BUS5VA (Summer Semester)

Assessment 3

Data Visualizing Using SAS Viya

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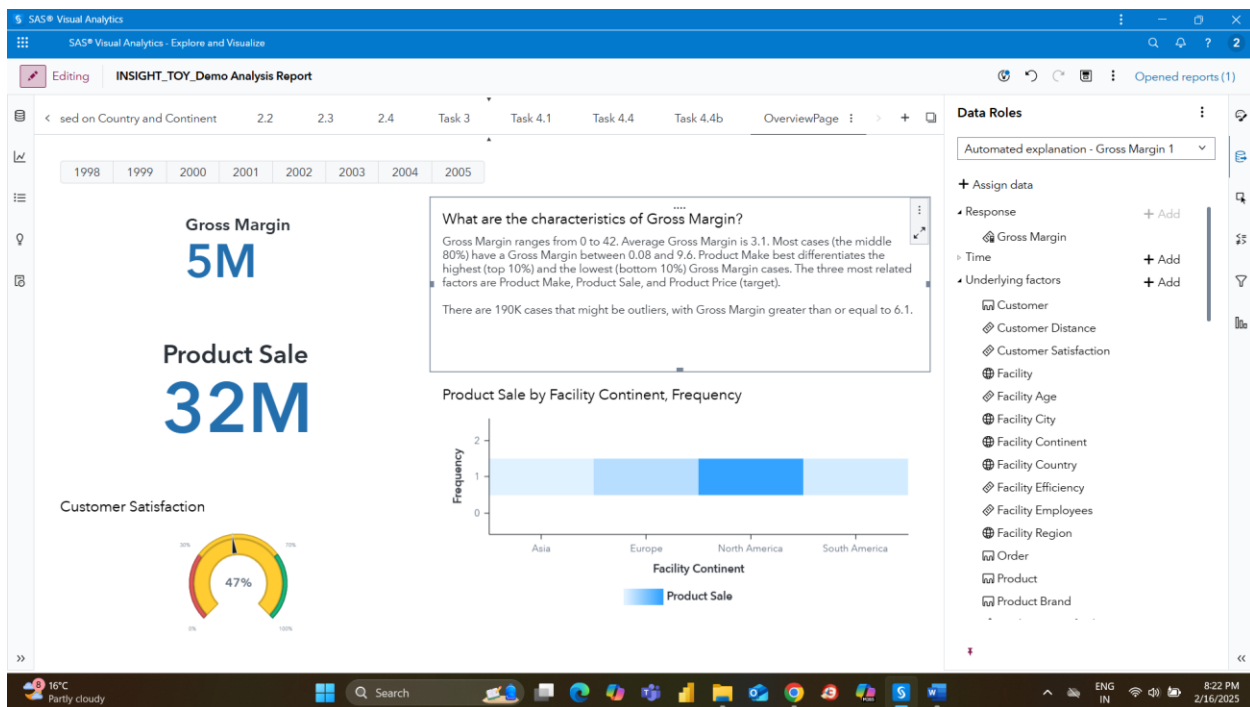# Table of Contents

Objective:

This assessment involved a comprehensive analysis of a provided dataset. An overview of the analysis is provided in this report.

Overview:

Overview of Report:

The dashboard effectively presents Gross margin, Product sales as well as in which continent it is selling most in each year. It shows customer satisfaction so we can get insight if the customer satisfaction has any relationship with product sales.

The overall Gross margin is 5M on 32M product sales. Whereas customer satisfaction is not even 50%. North America is the country with the highest selling products.

Task 5: Overview Explanation:

If we breakdown year by year we can get more information or maybe insights that can help us improve quality of performance leading better financial outcomes.

Year 2000:
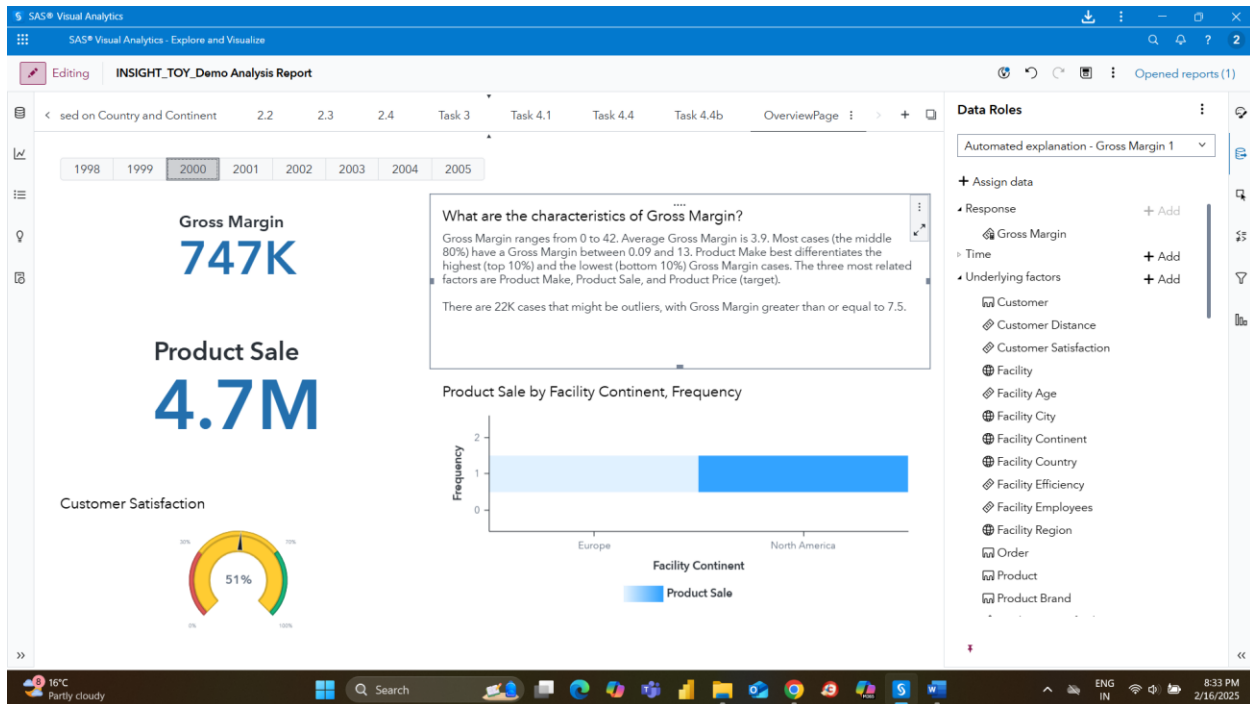
In the year 2000, Europe and North America used to sell almost same amount of toys. At that time customer satisfaction used to be better than now giving us 747k margin on the 47M sales.

In the year South America enters the market. Increasement in the sales gave us a margin of 1.1M. But in a year, it deep downs. See the visuals below for that.

| 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |

Gross Margin

1.1M

Product Sale
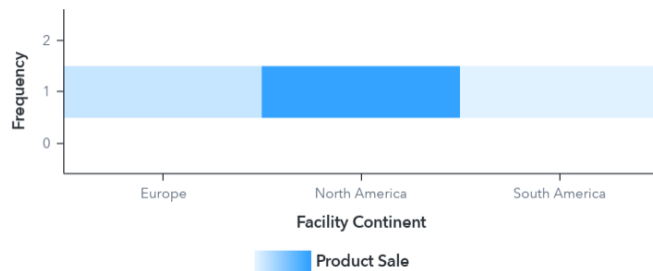
6.5M

Customer Satisfaction

46%

What are the characteristics of Gross Margin?

Gross Margin ranges from 0 to 32. Average Gross Margin is 3.7. Most cases (the middle 80%) have a Gross Margin between 0.17 and 10. Product Make best differentiates the highest (top 10%) and the lowest (bottom 10%) Gross Margin cases. The three most related factors are Product Make, Product Price (target), and Product Sale.
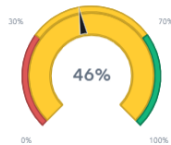
There are 45K cases that might be outliers, with Gross Margin greater than or equal to 7.1.

Product Sale by Facility Continent, Frequency

Product Sale

2005:

| 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |

Gross Margin

610K

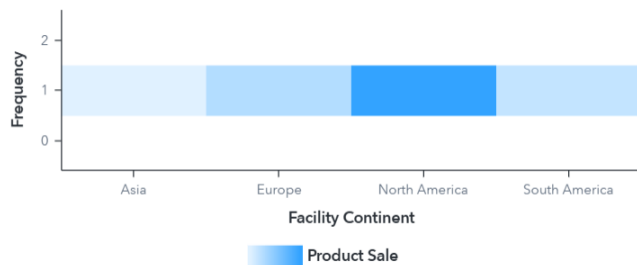**Product Sale**

3.8M

Customer Satisfaction

48%

What are the characteristics of Gross Margin?

Gross Margin ranges from 0 to 35. Average Gross Margin is 3.5. Most cases (the middle 80%) have a Gross Margin between 0.16 and 11. Product Make best differentiates the highest (top 10%) and the lowest (bottom 10%) Gross Margin cases. The three most related factors are Product Make, Product Sale, and Product Price (target).
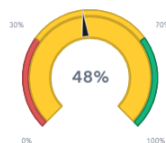
There are 22K cases that might be outliers, with Gross Margin greater than or equal to 7.7.

Product Sale by Facility Continent, Frequency

Product Sale

The report is findings and breakdown of what might cause that.

Task 1

Hierarchy and Gross margin

Gross margin: To create Gross Margin select new data item from calculated item. Calculate Gross margin by the formula.

'Product Sale' n-'Product Cost of Sale'n

This will create a new data item called Gross Margin.

Hierarchy: Go to add data item then select hierarchy. After that map 100% of every geo location. And create Facility Geo-hierarchy. For Product hierarchy follow the same procedure. It will create like this.

To show the average gross margin in each country on the chosen continent. To achieve that Drag bar chart from the objects into canvas and choose Geo hierarchy as category with avg gross value as measures.

South America is highest avg gross margin while North America has the lowest.
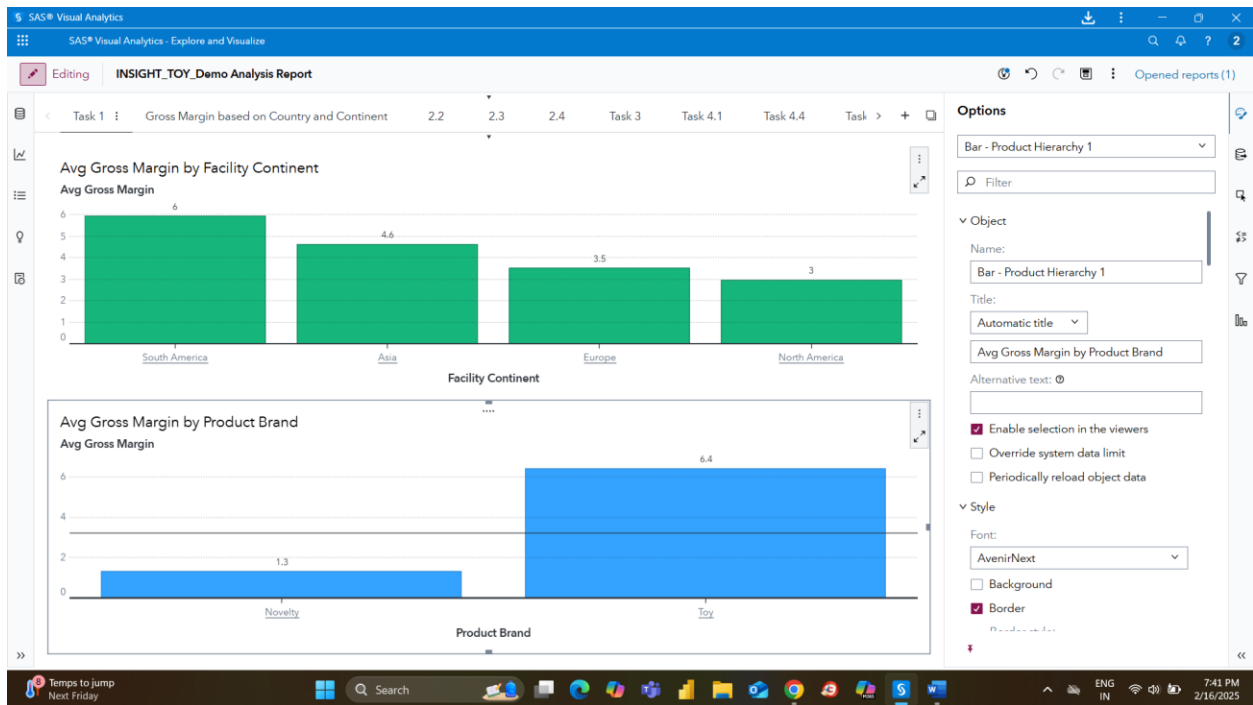
This is the visualization showing us avg of gross_margin in every continent and its country based on the brand. It's drillable so we get to choose one continent and its country of our own choice.

Here I have selected North America (Continent) and Canada (Country) and toy as product type. The visual shows us in Canada British Columbia and Ontario has almost similar gross margin while highest selling product is plushie.
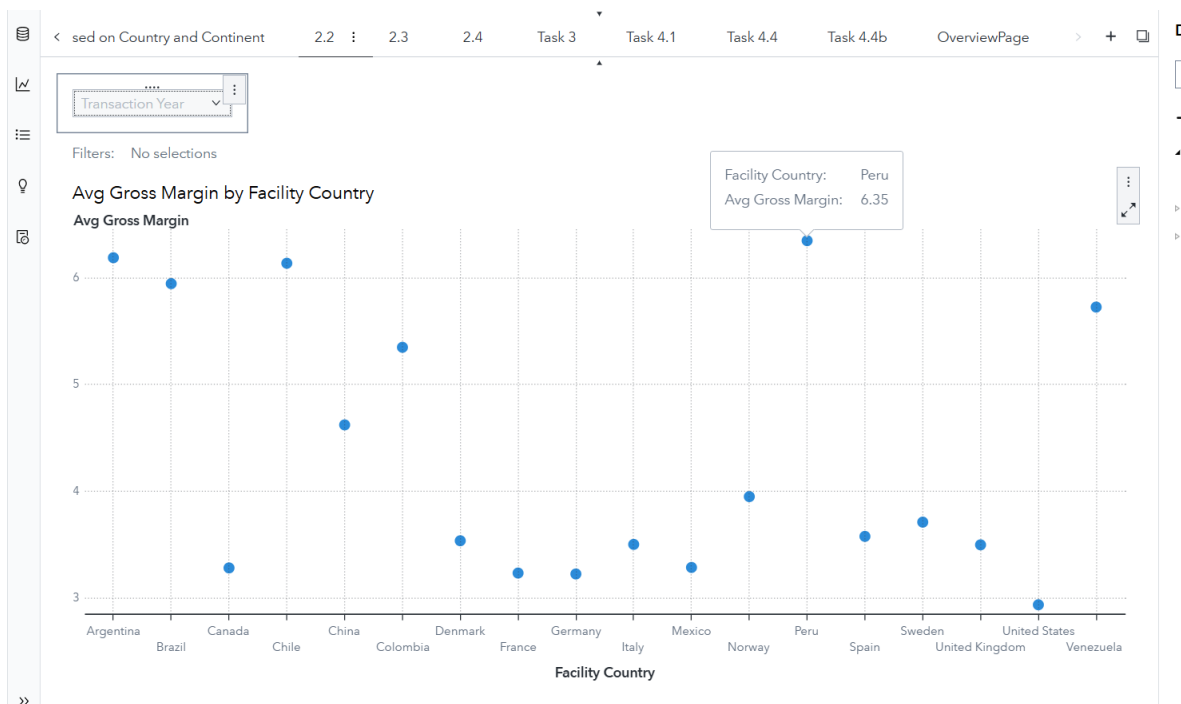
Like this from drill you can choose for any country for any product type and check the stats.

Task 2

Visualization for summary of Gross Margin:

2.1) It shows a summary of product sales and gross margin based on continent and country.

2.2) Highest and Lowest of Gross Margin in a country depending on the year.

From this we can find out that overall Peru(6.35) is the country with highest Gross margin whereas United States as country created lowest amount of Gross margin.
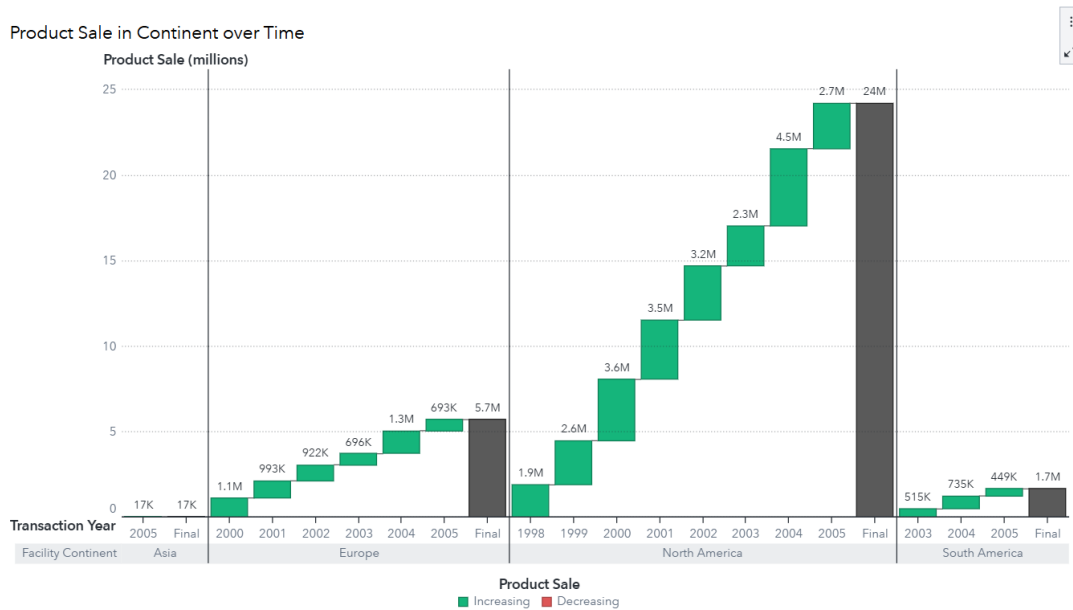
According to year we can see ups and downs of every country's margin.
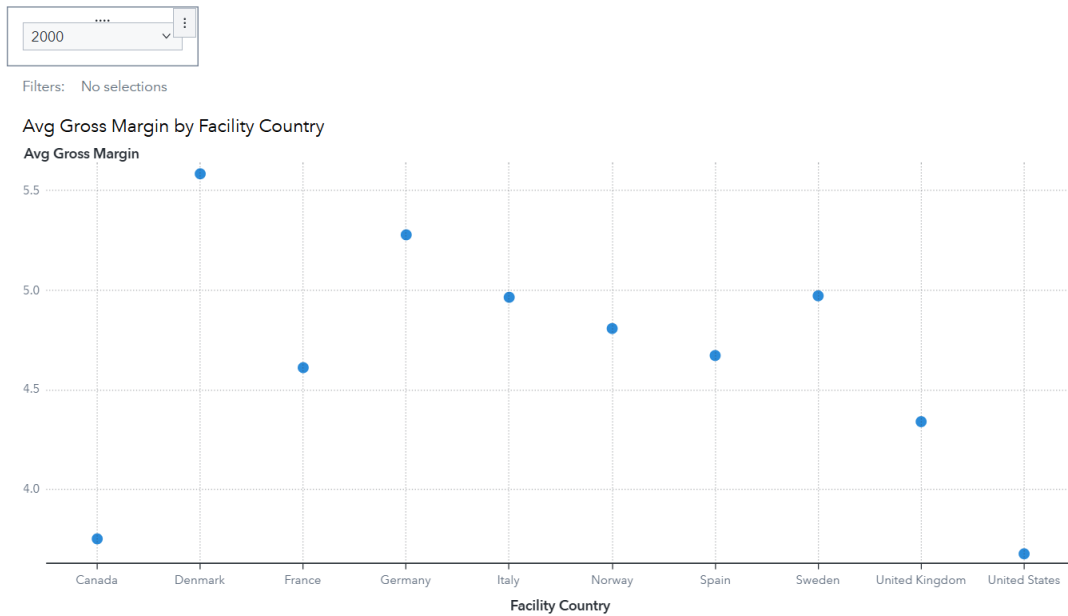
As you can see in 2000, Denmark has the highest amount of margin and US has the lowest. But in recent years Denmark's avg gross margin is way less than before. While Peru (7.76 avg gross margin) has emerged as top country.
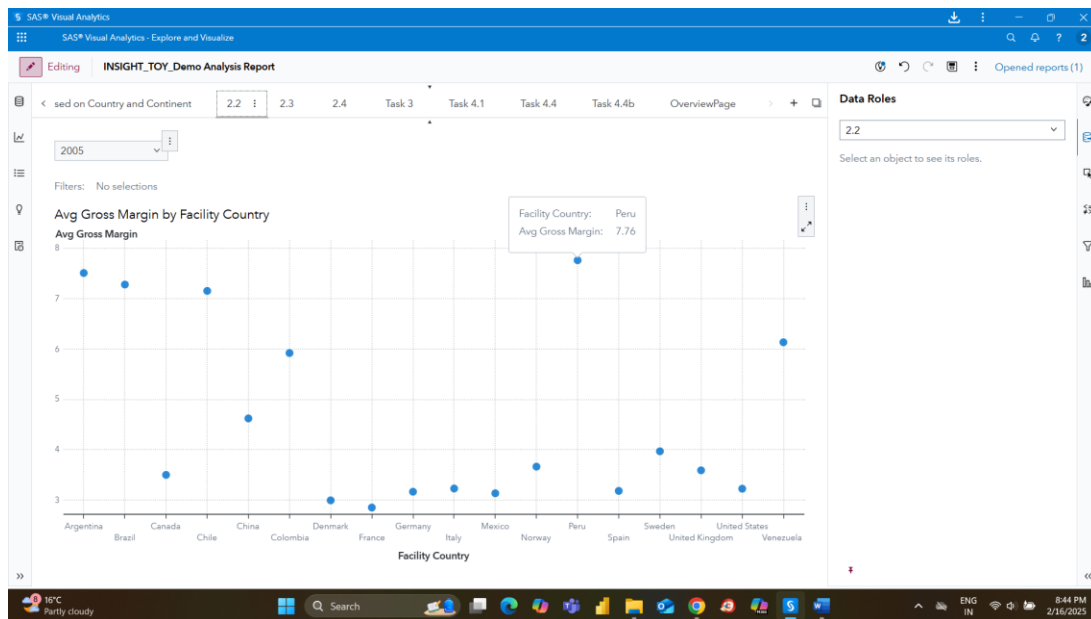
2.3) Product Sales over Time:

This visual is about how Product Sales changes in continents over the time. For example, how North America rapidly emerged as a top selling continent over the years. The insight is China in Asian continent just started selling toys in 2005 before that there is no record found. South America is showing less progress (449k) in 2005 than in 2004.

2.4) Trends over product brand in different continents:

Gross Margin by Transaction Year grouped by Product Brand
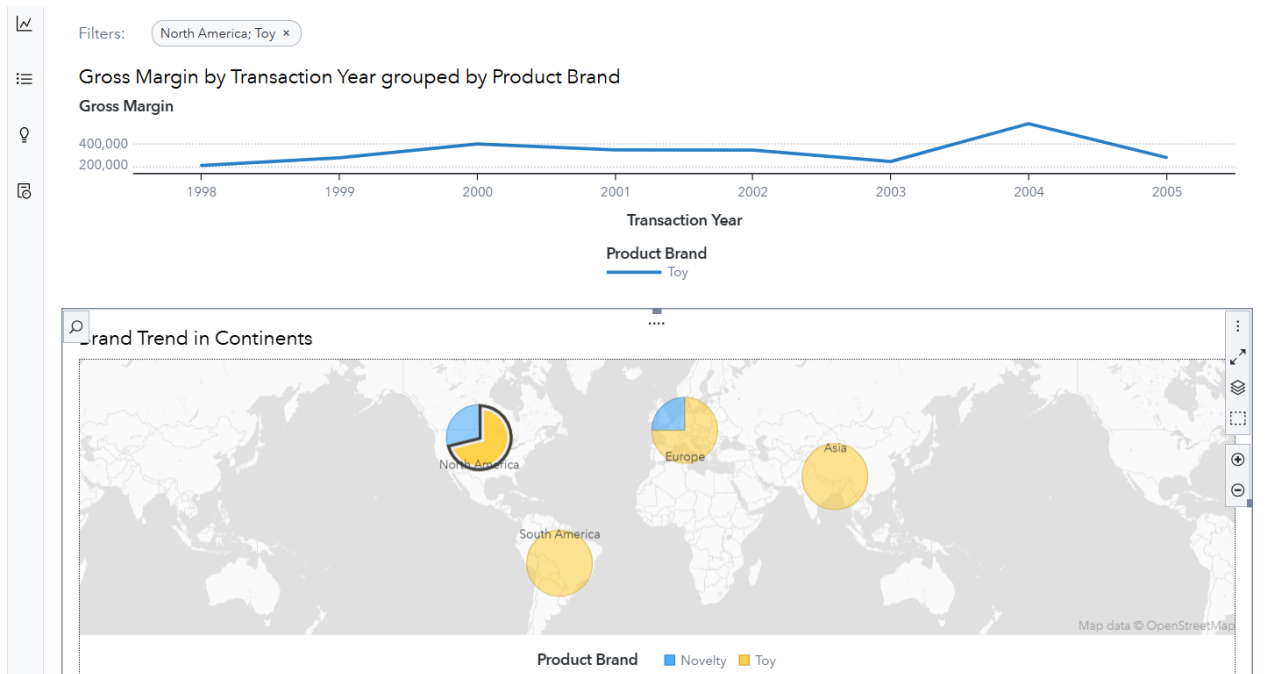
Brand Trend in Continents
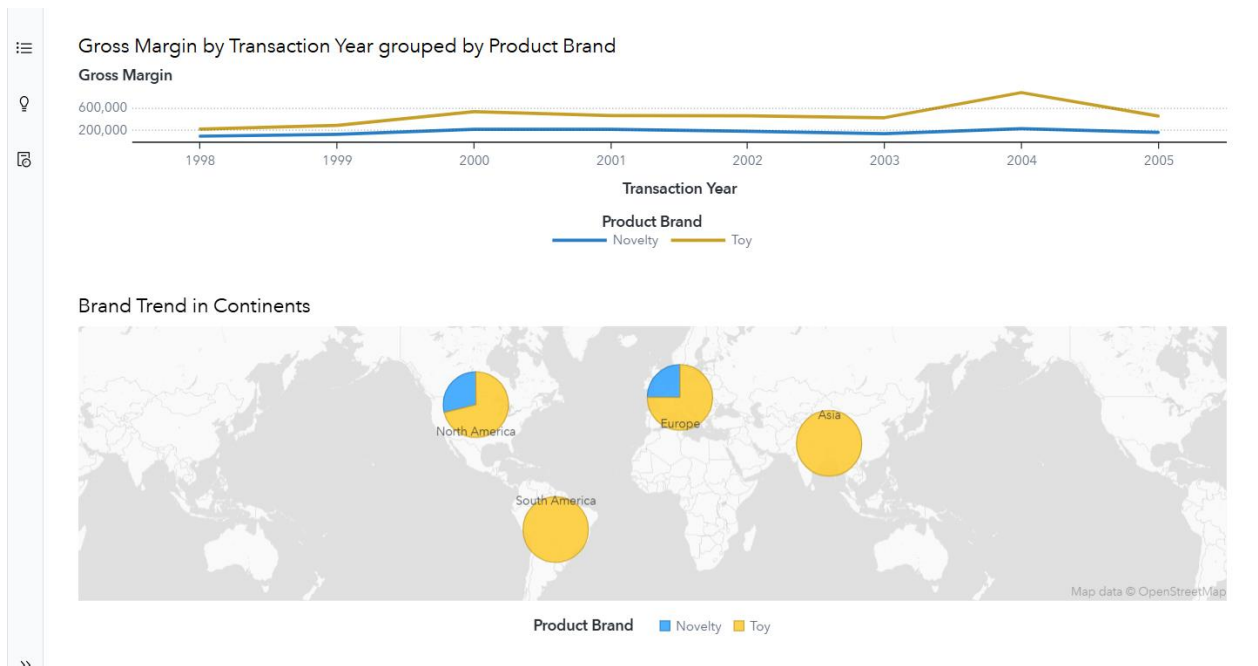
This is the visual how product brand played role to gather more gross margin over the years in different continents. With the help of this we can analysis which type of product is sold more in which area. After getting that we can construct strategies and recommendations to business authorities to put them in use for generating more product sales and eventually getting more margin for the company.

Here are some of the analyses:

- In All continent toys gather more margin revenue than novelty.
- Novelties are only beneficial in Europe and North America and not even traceable in South America and Asia.

North America:

1.) For Toy:

Filters: North America; Toy ×

Gross Margin by Transaction Year grouped by Product Brand

Gross Margin

Brand Trend in Continents

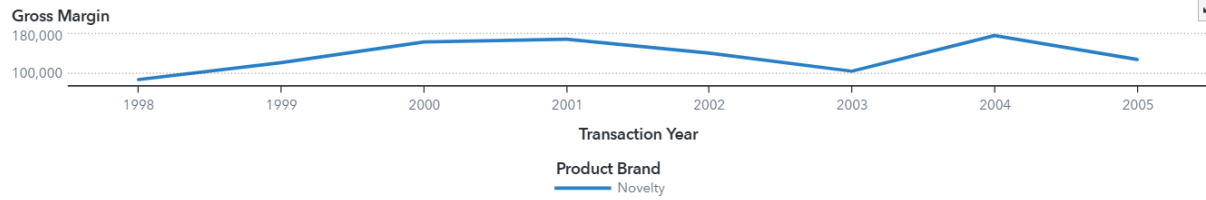Product Brand ■ Novelty ■ Toy

In North America the trend of Toy started in 98 but it peaked in 2000. While hitting at bottom in 2003 while rising its peak in 2004 to falling down again 2005. It suggests it's not stable but a very affective trend.
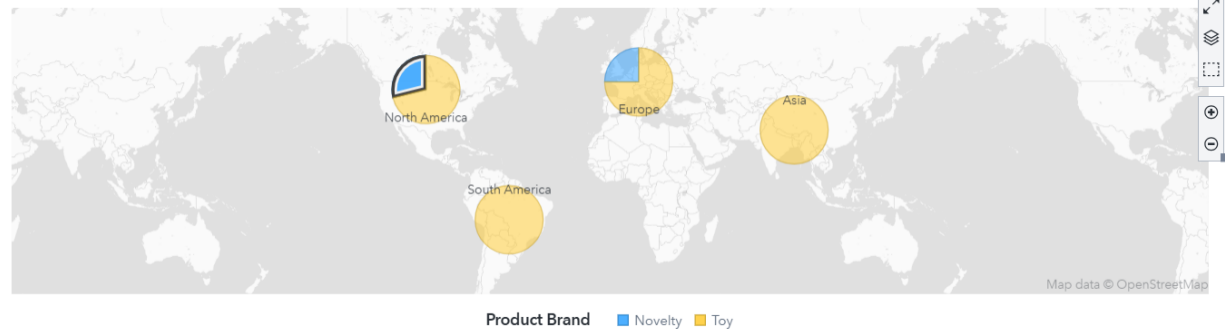
2.) For Novelty:

The constant rise of Novelty bringing margin in North America from 1998 to 2002 is clearly visible while hitting bottom in 2003 to reach its peak in 2004. It slowed down a bit in 2005.

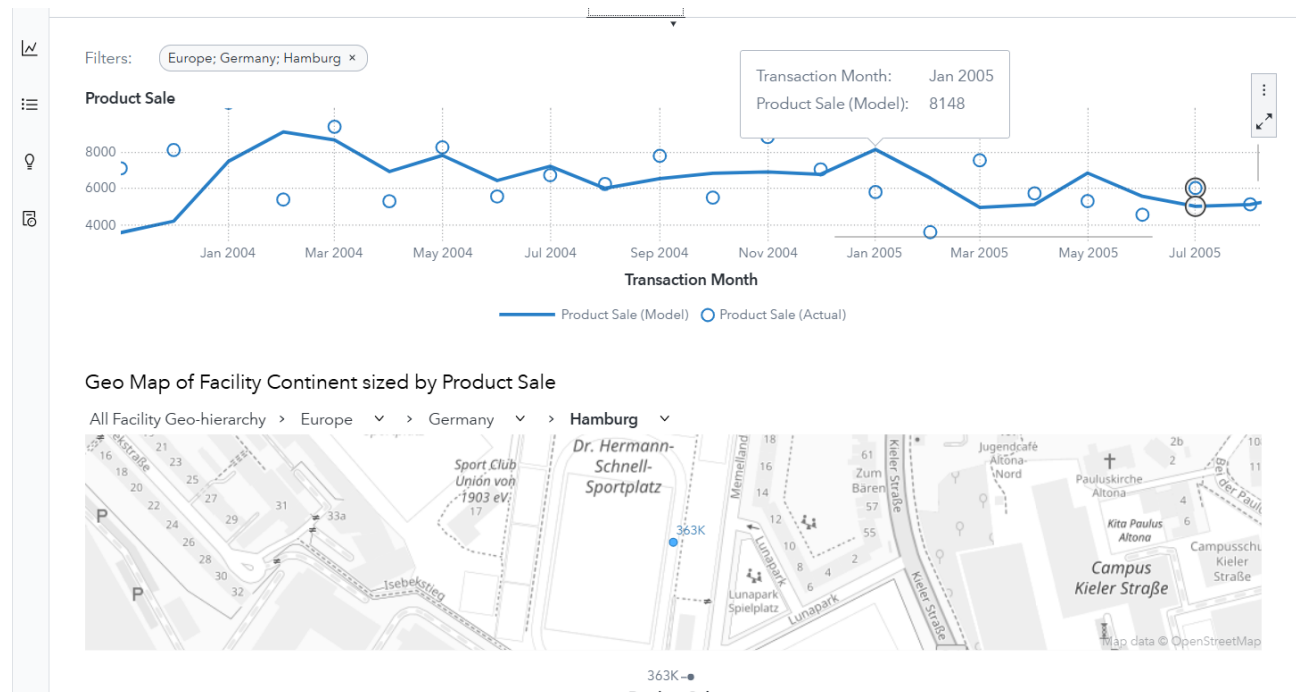Gross Margin by Transaction Year grouped by Product Brand

Gross Margin

Transaction Year

Product Brand
— Novelty

Brand Trend in Continents

Product Brand   ■ Novelty   ■ Toy

Task 3

Product Sales and Customer Satisfaction over facility hierarchy:

Filters: Europe; Germany; Hamburg ×

Product Sale

Transaction Month: Jan 2005
Product Sale (Model):   8148

Transaction Month

— Product Sale (Model)   ○ Product Sale (Actual)

Geo Map of Facility Continent sized by Product Sale

All Facility Geo-hierarchy ＞ Europe ＞ Germany ＞ **Hamburg** ＞
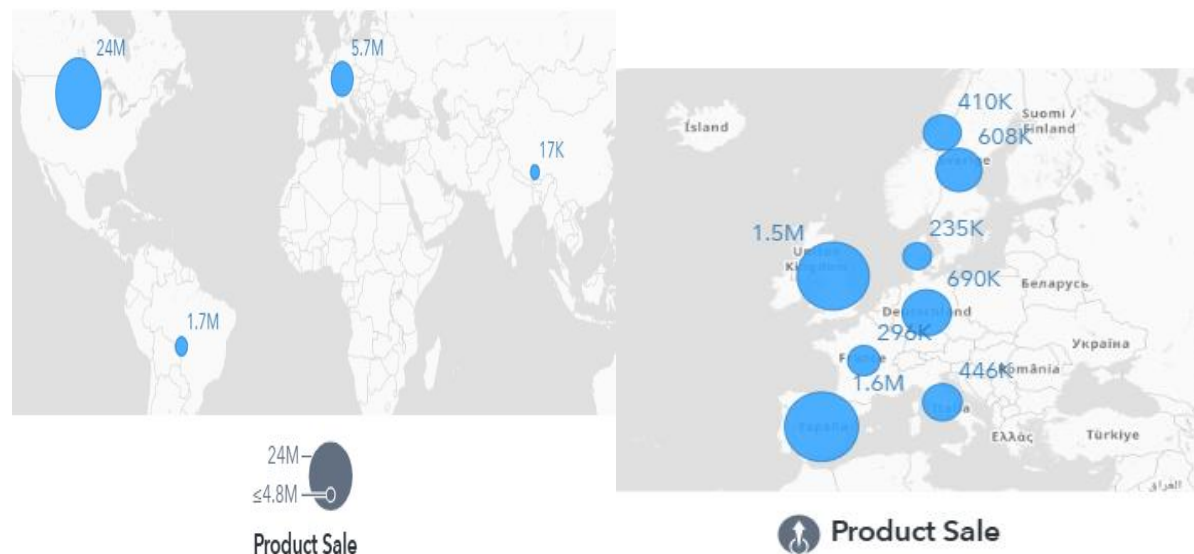
363K —●
Product Sale

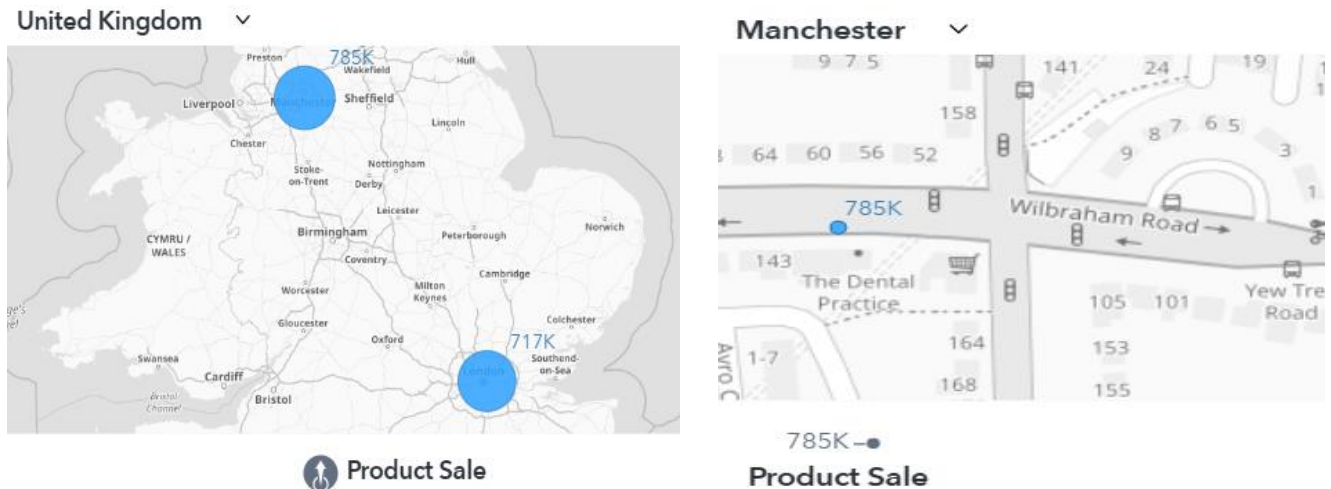Here is the visualization of drillable geo-map which shows customer satisfaction on complete geo hierarchy.

3.1) From the above visual you can gather information like which stores sold exact amount of product. And how much product sale is gathered.
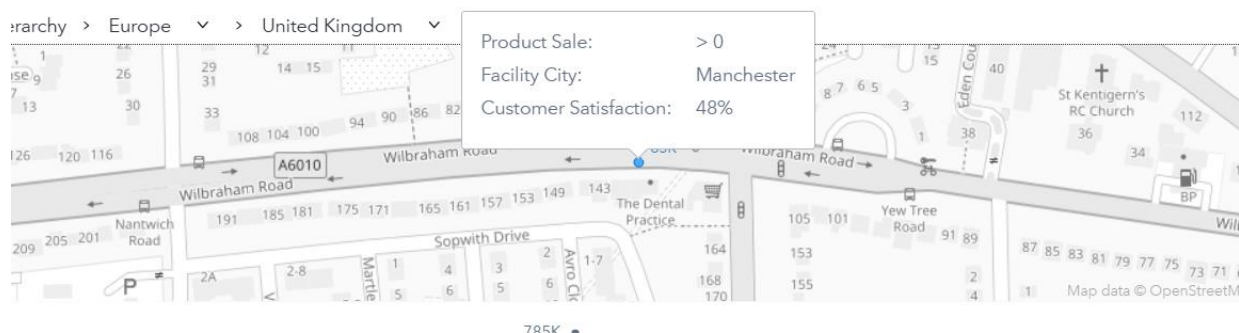

To get the exact store location we need to drill down from continent to country to region to city.
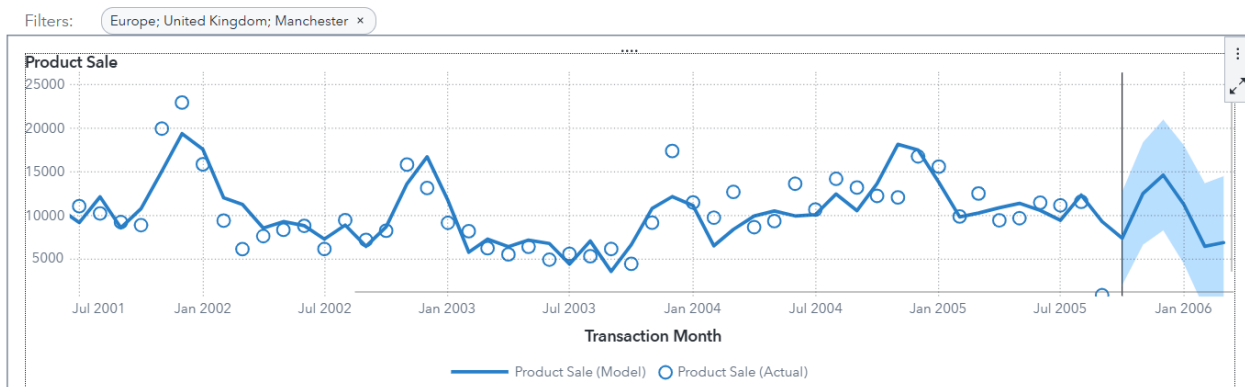
Like this you can decide which store has good reviews and store's exact location.

3.2) In the above we can also check customer satisfaction like this.

3.3) 4 months of forecast:

Below is the visual of 4 months of forecast. If you drill down, you can see estimated product sales as well as actual product sales.
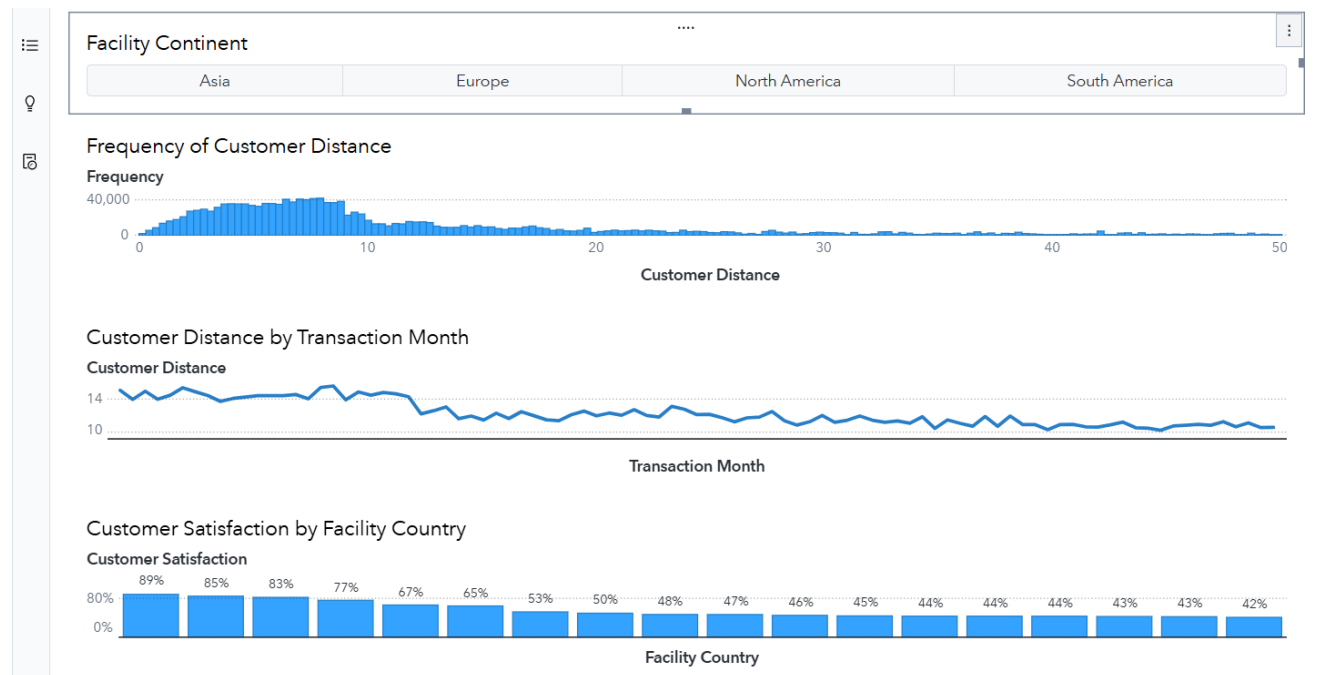
With the help of drill down we can choose which store we want to check out and how much revenue it will generate. With those data we can calculate estimated margin.
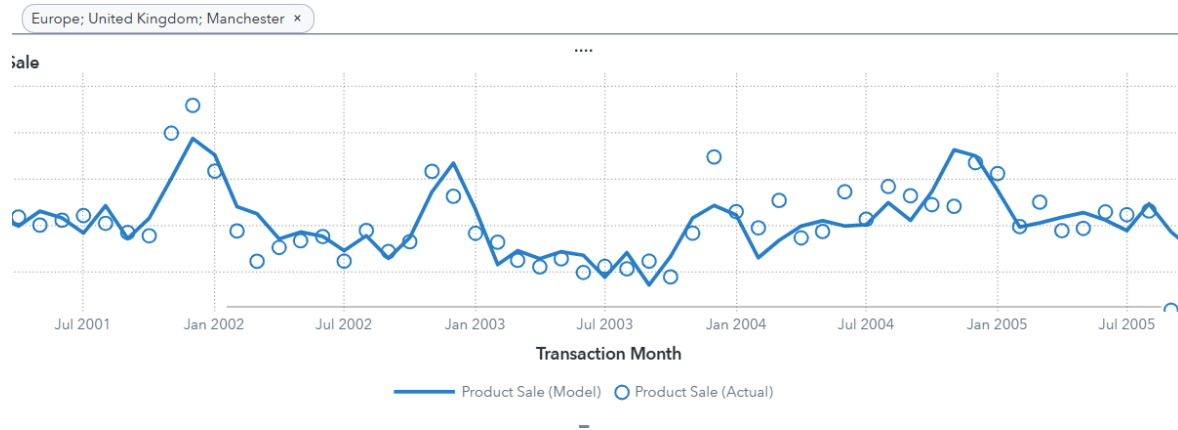
Task 4

Relationship between Facilities and Customer Satisfaction

4.1,4.2,4.3)

This visual shows,

- The distribution of customer distances.
- The trend of customer distance over time.
- The comparison of customer satisfaction across different facilities in countries.

The interactive elements, such as filters and the "Facility Continent" button bar, enable further exploration and analysis of the data. The "Data Roles" panel facilitates the creation and modification of visualizations.

For Europe continent:
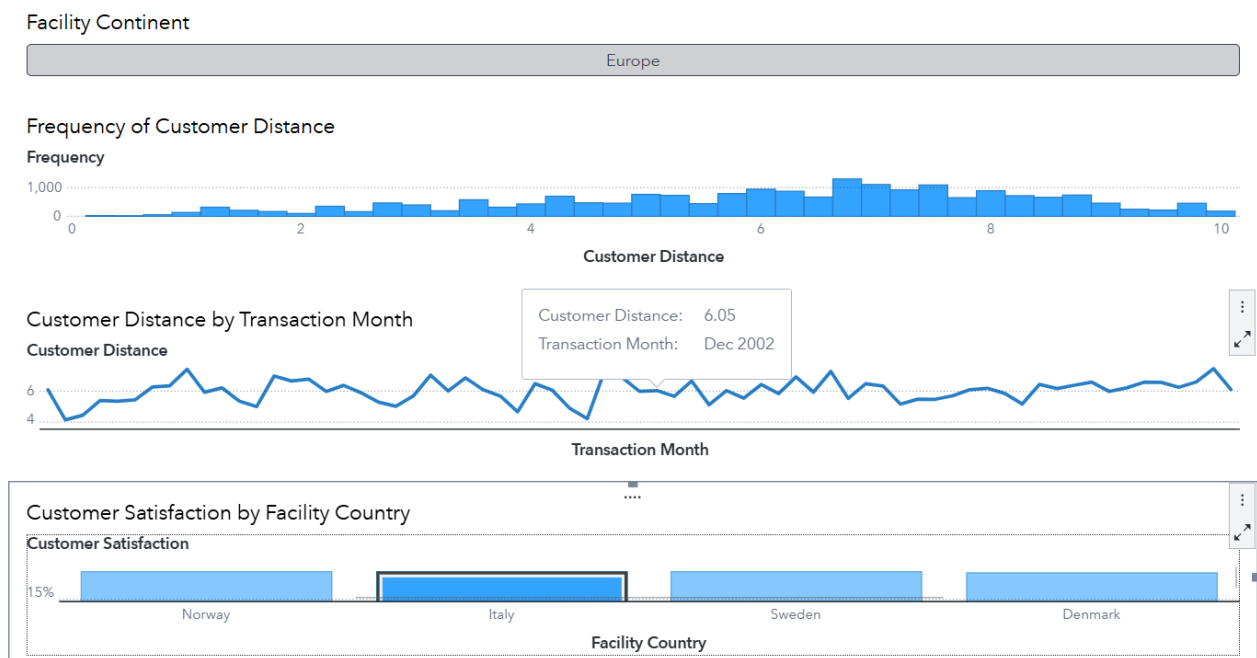
It shows that in Europe, Italy has over 15% of customer satisfaction rate over the month of Dec 2022. It also shows the customer distance of 12.72.
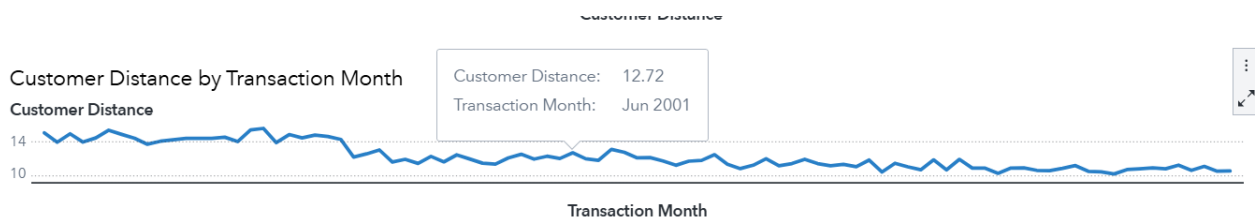
4.4) SAS Viya Analytic feature:

Sas offers analytic features. Here is the result of customer satisfaction and what is the biggest factor for that. As it shows, Sales Rep Rating has the strongest relationship with customer satisfaction.
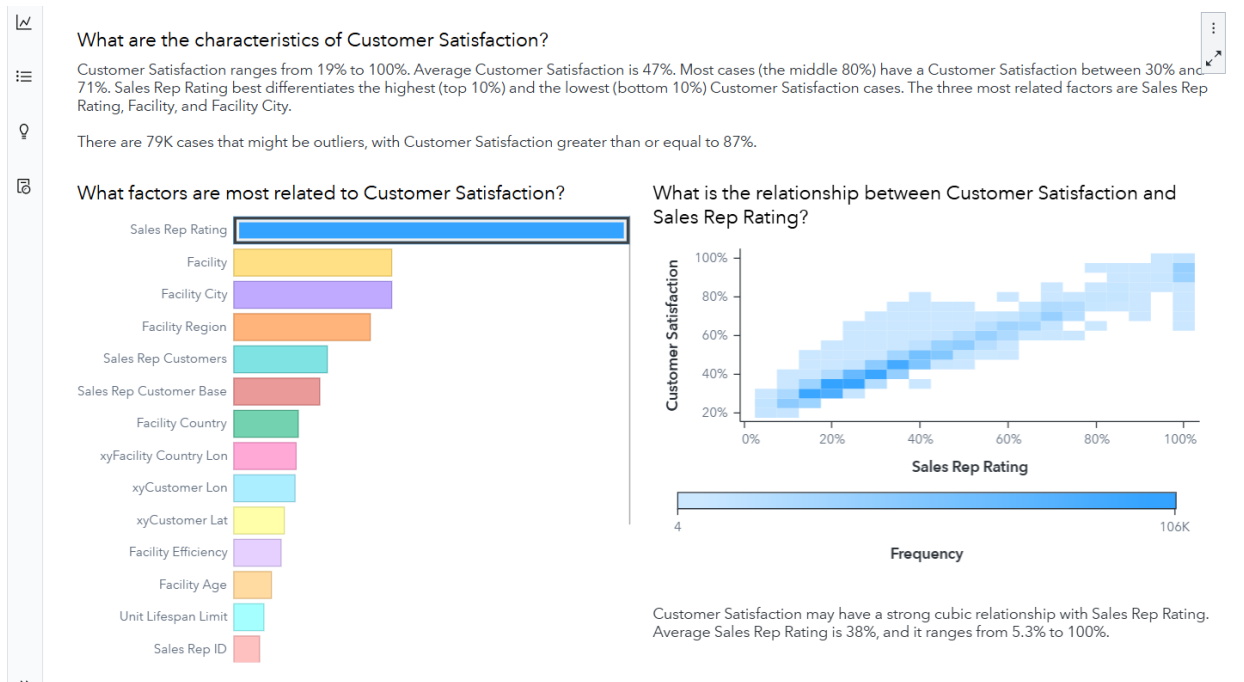
Another factor is the facility country. Here is the analysis of the relationship between customer satisfaction and facility country. Other factors which are relevant:

- Facility
- Facility City
- Facility region
- Sales Rep Customers

4.4 b) Customer Satisfaction over country for Gross Margin:

Gross Margin by Customer Satisfaction, Facility Country
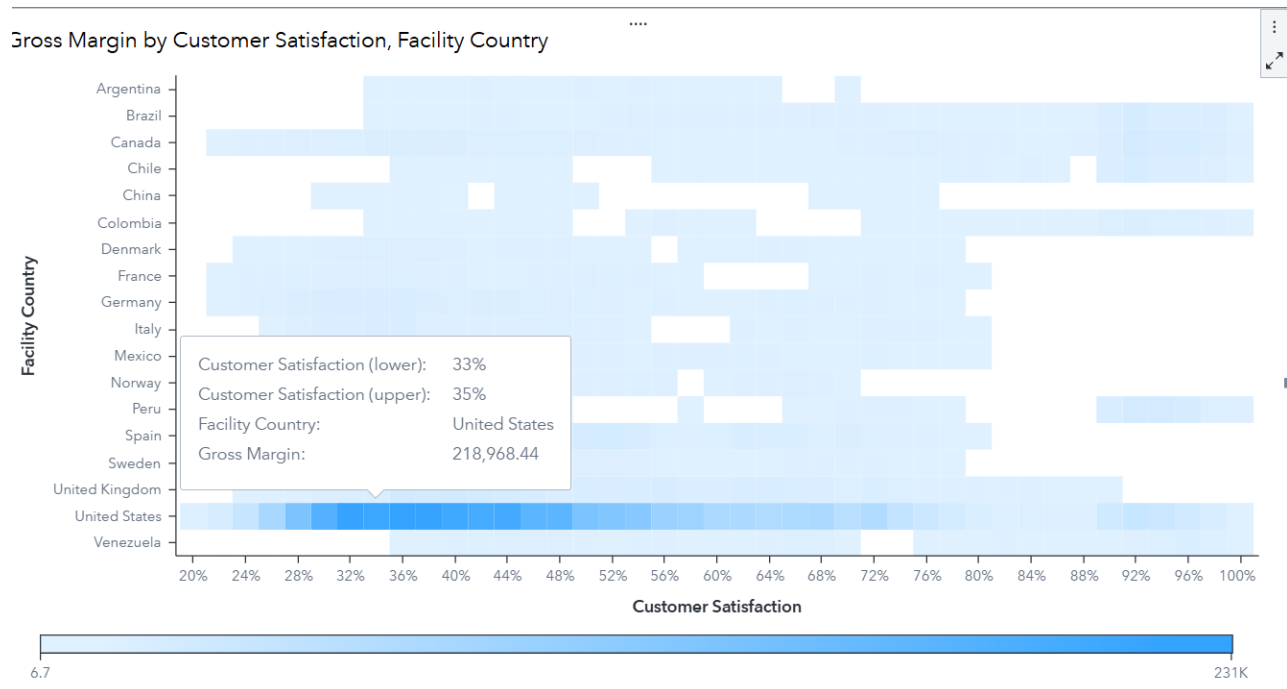
It's visible that USA has highest rating for customer satisfaction due to high number of gross margin. Where the lowest satisfaction rate is 33% and the highest satisfaction rate is 35%. It should be noted that the relationship between country and satisfaction is scattered showing that its weak entity and not that much effective.

Summary

This report is actively exploring and analyzing data within SAS Visual Analytics. We analyze customer-related data, including customer distance and satisfaction, and use various visualizations to gain insights. The interactive nature of the tool allows for dynamic exploration and analysis of the data.