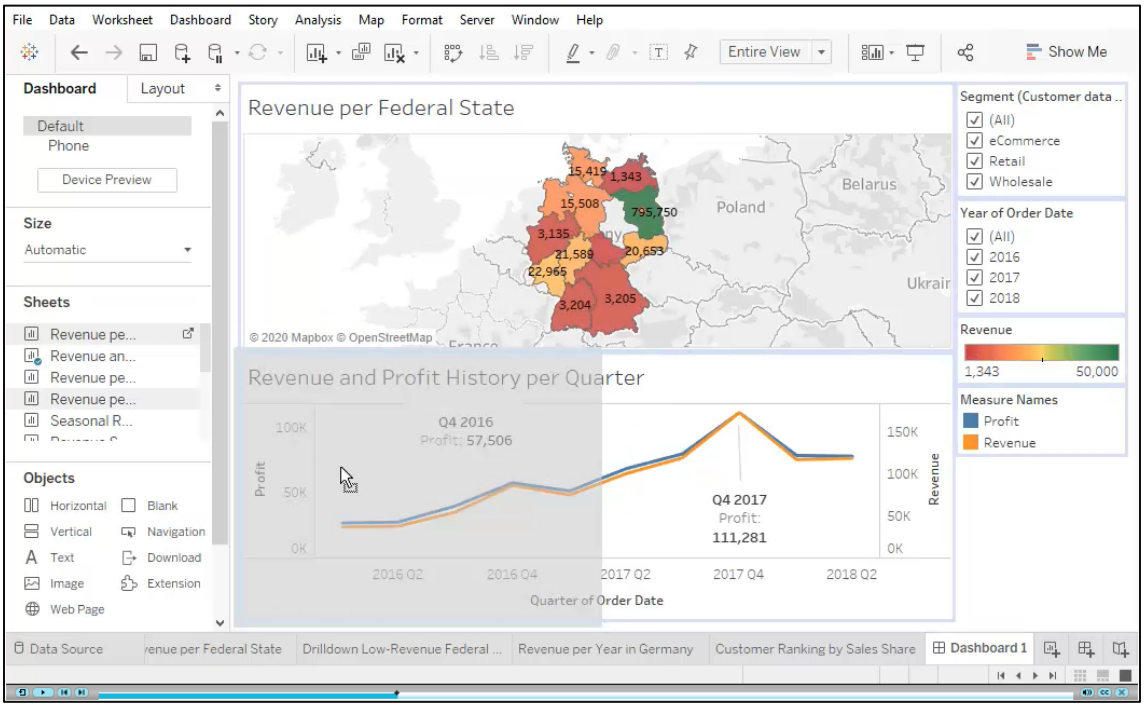

Fig. 54: Creation of a Dashboard

A dashboard heading is useful.

- To do this, check the box “Show Dashboard Title” in the left navigation bar.

The dashboard title appears in the header. Give the dashboard the title “Current Situation of the CornFactory 2016 to 2018”.

6.3.2 Creating Interactive Filters in the Dashboard

Unfortunately, the filters were lost when the dashboard was created.

Change them. Add the filter “Year” again.

- Click on any visualization and open the appearing drop-down menu.
- Click on “Filter” and select “Year of Order Date”.

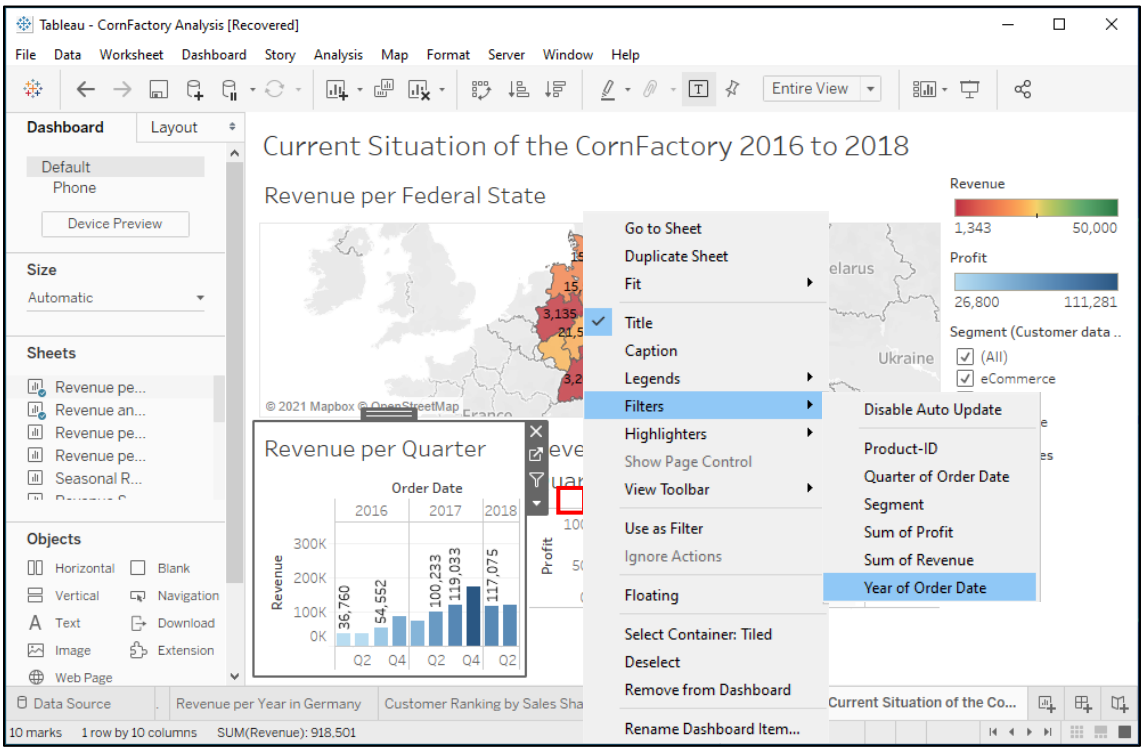

Fig. 55: Adding a Filter in the Dashboard

However, the filter now only applies to this one visualization. However, we would like to filter all visualizations simultaneously by years. Change that.

- Click on the filter navigation and open the drop-down menu.
- Click on “Apply to Worksheets” and select “All Using Related Data Sources”.

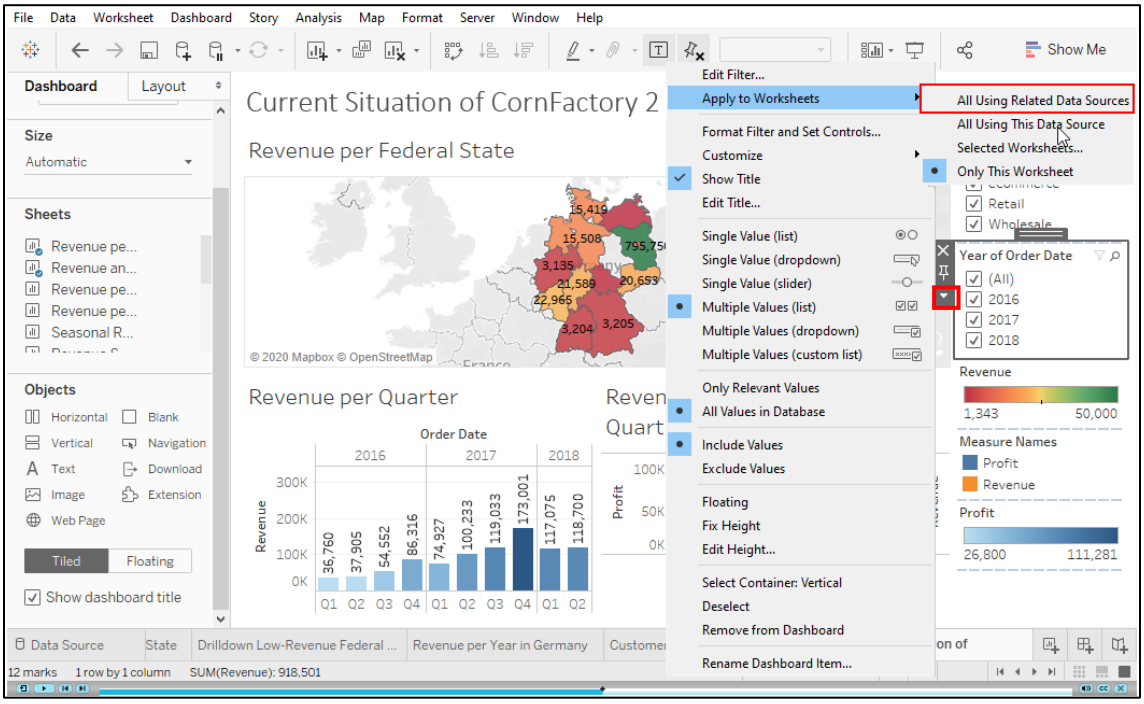

Fig. 56: Creation of an Interactive Dashboard Filter

Great, that worked. Click through the years. All visualizations now interact with the year filter.

The first dashboard is complete, bravo!

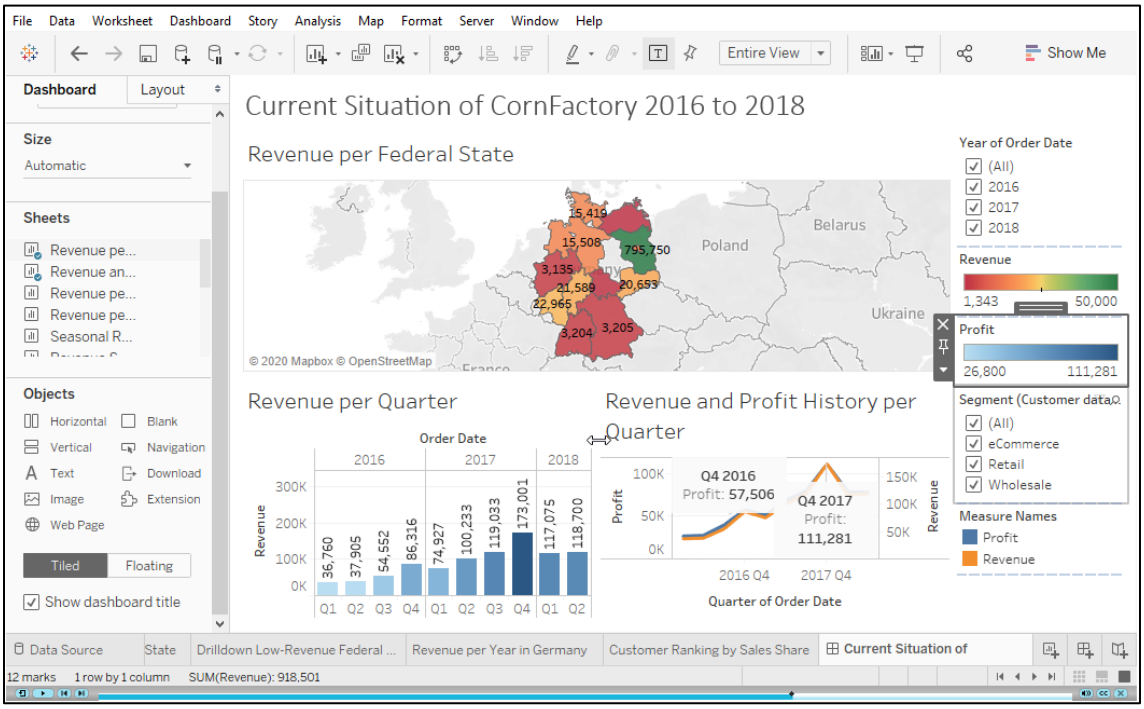

Fig. 57: The Dashboard “Current Situation of the CornFactory 2016 to 2018“

Note: Additional dashboards are created in the video. For this purpose, the steps shown were repeated exactly as before.

6.4 Creation and Publication of a Story

Note: A video is available in the WBT to demonstrate the following Tableau functions. In this video, you will learn how to merge the created dashboards into a story, present it and share it with others.

A story is a compilation of several dashboards or visualizations in order to structure the insights gained, present them in an understandable way and share them easily with others.

Example: Your supervisor, Mr. Sommerkorn, asks you to present your results at the next board meeting.

Prepare a story for that.

6.4.1 Opening a Blank Story Mask

First, create a blank story mask.

- To do this, click on the “Story Icon” in the footer. It is located directly next to the “Dashboard Icon”.

As in the Dashboard mask, the left navigation bar shows all created visualizations and dashboards, which can be inserted into the Story View via drag & drop.

- Also adjust the display size of the story to “Automatic”.

Tableau calls the selected label fields “Story Points”. A Story consists of several Story Points, where you can insert short explanations of each visualization.

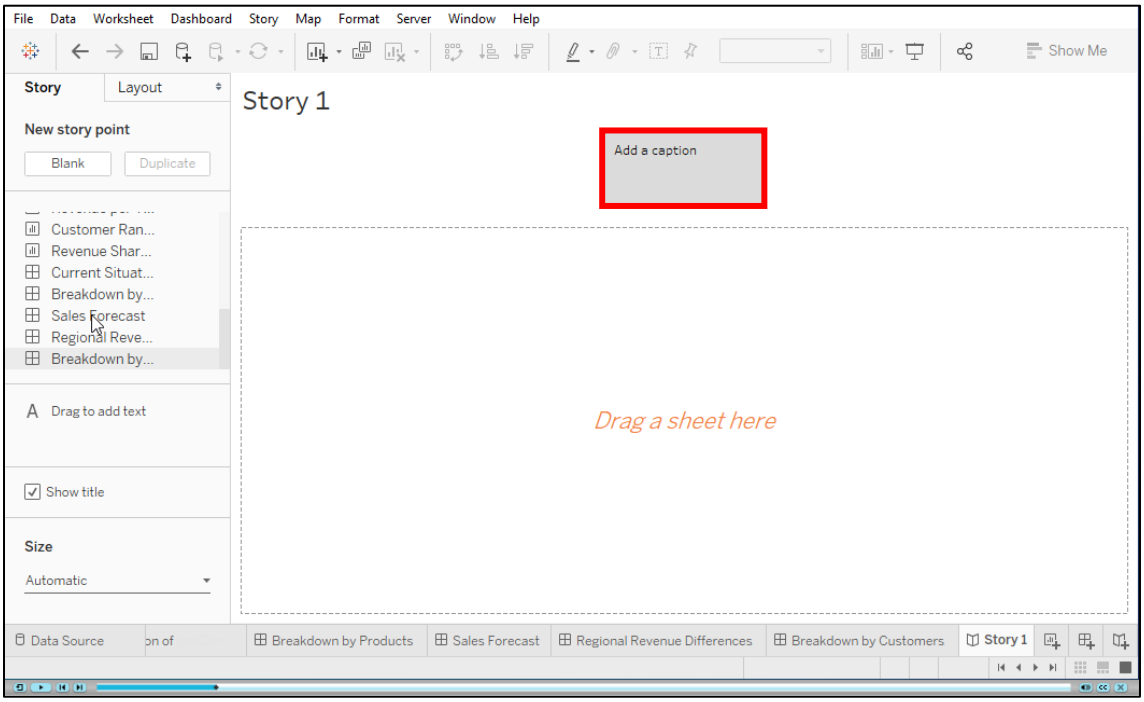

Fig. 58: The Blank Story Mask

Now, create a Story for your CEO, Mr. Sommerkorn, that will inspire him.

6.4.2 Creating a Story

The first story point is intended to give a general overview of the current situation of the CornFactory.

- Drag and drop the created dashboard “Current Situation of the CornFactory 2016 to 2018” into the Story visualization.
- In the text box, briefly describe what you want to show with the first Story Point and resize the text box to the size you need.

Great, that was fast. The first Story Point is already finished.

Now create a new Story Point.

- To do this, click on “Blank” in the left navigation bar beneath Story Points.
- Repeat the steps above and create more Story Points.
- Title the story “Quarterly Report of the CornFactory Q2 / 2018”.

Note: The video shows the creation of additional Story Points.

Bravo - this is how quickly you have created a story and presented your results in a comprehensible way.

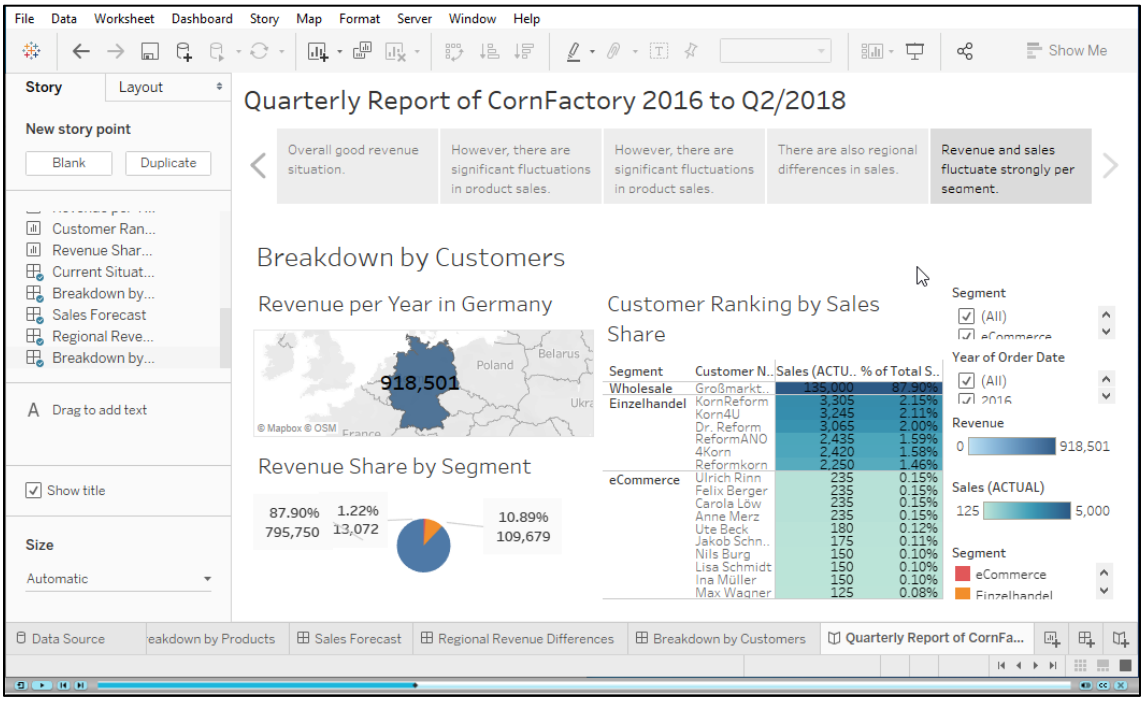

Fig. 59: The Story “Quarterly Report of the CornFactory”

Now it is time to present your work to the management and the team.

6.4.3 Presentation of the Story

- Click on the highlighted “Presentation Mode Icon” in the top navigation bar and present your story.

Fig. 60: The “Presentation Mode Icon”

Great, the presentation went well!

- With the “ESC Key”, you can end the presentation mode.

6.4.4 Exporting a Story Point as an Image File

If you want to print out a snapshot of your story, you can also save each story point as an image file.

- To do this, click on “Export Image” in the “Story” tab in the header and save it in any format.

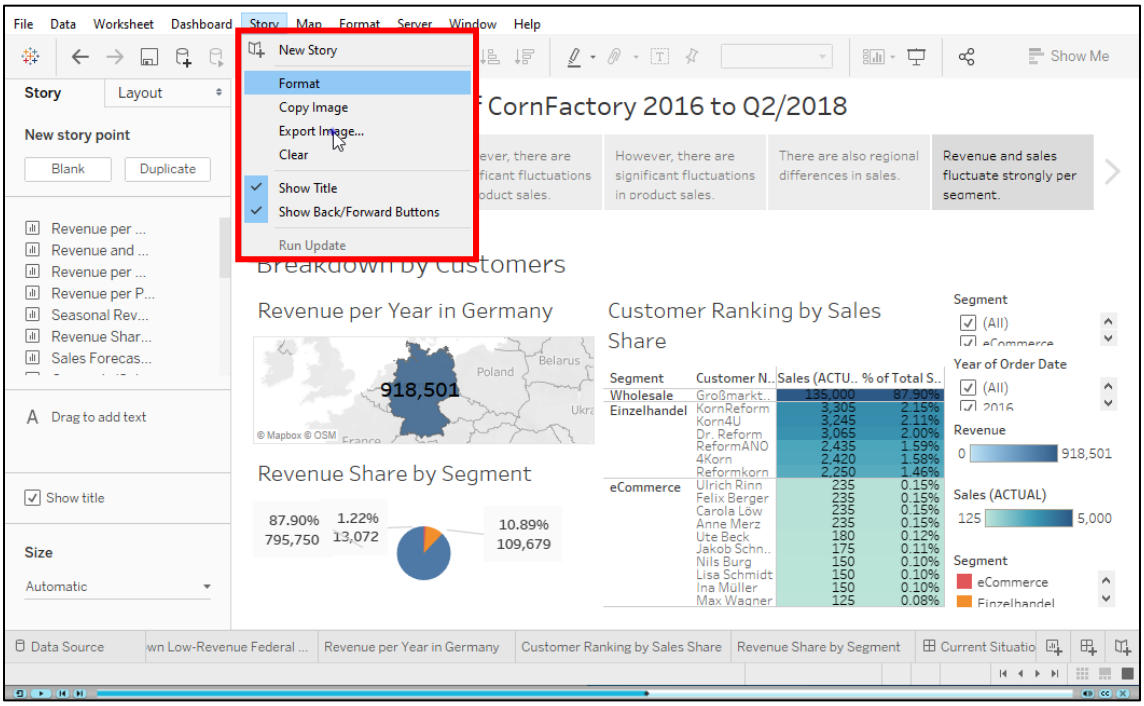

Fig. 61: Exporting a Story Point as an Image File

6.4.5 Publishing the Story

Bonus question: What use are these revealing analyses to us if we do not share them with others? Right, not much.

Publish your story so that management and your team know about your insights.

There are three possibilities:

- **Publishing via the server Tableau Public**

  Tableau Public is free of charge. As the name suggests, your analyses and visualizations are publicly available here for every Internet user. You should definitely keep this in mind.

The analyses and visualizations can only be viewed but not edited. Tableau Public thus serves as a public “Viewer” for non-critical data.

- **Sharing via the server Tableau Online**

  Tableau Online is a secure cloud-based solution for sharing Tableau content. “Secure” means that your analyses and visualizations are only visible to people that you have specified yourself.

  The special thing about Tableau Online is that it allows team members to collaborate on Tableau content directly on the web. The analyses can be viewed independently of time and location and edited directly online. However, you will need a Tableau Online account.

  For the server utilization, fees are usually incurred. However, students can use this service free of charge.

- **Send by e-mail using the Tableau Reader preview tool**

  Tableau Reader is a free software for opening and viewing Tableau workbooks.

  If you want to send an analysis to a person who does not have a Tableau installed, you can send the exported file together with the Tableau Reader. It is important that you export your “Workbook Package” first. This was already shown in the previous WBT.

  With the Tableau Reader the visualizations can only be viewed but not edited.

An end to dull theory, back to practice.
In the following, I will show you how you can upload your visualizations to Tableau online and share them with other people.

- Click on the marked “Share Icon” or on the tab Server on “Publish Workbooks”.
- Log on to the “Tableau Online” server.

Note: If you do not already have a Tableau online account, create one.

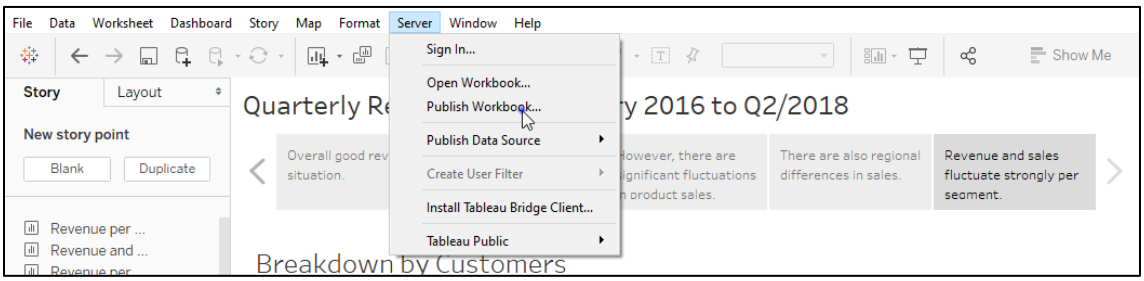

Fig. 62: Publishing the Story

You can use the form that appears to make default settings for your workbook.

- First, name your project and add a description.
- Add tags to make the project easier to find.
- You can also specify which visualizations, here called “Sheets”, are to be uploaded to Tableau Online. In this case, select “All“.
- Last but not least, users can be added and individual user permissions can be set if required. You will do this later elsewhere. You do not need to add users here yet.
- Click on “Publish” and see what happens.

Tableau automatically opens your Tableau online account in your web browser. The visualizations have been uploaded and appear as previews.

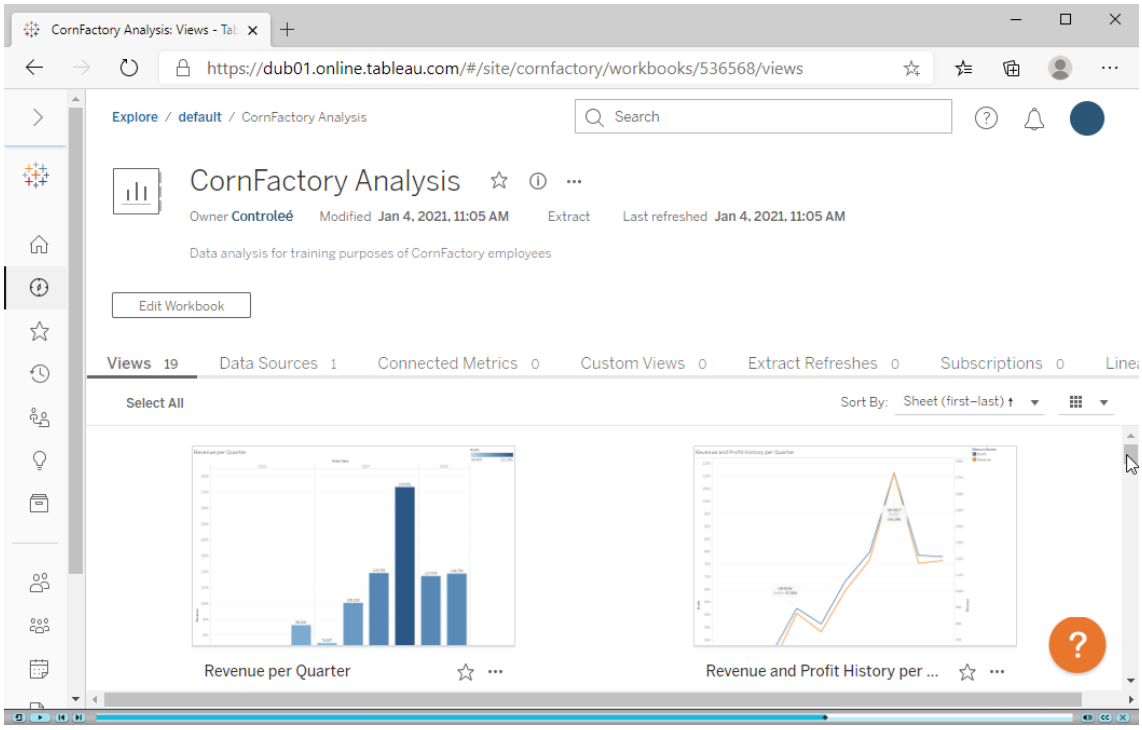

Fig. 63: The Story in Tableau Online

6.4.6 Sharing the Story

You can now share visualizations or your story with other people.

- First, open your story in Tableau Online.

Using the highlighted navigation bar, you can now edit your story directly on the web, add comments, share it with others or download it.

These tools are available to all team members to whom you have shared this visualization with and granted the appropriate permissions in Tableau.

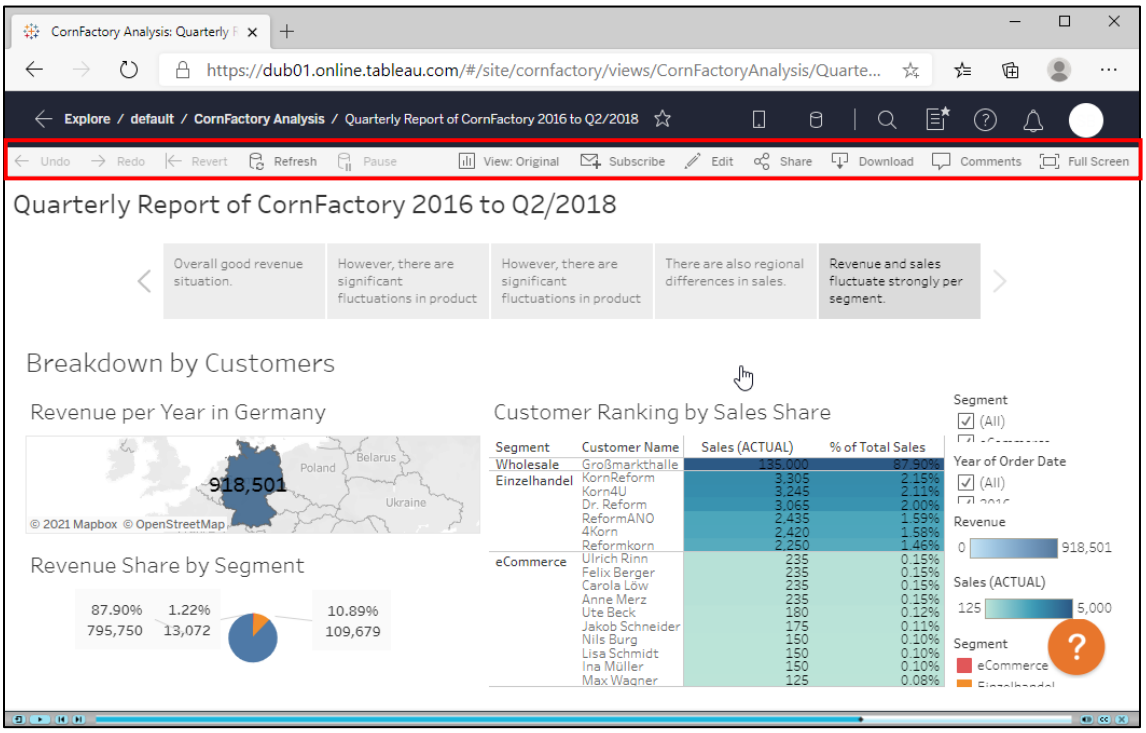

Fig. 64: The Toolbar in Tableau Online

Now, share the story with the CEO, Mr. Sommerkorn, by sending him the link to the story on the Tableau Online server by e-mail.

- Click on “Share” in the toolbar.
- Tableau provides you with an embed code for a web site and a link to share. Click on “E-mail Address” to go directly to your e-mail inbox.
- The Tableau link to your story was automatically added to the email. Now, write your e-mail and send it.

In order for Mr. Sommerkorn to access the story, he must first be given permission.

6.4.7 Adding a Permission

- Click on the tab “Users” in the header and add Mr. Sommerkorn as a new user.

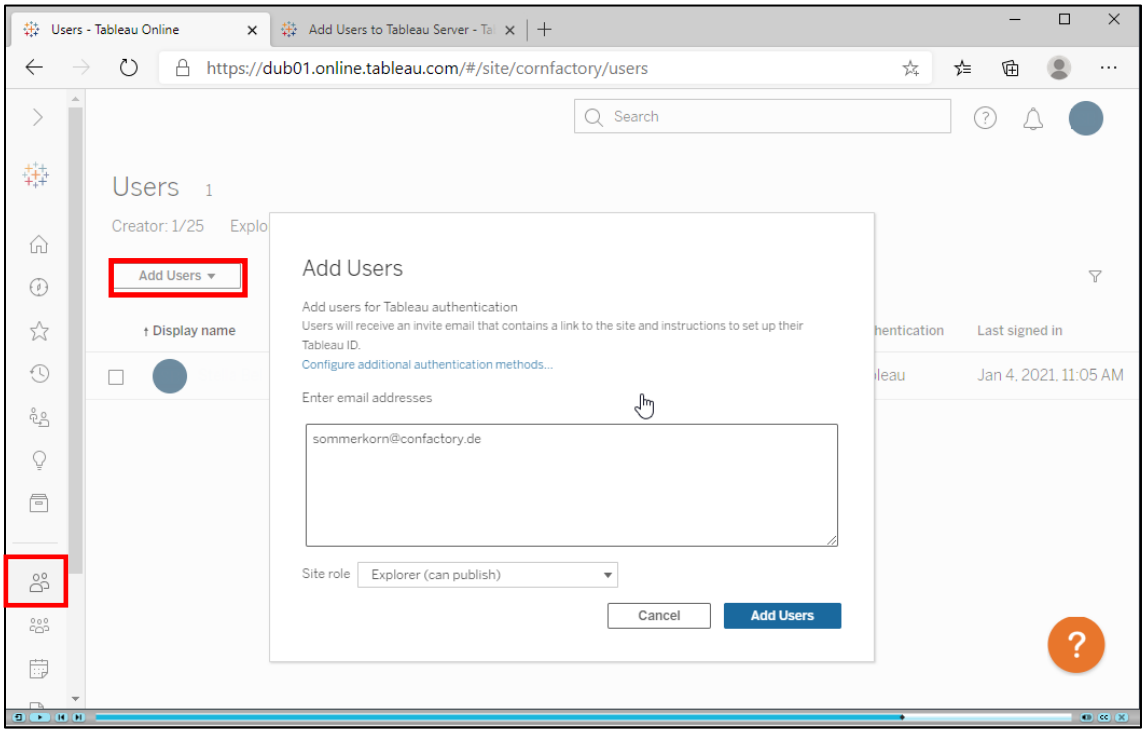

Fig. 65: Adding a User

Mr. Sommerkorn was added to this project as a user. If he now opens the link from the e-mail, he has access to the shared project after logging in to his Tableau account.

6.4.8 Granting of a Specific Permission

As CEO, Mr. Sommerkorn receives special privileges. He may also make edits. Grant him this special permission for the story.

- Switch back to the “Contents” tab in the header.
- Mark your story by checking the box.
- The highlighted “Actions” box appears. Now click on “Actions” and select “Permissions”.

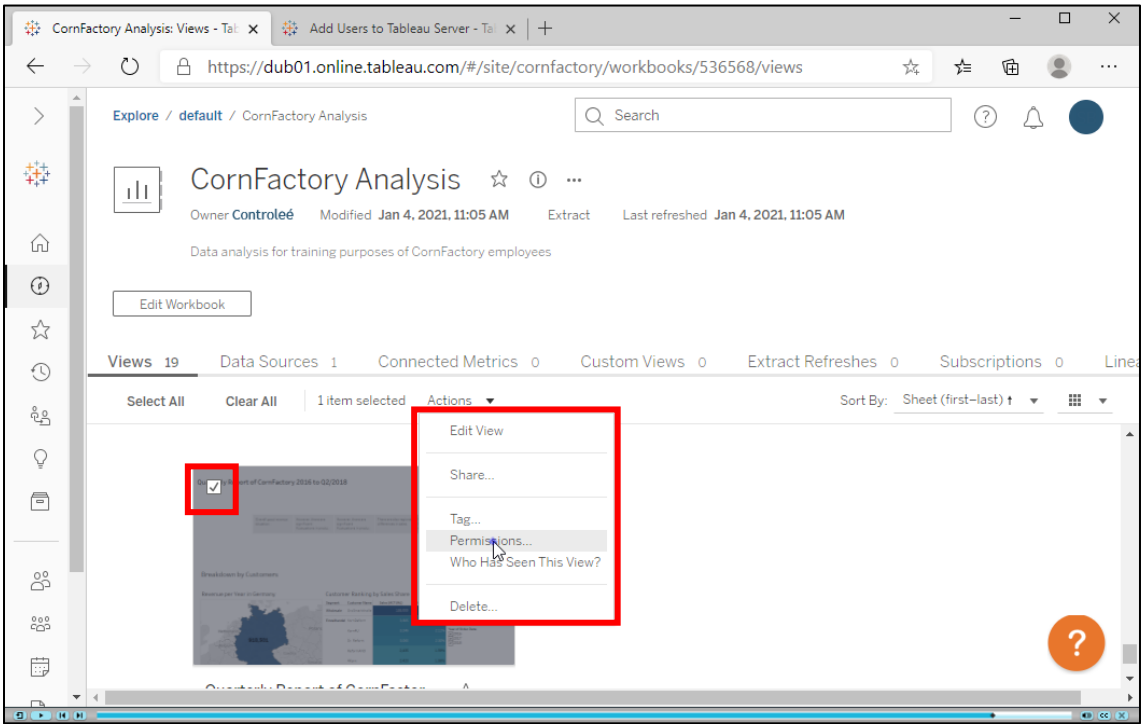

Fig. 66: Editing Permissions

- Click on “Add Group/User Rule”.

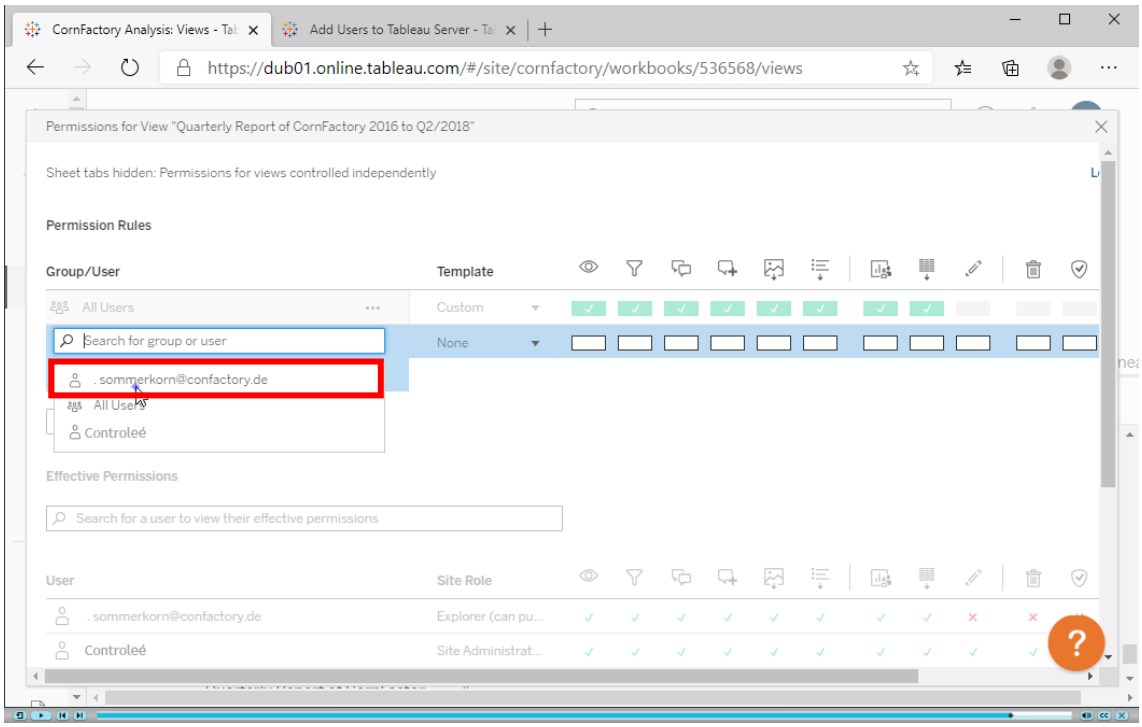

Fig. 67: Adding a New User Rule

- Click on “User” in the drop-down menu that appears and select Mr. Sommerkorn.

- A new user rule has been created. In the drop-down menu, Tableau offers some permission preferences. Select “Explore” for Mr. Sommerkorn so that he can additionally edit the story.

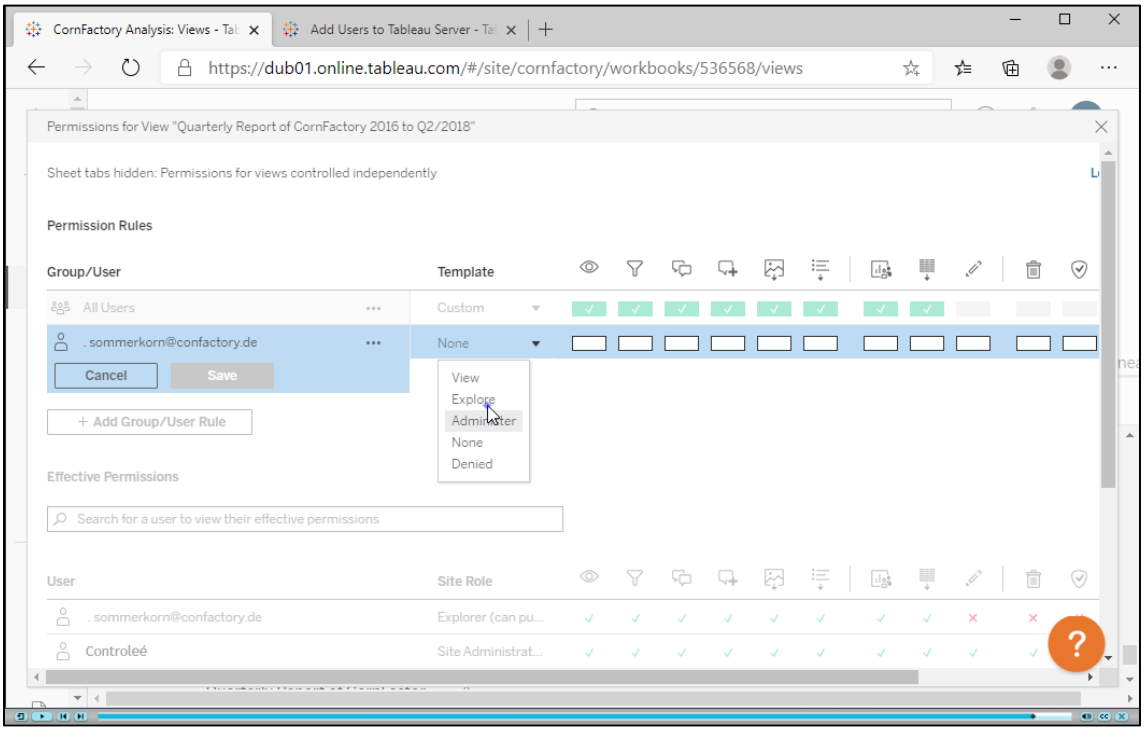

Fig. 68: Creation of a Special Permissions

Very good, Mr. Sommerkorn now has permission to edit the selected visualization. However, the deletion and modification of permissions is reserved for Mrs. Controleé as administrator.

Note: This was the last video of the training “Business Intelligence with Tableau”. You have learned some important functions and created the basis for further work with Tableau.

Congratulations - you are now a data rock star!

6.5 Exercise: It's Your Turn!

6.5.1 Exercise “Dashboards and Stories“

After you have watched the video, you should now perform the steps shown in the Software Tableau yourself:

1. Create the new visualizations “Sales per Year in Germany”, “Sales and Profit History” and “Customer Ranking by Sales Share”.

2. Create dashboards from the insights of your visualizations.
3. Bring your dashboards together into a story and share it.

6.5.2 Final Test 6

Test your knowledge. Tick the correct answer options

No.	Question	True	False
1	Dashboards are “Bulletin Boards”, so to speak, on which you assemble several visualizations to show a particular subject.		
2	Tableau provides various standard calculations via the “Fast Table Calculation” function, e.g., "Percent of Total Value".		
3	Overall, the CornFactory has a good sales and profit situation with annual sales growth. There are, however ...		
	• Regional sales differences.		
	• A poor sales forecast for the product “Tortello Salmone”.		
	• Seasonal sales fluctuations.		
	• Strong sales fluctuations within the customer segments.		
	• A forecast excess demand during the Christmas period for the product Tortello Salmone, which threatens to make deliveries impossible.		
4	Dashboards can interact with filters, meaning that a filter affects all visualizations in the dashboard.		
5	You have now learned all the functions of the BI software Tableau.		
6	The so-called “Story“...		
	• Helps you structure your dashboards so that your insights are clear and understandable to others.		
	• Is a combination of dashboards for the purpose of presentation and publication.		

	• Provides a marketing tool in the CornFactory online shop.		
7	Tableau Reader is a free preview tool that enables tableau analyses to be opened even by people who do not have a tableau installed.		
8	Tableau Public is only suitable for uncritical data, since the uploaded Tableau analyses are publicly accessible to every Internet user.		
9	Using the Tableau online server, authorized team members can edit, comment on or share Tableau content directly online.		
10	High Five - You are now a data rock star!		

Tab. 7: Final Test 6

7 Congratulations!

Ms. Supporto:

Congratulations, you are now familiar with the main Tableau functions and have made important profits to the CornFactory.

Of course, the analyses can still be continued and other details or measures can be researched.

You have now learned everything you need to know. The foundation for further work with Tableau has been laid.

I wish you exciting new insights and all the best for the future of the CornFactory!

Note: In the WBT series, the individual results of the analyses are explained in more detail and concrete recommendations for action are formulated for the CornFactory.

Annex: Answers to the Final Tests

Answers Final Test 1

No.	Question	True	False
1	The problem of the CornFactory is that after company growth, the resulting data volumes can no longer be understood properly, making it difficult to see where and why the existing discrepancy between production and sales arises.	**X**	
2	The goal of BI is to generate important insights for operational decision-making processes from a large amount of data by		
	• Collecting,		
	• Preparing,		
	• Maintaining,	**X**	
	• Analyzing,		
	• Presenting business-relevant data in an understandable form.		
3	BI is only a very effective controlling tool and has no purpose for other business divisions.		**X**
4	BI provides daily updated analyses and automatic reports with the push of a button and enables the identification of trends, even with large amounts of data.	**X**	
5	When using a Business Intelligence system, other systems, such as ERP, CRM or SCM can be abolished.		**X**
6	Thanks to BI, more informed decisions are possible, deviations and market changes can be responded to quickly, thereby increasing the efficiency of the CornFactory. This leads to improved competitiveness and business success.	**X**	
7	A BI software eliminates the tiresome maintenance of data and can be easily operated by anyone, as it is self-explanatory.		**X**

8	Tableau is one of the leading BI softwares and shines above all with intuitive operation and outstanding visualization options.	**X**	
9	Which statement is **false**? The advantages of BI include the fact that ...		
	• Complex data can be analyzed on a daily basis and automatically generated as a report.		
	• Weak points, e.g. regional sales differences are detected.		
	• Trends can be identified, and forecasts and measures can be derived from them.		
	• The business becomes smarter.		**X**
	• Strategic and operative decisions of the management and also of the specialist departments are supported and thus improved by solid information.		

Tab. 8: Answers Final Test 1

Answers Final Test 2

No.	Question	True	False
1	The Business Intelligence software “Tableau” can only analyze Excel files.		**X**
2	Tableau allows you to analyze and visualize several, different data sources simultaneously.	**X**	
3	Tableau can establish connections to the following data sources...		
	• Data from cloud servers (such as Dropbox).	**X**	
	• Data from Excel tables (xslx files).	**X**	
	• Data from text and PDF files.	**X**	
	• Data from CRM systems (such as SAP, Salesforce).	**X**	
	• Data from Google Analytics.	**X**	

4	A “left-sided join” of two data sources in Tableau means that all data values of the left data source are transferred to the common table. From the right data source, however, only those data values that match the left data source are transferred.	**X**	
5	The data of the data source are always transferred correctly into Tableau, so that a check for correctness is not necessary.		**X**
6	If your data is not transferred correctly to Tableau, the data type can be adjusted very easily. For example, the data types “Number”, “Date”, “String” are available.	**X**	
7	Which statements are true?		
	• When connecting to your data sources, you can choose between a "Live Connection" and the "Extract Connection”.	**X**	
	• With the “Extract Connection”, data source extracts are uploaded to Tableau and saved. This enables Internet-independent working.	**X**	
	• With a live connection, Tableau makes a direct connection to the data sources. Updates and changes are immediately and automatically transferred to Tableau.	**X**	
8	Which statement is **false?** The data for analysis in Tableau should ...		
	• Have a common join parameter when several data sources are joined.		
	• Already contain calculations and be prepared as a cross tab.		**X**
	• Be as “raw” as possible, preferably simple line parameters with corresponding line values.		

Tab. 9: Answers Final Test 2

Answers Final Test 3

No.	Question	True	False
1	Tableau can analyze a maximum of two data fields simultaneously, such as revenue per quarter. The analysis of several measures or dimensions is not possible.		**X**
2	Individual data fields (measures or dimensions) can be removed or added to the analysis at any time.	**X**	
3	The following visualization types can be selected manually in Tableau...		
	• Bar chart	**X**	
	• Lines	**X**	
	• Pie charts	**X**	
	• Automatic adjustment	**X**	
	• Area charts	**X**	
4	Tableau only calculates the total sums, e.g., the total turnover of the CornFactory from 2016 to 2018. The numerical values per year or month must be calculated by the user. Unfortunately, Tableau cannot help here.		**X**
5	The data fields in the rows and columns and their arrangement can be swapped as desired. This allows the visualization to be changed as desired.	**X**	
6	Dimensions represent information values, like a date or a name. They usually generate the labels of the columns or rows (e.g., “Year” or “Product Name”).	**X**	
7	Measures have the following characteristics...		
	• They represent numerical values.	**X**	
	• They are automatically added together to form totals (for example, total revenue).	**X**	
	• They usually generate the diagrams within the analysis visualization.	**X**	

8	“Show Me” provides you with a selection of visualization options. However, there are many more visualizations that can be created individually.	**X**	

Tab. 10: Answers Final Test 3

Answers Final Test 4

No.	Question	True	False
1	Using the “Marks” tab, individual measures or dimensions can be added to the visualization as details, text labels or coloring.	**X**	
2	The coloring of values in the visualization has the purpose...		
	• Of emphasizing important things.	**X**	
	• Of making data points quick and easy to find.	**X**	
	• Of focusing on certain details.	**X**	
	• Of structuring the large amount of data.	**X**	
3	Tableau has preset color combinations, e. g. “Green-Gold”. Individual color requests can unfortunately not be implemented.		**X**
4	Tableau offers the possibility to have trend lines, averages, forecasts and more calculated and added to the visualization.	**X**	
5	With filters, you can exclude values in the visualization or display them separately, e.g., a single product.	**X**	
6	Which statement is false? The purpose of adding filters is to...		
	• Focus on separate results.		
	• Hide bad numbers.		**X**
	• Create structure and visibility in the data set.		
7	To change the color depending on the amount of profit, drag the “Profit” measure into the “Color” box in the “Marks” tab. You can now see the profit amount based on the color tone.	**X**	

8	Tableau uses the exponential smoothing method to calculate forecasts. Forecasting algorithms try to detect a regular pattern in the existing time series that can be carried forward into the future.	**X**	
9	What recommendation can you make for production planning?		
	• No adjustments are necessary in production planning. Everything should continue as before.		**X**
	• According to the forecast sales volume, the CornFactory should concentrate only on the product Pasta Puro and remove all other products from its selection.		**X**
	• The sales forecast for the product Mizza is quite poor. Production should therefore be discontinued.	**X**	

Tab. 11: Answers Final Test 4

Answers Final Test 5

No.	Question	True	False
1	The Tableau function “Maps” is used to examine data with geographical information.	**X**	
2	"Show Me" unfortunately does not offer any visualization suggestions for the map visualization. There is only one map visualization available.	**X**	
3	Which is not a suitable data field for a geographical analysis?		
	• Postcode		
	• Country		
	• Order date	**X**	
	• City		
4	The “Marks” tab allows you, for example, to manually adjust the colour tones and size of the shapes used to display data values (e.g., points) in the map visualization.	**X**	
5	The Tableau function “Drilldown” means to “Zoom” into certain details to explore them even more thoroughly.	**X**	

	An example: Only the regions with weak sales are examined more closely in order to identify possible causes and optimization potential.		
6	Tableau recognizes data with geographical information and marks them with the data type symbol of a globe.	**X**	
7	The creation of a map visualization in Tableau is very complex. Programming knowledge is also required.		**X**
8	Which statement is **false**? The following statements can be made for the CornFactory after geographic data analysis:		
	• There are federal states in which no revenue has yet been generated.		
	• There are no regional sales fluctuations.	**X**	
	• Brandenburg is by far the federal state with the highest revenue.		

Tab. 12: Answers Final Test 5

Answers Final Test 6

No.	Question	True	False
1	Dashboards are “Bulletin Boards”, so to speak, on which you assemble several visualizations to show a particular subject.	**X**	
2	Tableau provides various standard calculations via the "Fast Table Calculation" function, e.g., "Percent of Total Value".	**X**	
3	Overall, the CornFactory has a good sales and profit situation with annual sales growth. There are, however ...		
	• Regional sales differences.	**X**	
	• Poor sales forecasts for the product “Tortello Salmone“.		**X**
	• Seasonal sales fluctuations.	**X**	
	• Strong sales fluctuations within the customer segments.		
	• A forecast excess demand during the Christmas period for the product Tortello Salmone, which threatens to make deliveries impossible.	**X**	
4	Dashboards can interact with filters, meaning that a filter affects all visualizations in the dashboard.	**X**	
5	You have now learned all the functions of the BI software Tableau.		**X**
6	The so-called “Story“...		
	• Helps you structure your dashboards so that your insights are clear and understandable to others.	**X**	
	• Is a combination of dashboards for the purpose of presentation and publication.	**X**	
	• Provides a marketing tool in the CornFactory online shop.		**X**
7	Tableau Reader is a free preview tool that enables Tableau analyses to be opened even by people who do not have Tableau installed.	**X**	

8	Tableau Public is only suitable for uncritical data, since the uploaded Tableau analyses are publicly accessible to every Internet user.	**X**	
9	Using the Tableau Online server, authorized team members can edit, comment on or share Tableau content directly online.	**X**	
10	High Five - You are now a data rock star!	**X**	

Tab. 13: Answers Final Test 6

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Herausgeber: Prof. Dr. Axel Schwickert
Prof. Dr. Bernhard Ostheimer

c/o Professur BWL – Wirtschaftsinformatik
Justus-Liebig-Universität Gießen
Fachbereich Wirtschaftswissenschaften
Licher Straße 70
D – 35394 Gießen
Telefon (0 64 1) 99-22611
Telefax (0 64 1) 99-22619
eMail: Axel.Schwickert@wirtschaft.uni-giessen.de
http://wi.uni-giessen.de

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