SPRINT #6
POWER BI: VISUALIZATION AND REPORTS

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SUMMARY

In this advanced Power BI module, I'll take my skills to the next level by delving into the use of Data Analysis Expressions (DAX) and mastering the variety of visualizations available to create engaging and interactive reports. Throughout this sprint, I'll gain advanced skills in designing reports that facilitate informed decision-making, understanding the critical importance of effective data presentation in Power BI.

RESULT

In this folder on the GitHub repository, you will find:

/db_data: csv-files with data and equivalent database dump
S6_01.pbix: dashboard in pbix
S6_01.pdf: dashboard in pdf
Sprint_6.pdf: interpretation of exercises and DAX formulas and descriptions with screenshots of all visuals and their results with comments

https://github.com/leocareer/DA_specialization/tree/main/Sprint_06

I analyzed all the tasks and modeled a report for them. Each level has one page. The first page is designed as a dashboard, the second and third countries have deeper filters and analysis and are designed as a report. In this sprint, I paid a lot of attention to the interface, using my experience in UX/UI, and the data story I want to tell based on the exercises.

I organized the measures optimally, not to use unnecessary ones and to create a system of names. All the measures I created are in a separate table called '_measures' and also the 'users' table and the 'transactions' table contain several calculated columns:

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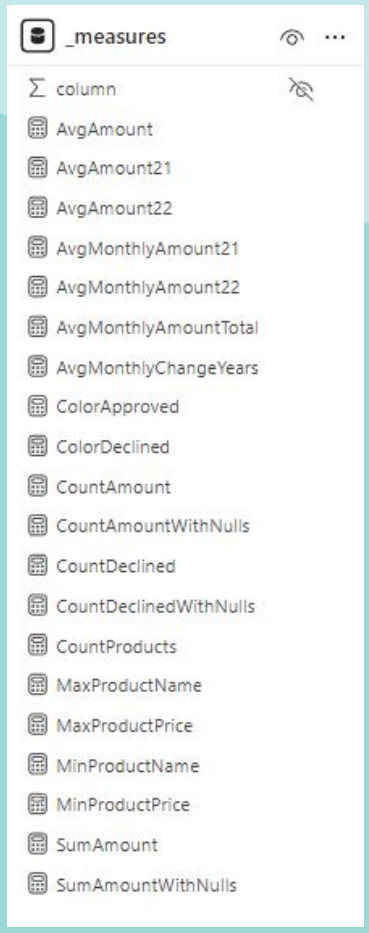
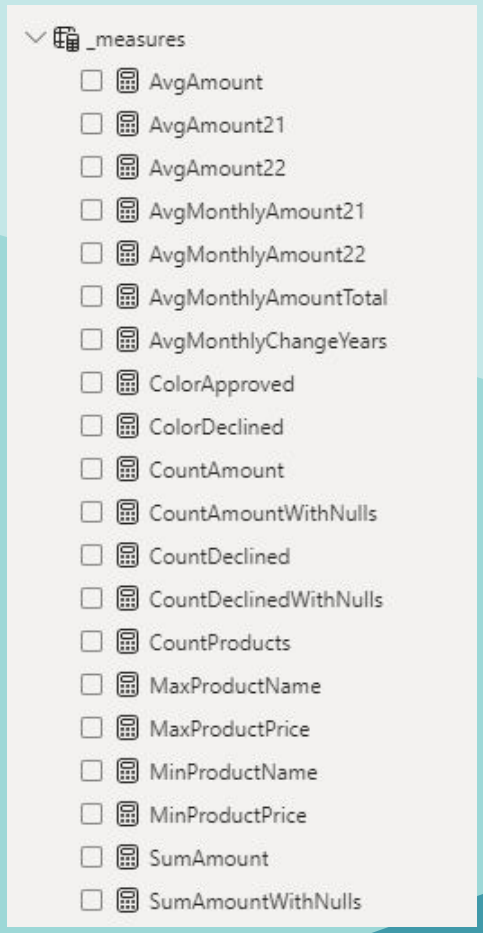
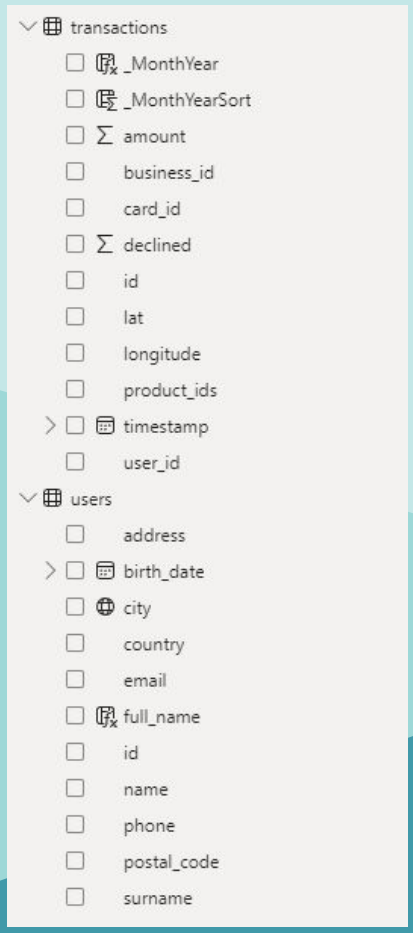
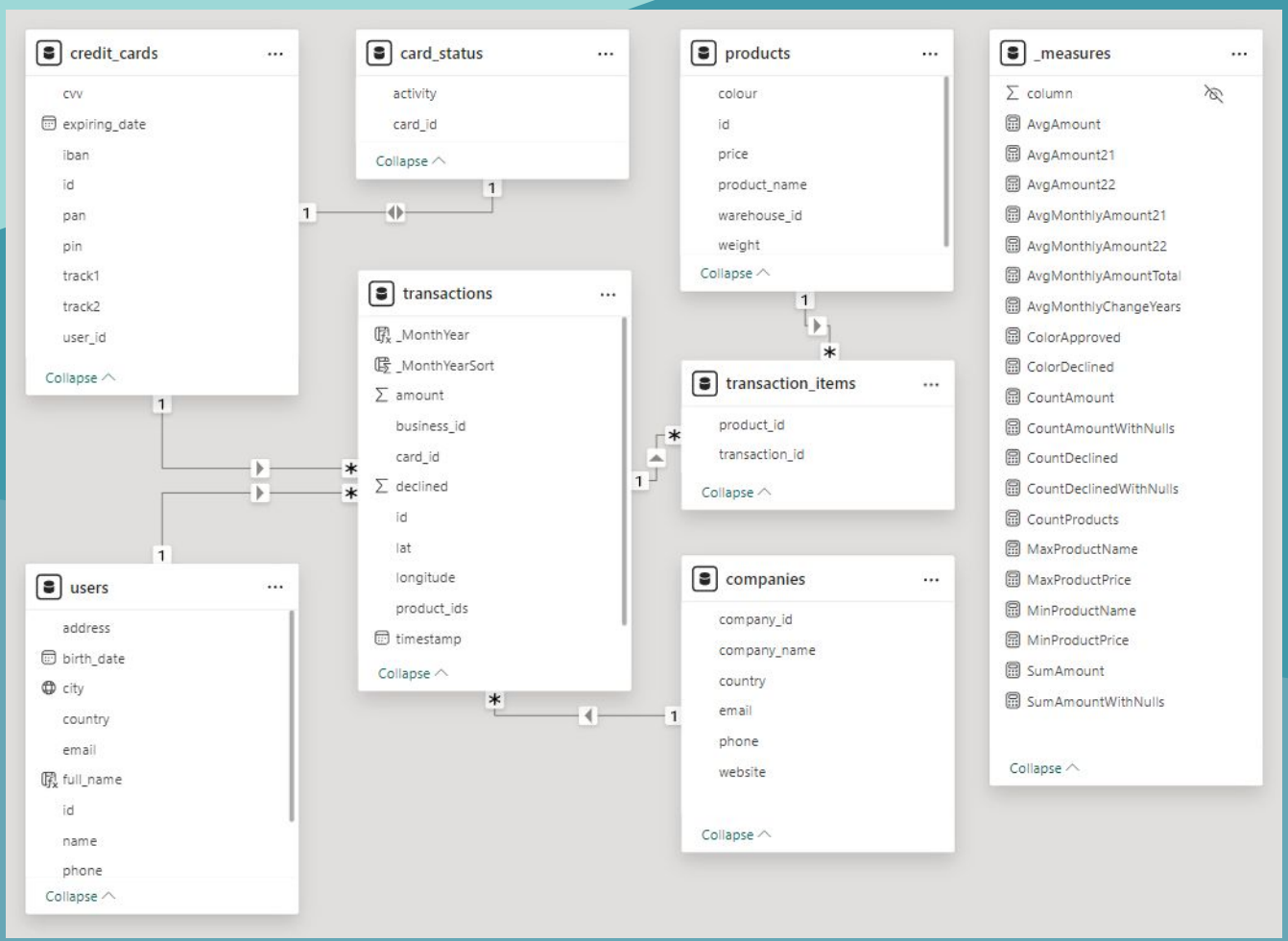
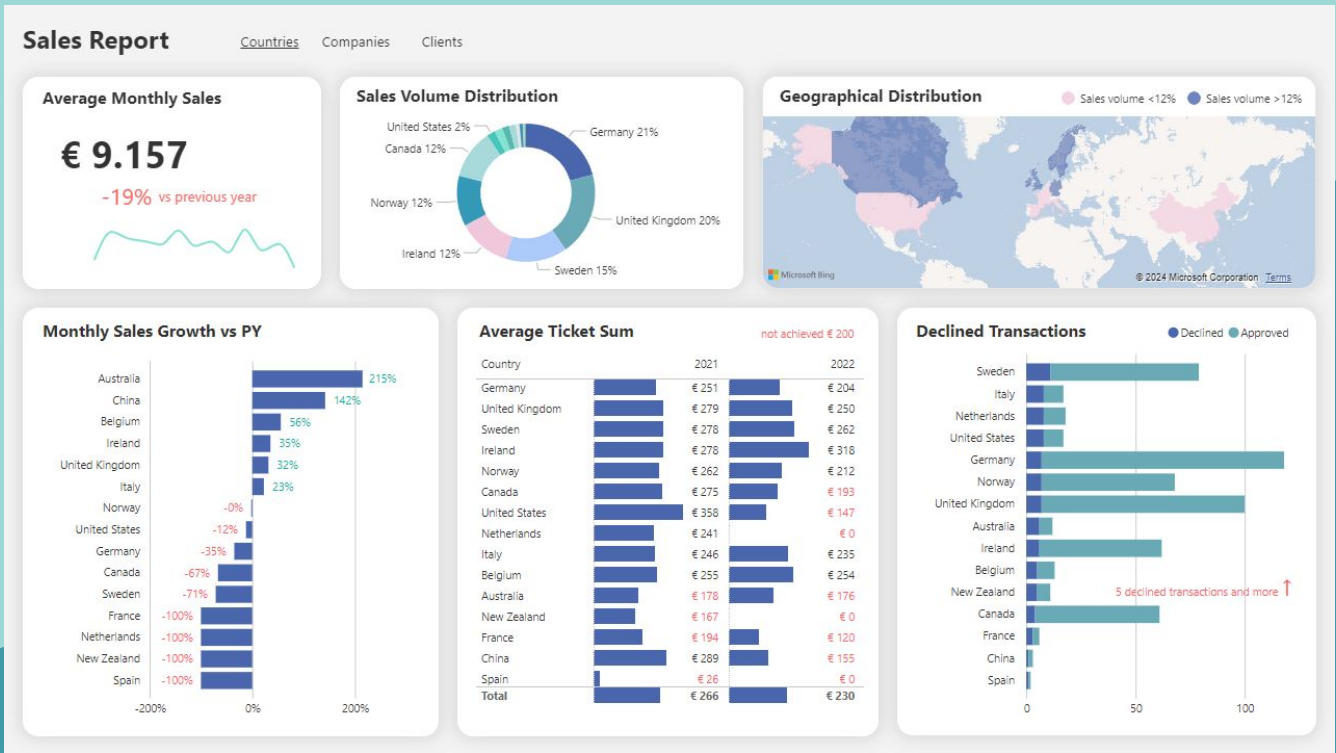






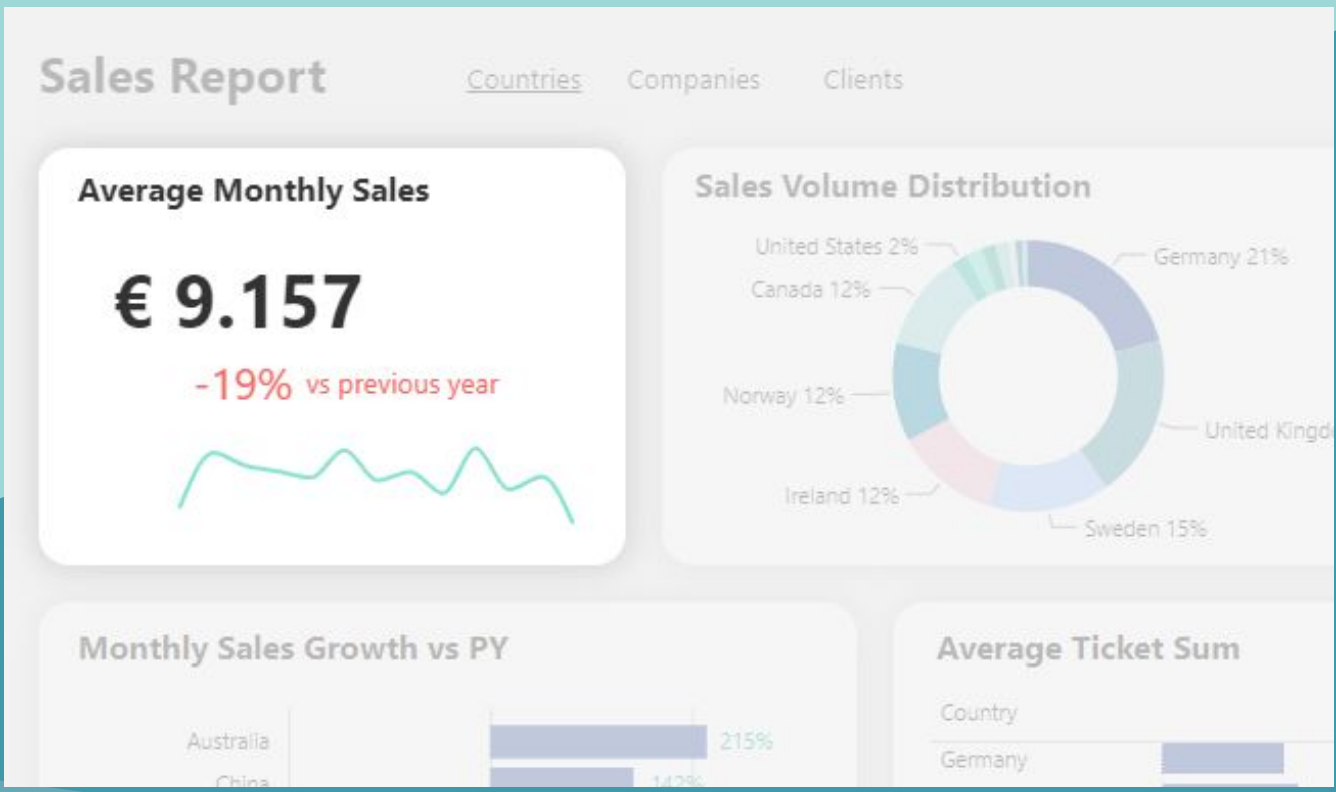


The first level and the first page of the report. This page is designed as a visual representation of the main information that is quick and easy to understand, there are no general filters, and country filtering is available which clearly highlights the necessary data. I have arranged the visuals on the page according to the storytelling and the user's eye movement, which is not the order of the exercises, so to keep the story I will break the order of the exercises in this presentation, but in the end they will all be described. I also have one widget that was not requested, it is the first one, I will start with it.



I started by analyzing what story I can tell, what key questions I can answer with the dashboard. In addition to the main slice by country, several tasks ask for a comparison by year. So I built my story starting with a demonstration of the current state of sales compared to the previous year, then an analysis of the problem in one of the way - analysis by country, an analysis of the possibilities for its solution and proposed further actions. Answering the question of how to show the change in sales compared to the previous year, I decided to use the Average Monthly Sales metric. In the future, if the data is kept up-to-date, it will be updated once a month and will be suitable for monthly reporting.

The user's first glance falls on the black header and the sum of the current average monthly sales. Then the user sees the insight highlighted in negative red color - by what percentage have sales changed compared to the previous year. He sees a problem here in the -19% drop. Next is a micrograph of sales for the entire period, the graph does not play a significant role in conveying information, the user needs only visually navigate by seeing the peaks and the drop at the end point. There are no axes and values here, since I do not want to focus attention here, but when further working with the page, if necessary, the user can look at the tooltip with the value here. This widget does not depend on others, is not filtered and does not change, it is designed to ask the question 'How have sales changed compared to last year?' and draw attention to the problem 'Sales fell by 19%'.



For the card with the sum of Average monthly sales, I created the 'AvgMonthlyAmount22' measure, which calculates the average of all approved transactions in 2022 and excluding the current month of March since it has not yet ended and there is no total amount. I have the same measure for 2021, it also does not take into account one month with incomplete sales, and a measure for 'AvgMonthlyChangeYears' to calculate the percentage of the difference. For the micrographic, the sum of all approved transactions is calculated in 'SumAmount'.

```
AvgMonthlyAmount21 = DIVIDE(
    CALCULATE(
        SUM(transactions[amount]),
        transactions[declined] = 0,
        YEAR(transactions[timestamp]) = 2021,
        MONTH(transactions[timestamp]) <> 3
    ),
    9
)
```

```
AvgMonthlyAmount22 = DIVIDE(
    CALCULATE(
        SUM(transactions[amount]),
        transactions[declined] = 0,
        YEAR(transactions[timestamp]) = 2022,
        MONTH(transactions[timestamp]) <> 3
    ),
    2
)
```

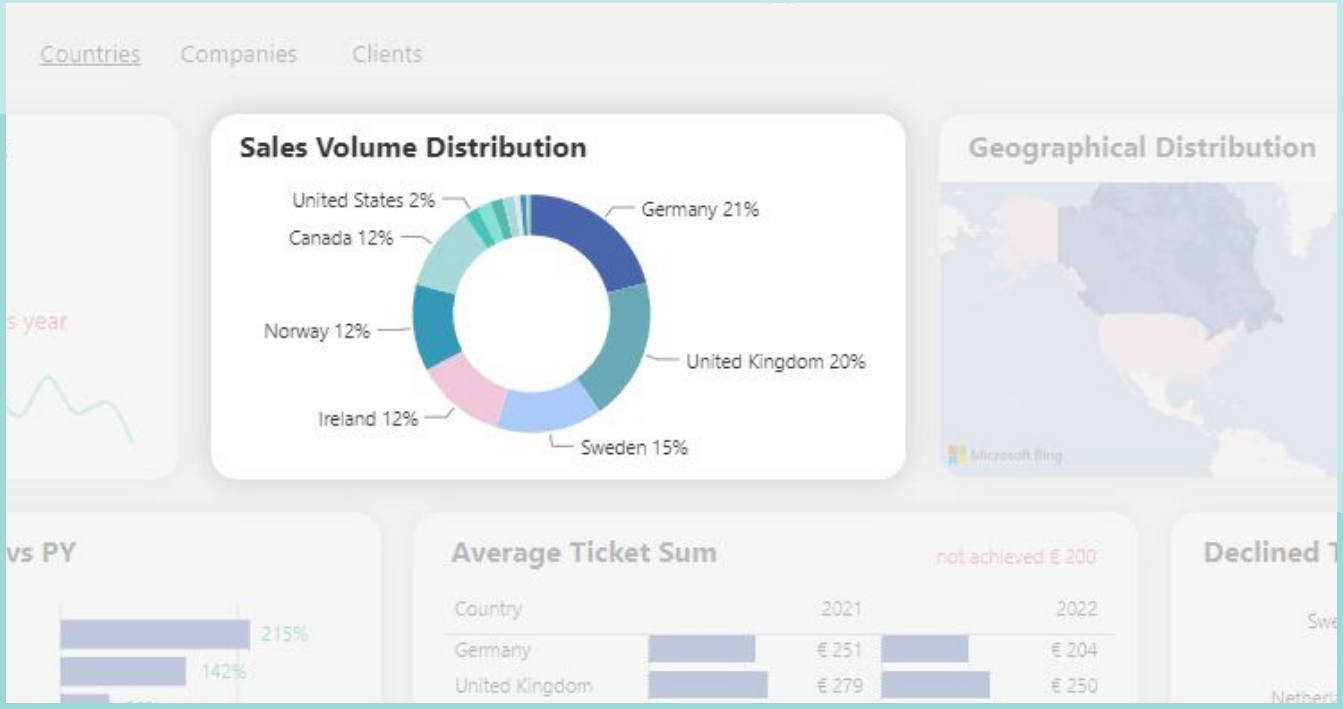
```
AvgMonthlyChangeYears = DIVIDE(
    [AvgMonthlyAmount22] - [AvgMonthlyAmount21],
    [AvgMonthlyAmount21],
    0
)
```

```
SumAmount = CALCULATE(
    SUM(transactions[amount]),
    transactions[declined] = 0
)
```

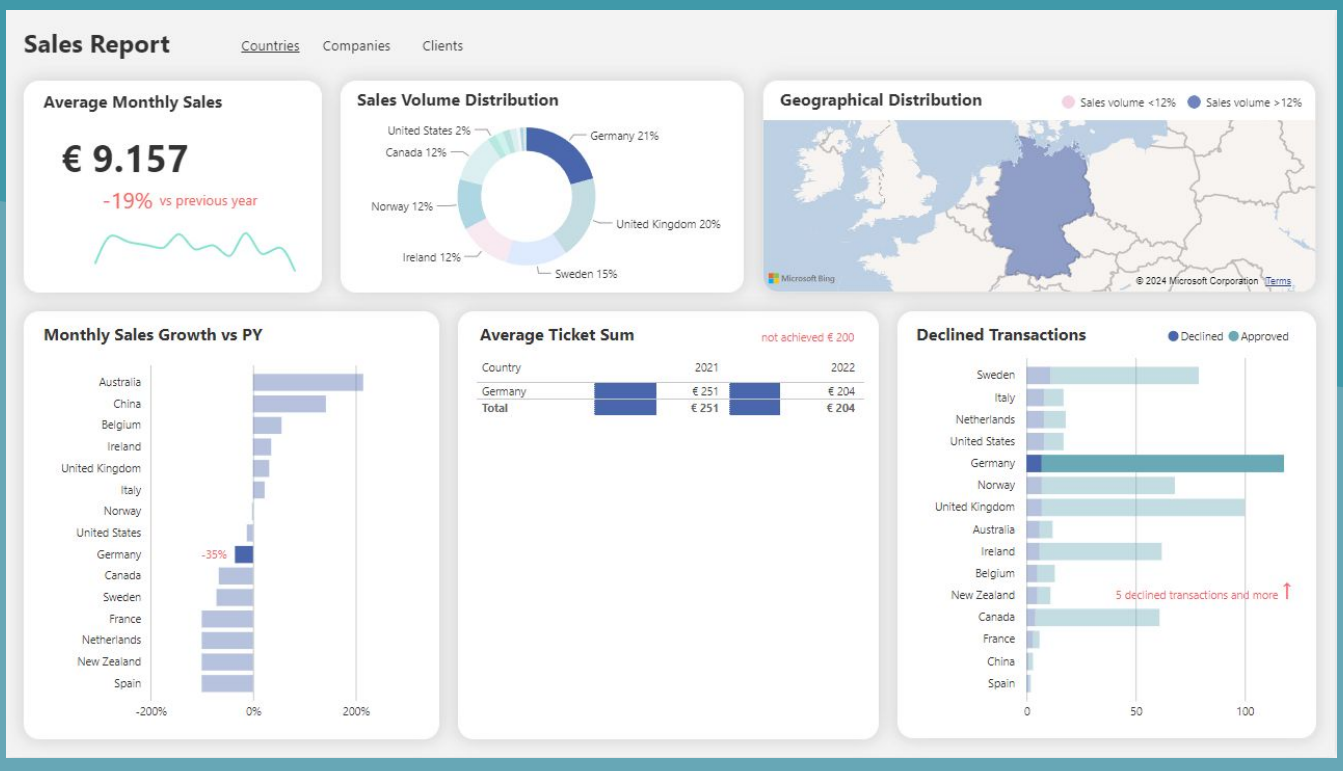
Now we move on to analyzing the problem. Let's see how sales were distributed across the companies' countries, what the dynamics were in different countries, whether there were significant increases or decreases somewhere.

LEVEL 1 EXERCISE 2

The company is interested in obtaining an overview of the transactions carried out by each country. Your task is to create a visualization that identifies the percentage of sales by country.



I chose the donut visual because we have 6 leading countries and 9 countries with minor sales, and the donut visualizes the distribution between the leaders well. If the distribution was more uniform, I would prefer a different type of visual, since with a large number of pieces the donut visualizes not very clearly, but with 6 leaders it looks good. The colors are neutral so as not to highlight anything and emphasize that this is a distribution. The diagram is clickable and highlights data by country if necessary. In the tooltip, you can specify the total sales by country.



This widget makes the first analysis to study the problem and allows the user to draw conclusions that we have two categories of countries - leaders, which we need to analyze especially carefully further, since they bring the company the main income, and a number of countries with a small contribution, for which we need to develop a development strategy.

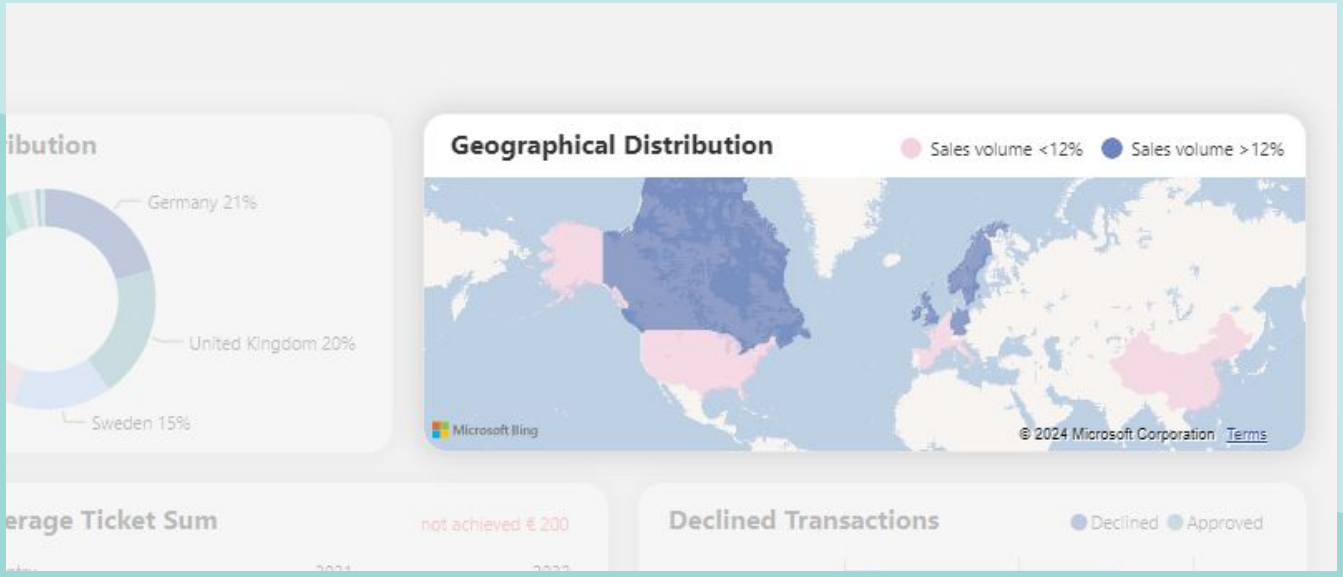
Here only one measure is used for the sum of all sales and only approved transactions:

```
SumAmount = CALCULATE(
    SUM(transactions[amount]),
    transactions[declined] = 0
)
```

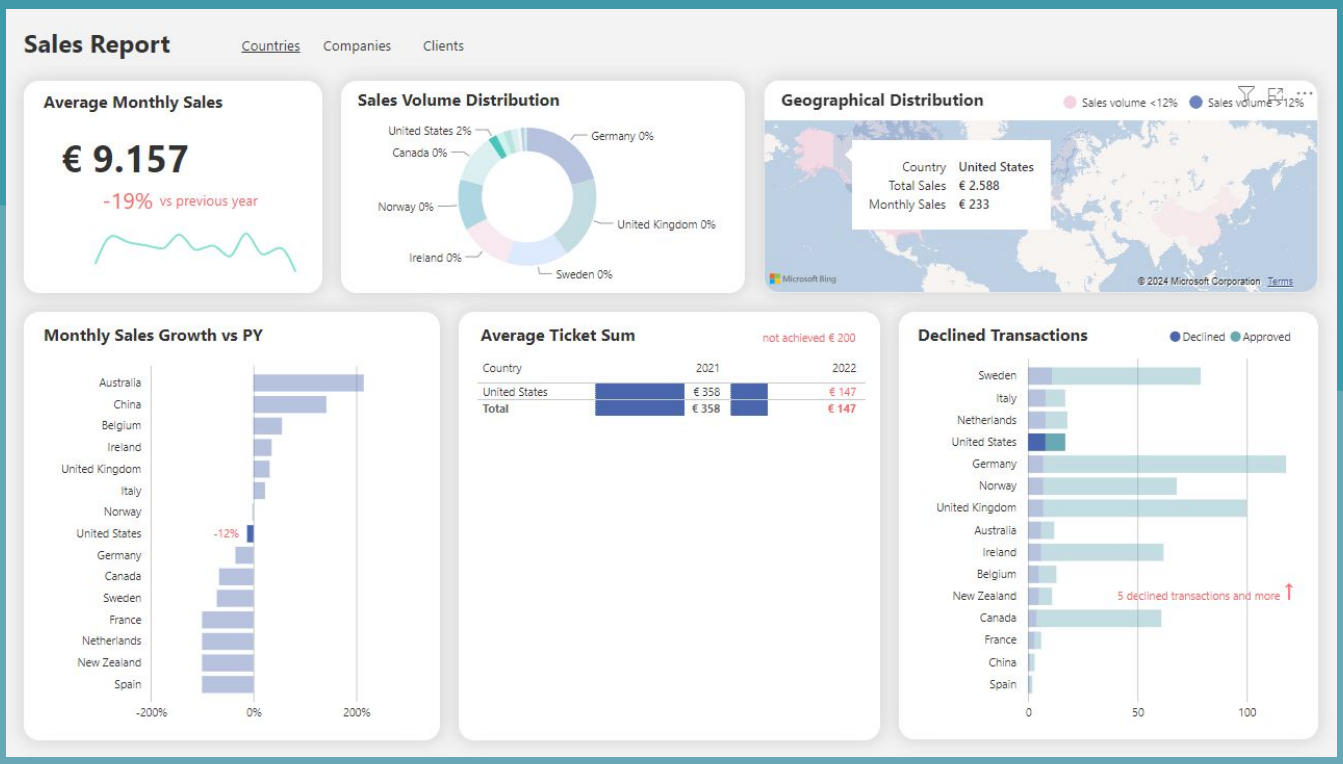
Let's continue the analysis by checking the geography, see how the leaders and losers are distributed on the map and whether there are any dependencies by region.

LEVEL 1 EXERCISE 5

The company seeks to understand the geographic distribution of sales to identify specific patterns and opportunities in each region. Select the best view to display this information.



The map highlights the leading countries in purple and the losers in pink, the colors are neutral, as are the indicators. The legend is not clickable since we only have two country segments and they are clearly visible on the map and the interaction with the legend is redundant, in addition, the visual settings of the map are limited and for a unified style I collected the legend and title from the text boxes, this is important for focusing on insights, I would not like to distract the user's attention on elements that stand out from the unified style. The countries on the map are clickable and clearly highlight information on the country throughout the dashboard. In the tooltip, the user sees total sales by country and current monthly sales, which can be compared with monthly sales for all countries from the first widget.



The widget continues the analysis of the problem, developing the insight of the previous widget about two segments of countries, allows the user to see whether the countries of one segment are located nearby, to ask the question why in this part of Europe we receive a large income, and in another several times less, whether there are reasons for this or we need to investigate this.

I used two measures you already know for the tooltip: 'AvgMonthlyAmountTotal' - average monthly sales for the entire period and 'SumAmount' - the sum of all sales. The countries on the map are colored manually.

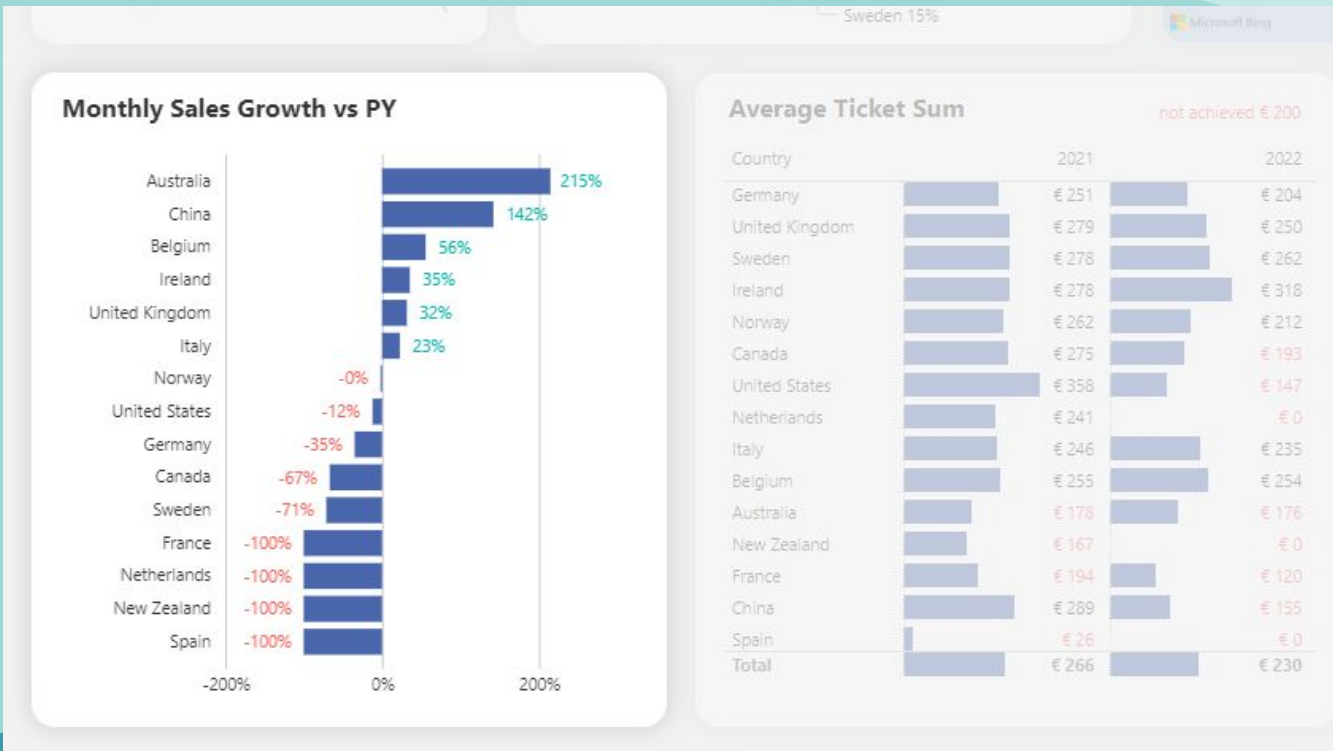
```
AvgMonthlyAmountTotal = DIVIDE(
    CALCULATE(
        SUM(transactions[amount]),
        transactions[declined] = 0,
        MONTH(transactions[timestamp]) <> 3
    ),
    11
)
```

```
SumAmount = CALCULATE(
    SUM(transactions[amount]),
    transactions[declined] = 0
)
```

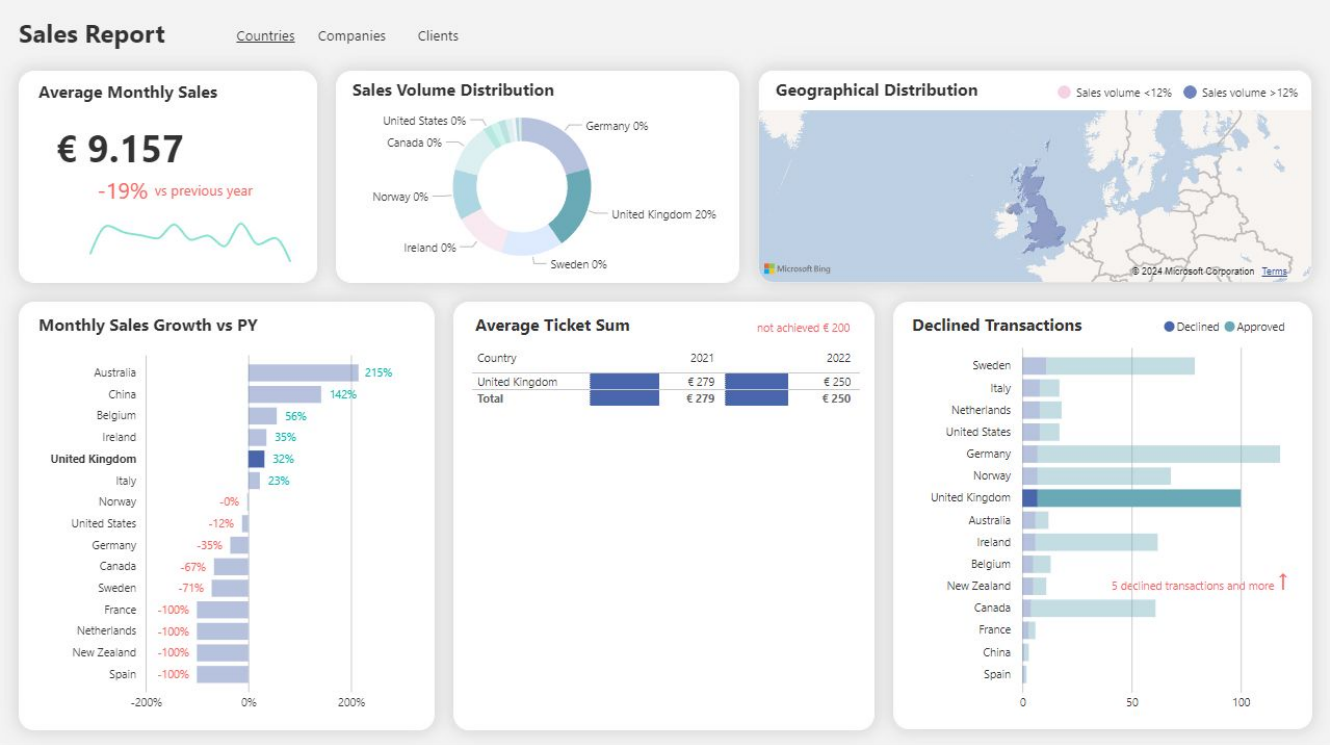
Moving to the culmination of our story and see how sales have changed compared to last year by country. I am sure that the user has kept the expectation of this information after the first widget.

LEVEL 1 EXERCISE 3

Design a visual indicator in Power BI to analyze the difference in sales between the years 2022 and 2021 in each country. The company is interested in understanding how sales have varied in different countries during this period and wishes to identify any significant decreases or increases in sales.



This chart shows the percentage change in sales year-over-year for each country. I used red to highlight negative values and green for positive values, and the bars on the chart are a neutral blue to avoid overload. The bars are clickable and highlight country information throughout the dashboard.



The widget allows you to analyze growing and losing countries, in combination with insights from previous widgets such as segments by sales volume and region, the wizard details the growth and decrease of each segment, which will allow the user to detail the strategy.

There are three measures here that you are already familiar with - 'AvgMonthlyChangeYears' for determining change in sales and two related measures:

```
AvgMonthlyAmount21 = DIVIDE(
    CALCULATE(
        SUM(transactions[amount]),
        transactions[declined] = 0,
        YEAR(transactions[timestamp]) = 2021,
        MONTH(transactions[timestamp]) <> 3
    ),
    9
)
```

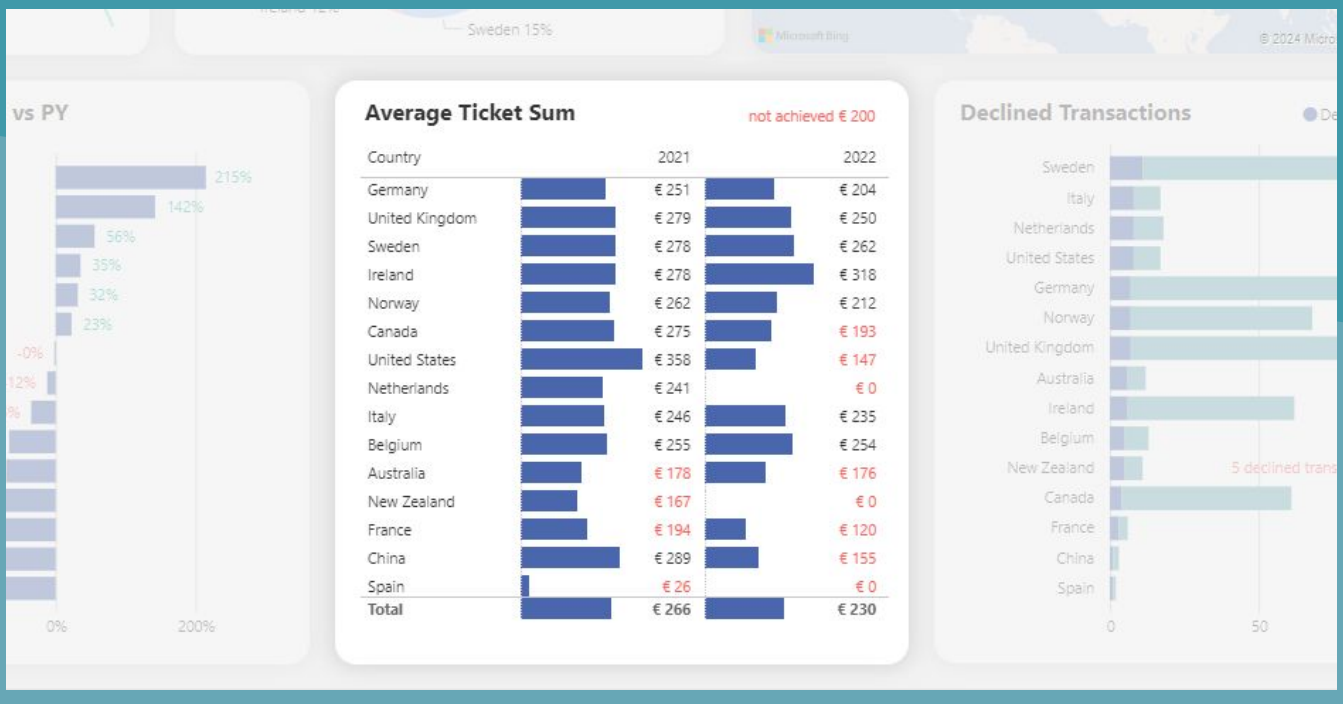
```
AvgMonthlyAmount22 = DIVIDE(
    CALCULATE(
        SUM(transactions[amount]),
        transactions[declined] = 0,
        YEAR(transactions[timestamp]) = 2022,
        MONTH(transactions[timestamp]) <> 3
    ),
    2
)
```

```
AvgMonthlyChangeYears = DIVIDE(
    [AvgMonthlyAmount22] - [AvgMonthlyAmount21],
    [AvgMonthlyAmount21],
    0
)
```

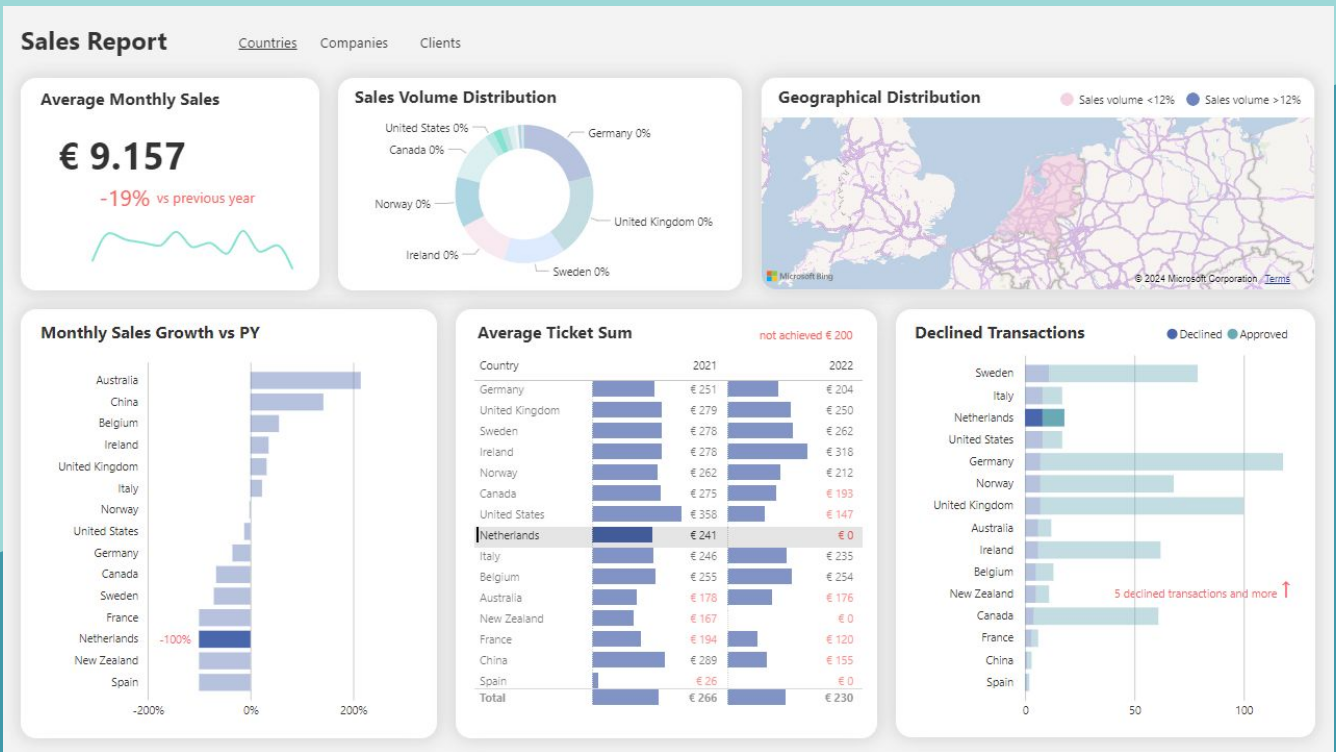
Now let's move on to finding the reasons and formulating possible further actions.

LEVEL 1 EXERCISE 1

The company needs to evaluate sales performance internationally. As part of this process, you are asked to choose a chart that details average sales broken down by country and year in a single visual presentation. It is necessary to point out the averages that are less than 200 euros per year.



To effectively present this data, I took into account the following facts: it is necessary to see values for all countries and years, goal achievement, be able to visually compare data for two years, and also hold the user's attention with such a large volume of parameters. I chose the table visual with column formatting, which allowed me to effectively place visual and text data on the wizard. First, the user's gaze falls on the red negative values and the legend "not achieved € 200", then on the neutral blue bars: peaks among countries and the difference between years, then on the total value at the end. Countries are sorted by sales volume (this column is hidden and is used only for sorting) for a clearer comparison with previous wizards, the user can also sort by average check. Countries are clickable and highlight information on the entire page.



This wizard analyzes problem areas by check amount, the identification of which will allow you to implement an appropriate marketing strategy.

Here I created two measures - the average ticket for each year, they take into account that we only need approved transactions and display zero values for correct highlighting of goal fulfillment. And also for sorting in an invisible column I use the sales amount.

```
AvgAmount21 = COALESCE(
    CALCULATE(
        AVERAGE(transactions[amount]),
        transactions[declined] = 0,
        YEAR(transactions[timestamp]) = 2021
    ),
    0
)
```

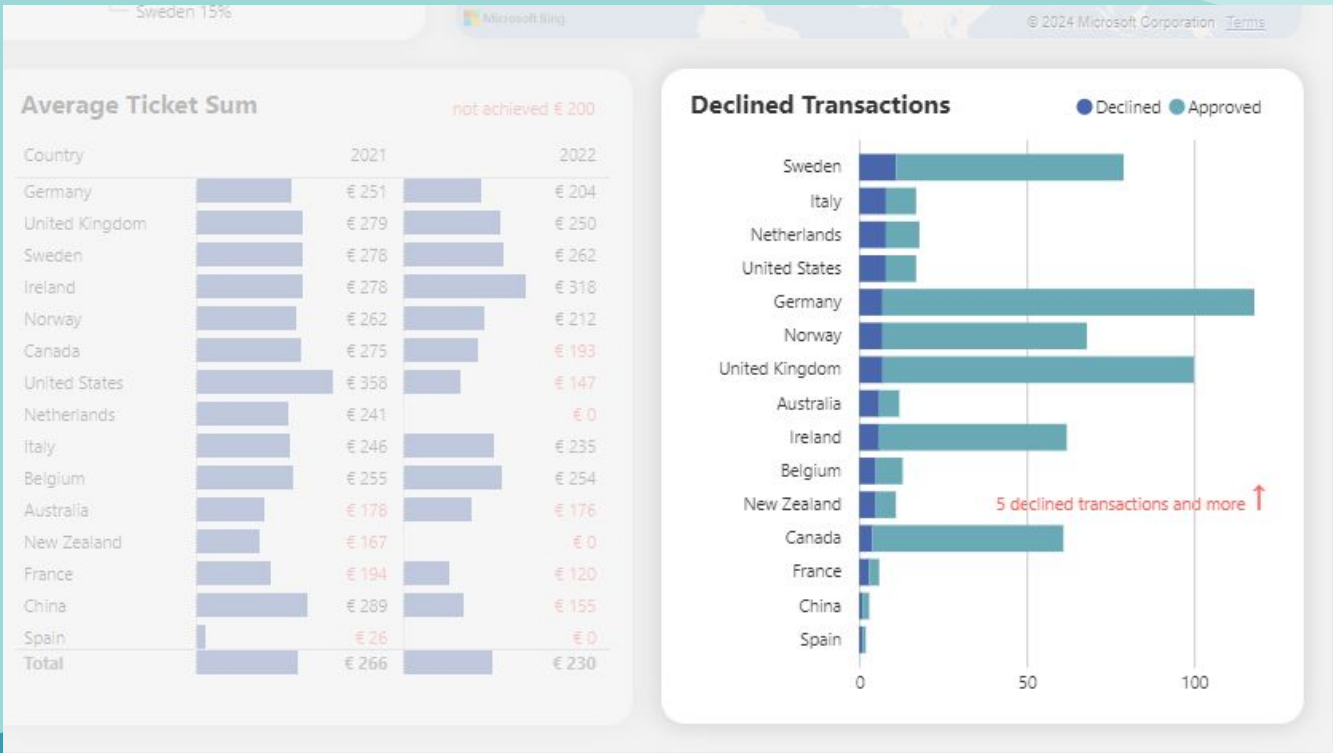
```
AvgAmount22 = COALESCE(
    CALCULATE(
        AVERAGE(transactions[amount]),
        transactions[declined] = 0,
        YEAR(transactions[timestamp]) = 2022
    ),
    0
)
```

```
SumAmount = CALCULATE(
    SUM(transactions[amount]),
    transactions[declined] = 0
)
```

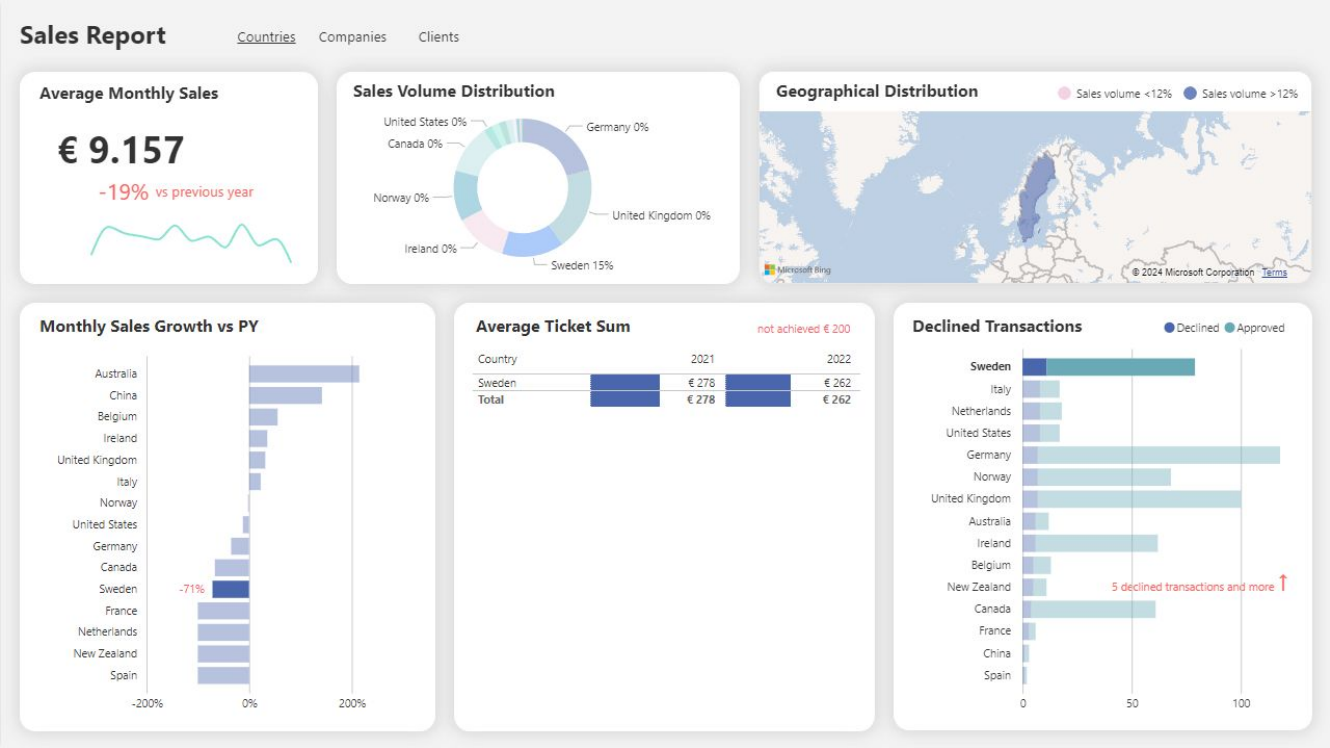
Now let's move on to the final indicator that can provide growth points - declined transactions.

LEVEL 1 EXERCISE 4

Create a visualization in which the number of rejected transactions in each country can be counted to measure the effectiveness of the operations. Remember that the company expects to have less than 5 declined transactions per country.



Stacked bar chart to visualize the percentage of declined transactions relative to those that made money. Red legend for target losers. Highlighting country information on the entire page.



The wizard allows to quickly highlight countries with a large number of declined and approved transactions and compare them with market leaders and previous insights to understand where to plan appropriate activities.

Here I created two measures for counting declined and approved transactions. These measures are also used for other visuals and it so happened that here the counting is done by different columns, I think this is not critical and I left it as is.

```
CountAmount = CALCULATE(
    COUNT(transactions[amount]),
    transactions[declined] = 0
)
```

```
CountDeclined = CALCULATE(
    COUNT(transactions[id]),
    transactions[declined] = 1
)
```