

**Queen Mary**  
**University of London**

MTH782P – SAS for Business Intelligence – 2021/22  
Module Assignment Midterm: Designing Business  
Intelligence Reports

Name : Dev Upadhyay

Student ID : 200644879

## Site Analysis

AF	AS	EU	NA	OC	SA
----	----	----	----	----	----

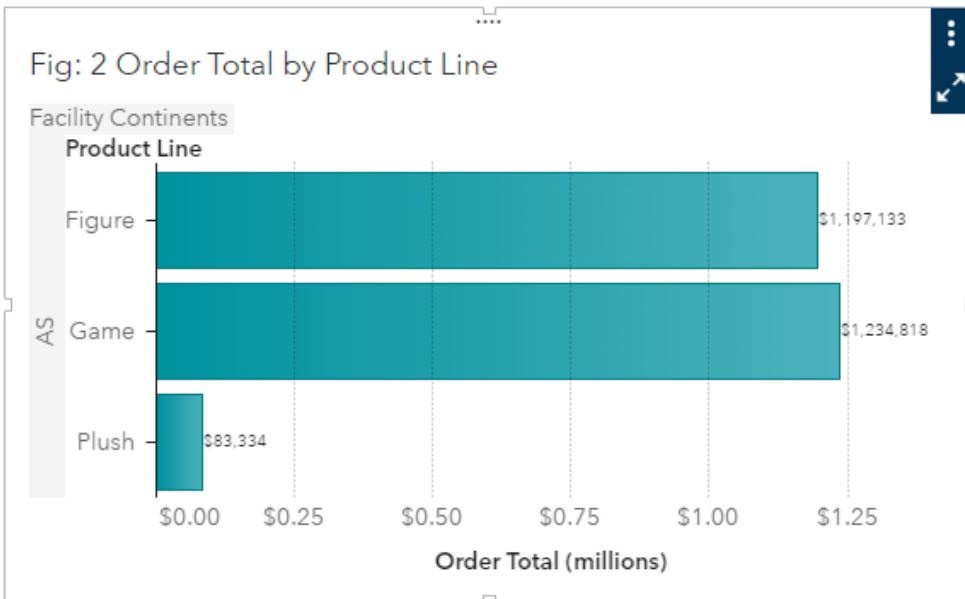
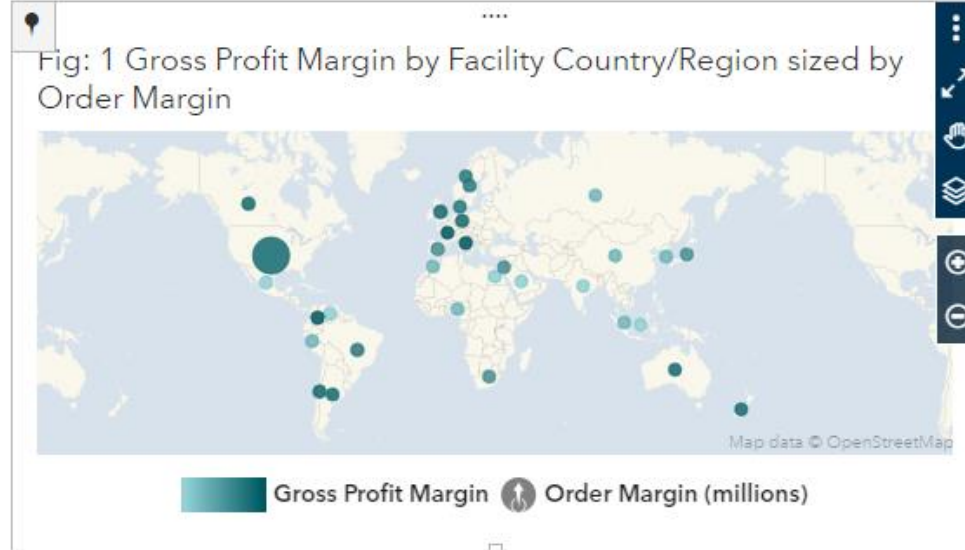
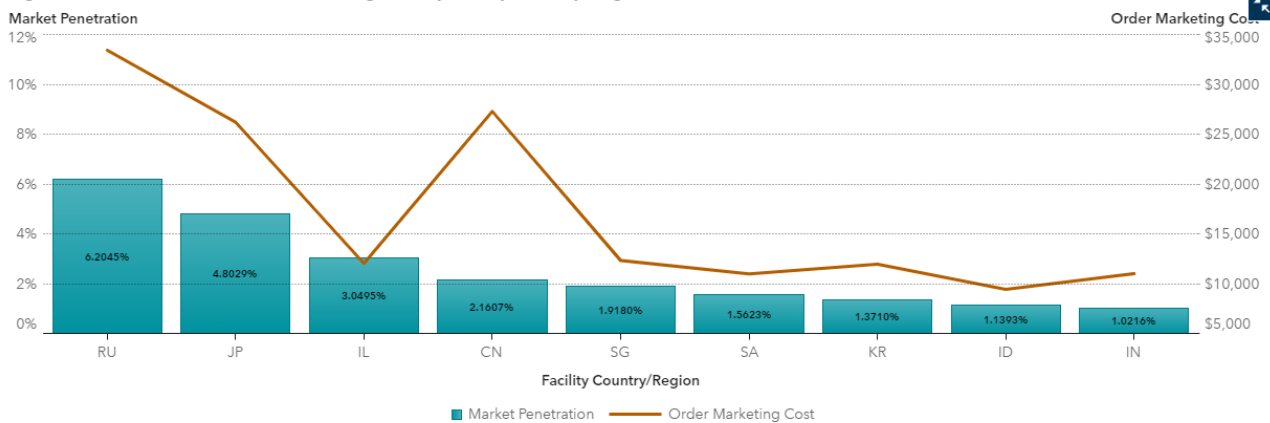


Fig: 3 Market Penetration, Order Marketing Cost by Facility Country/Region



# Sales Analysis

Fig: 1 Order Margin, Sales Rep Rating by Product Line

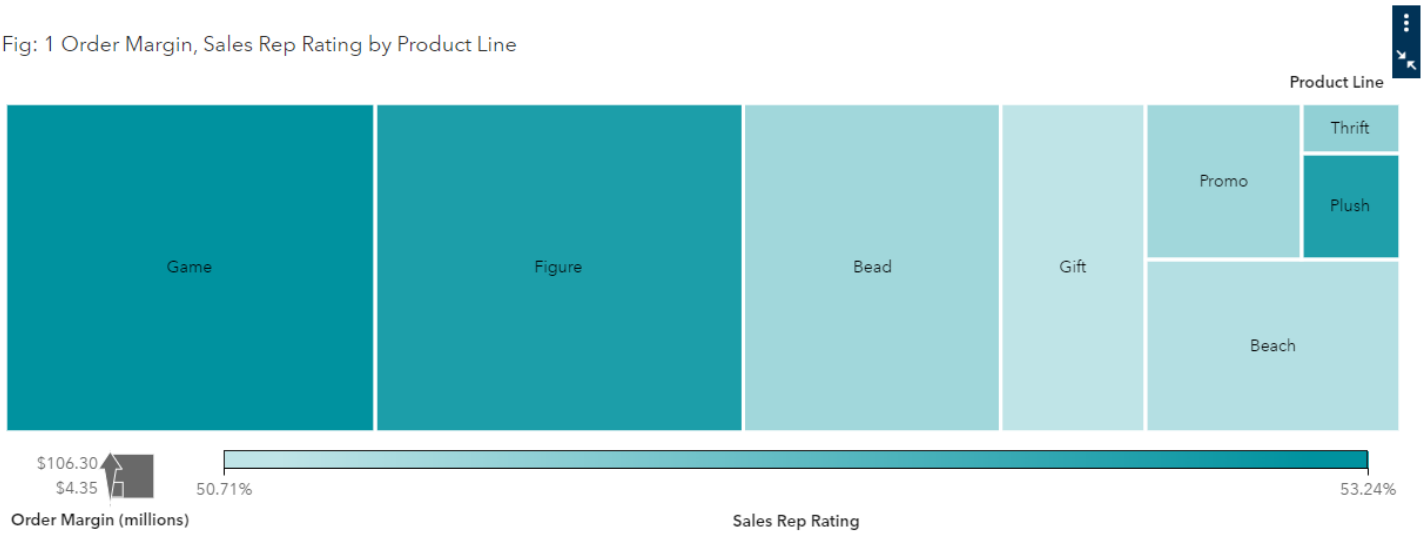


Fig: 2 Bottom 10 Revenue by Facility Country/Region Code

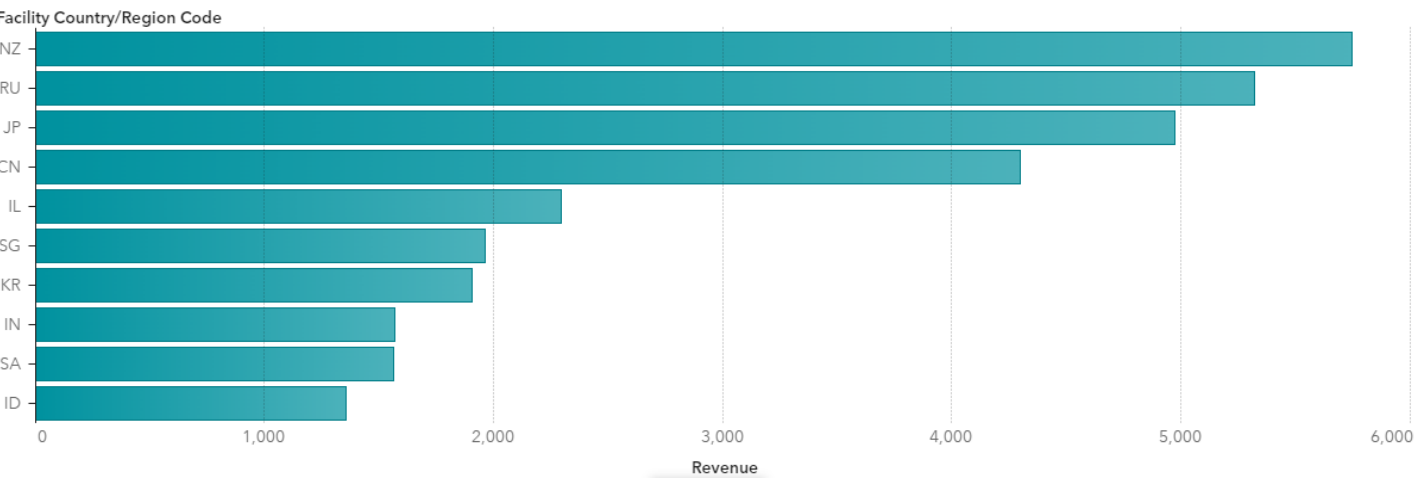


Fig: 3 Sales Rep Orders by Transaction Day of Week grouped by Product Line

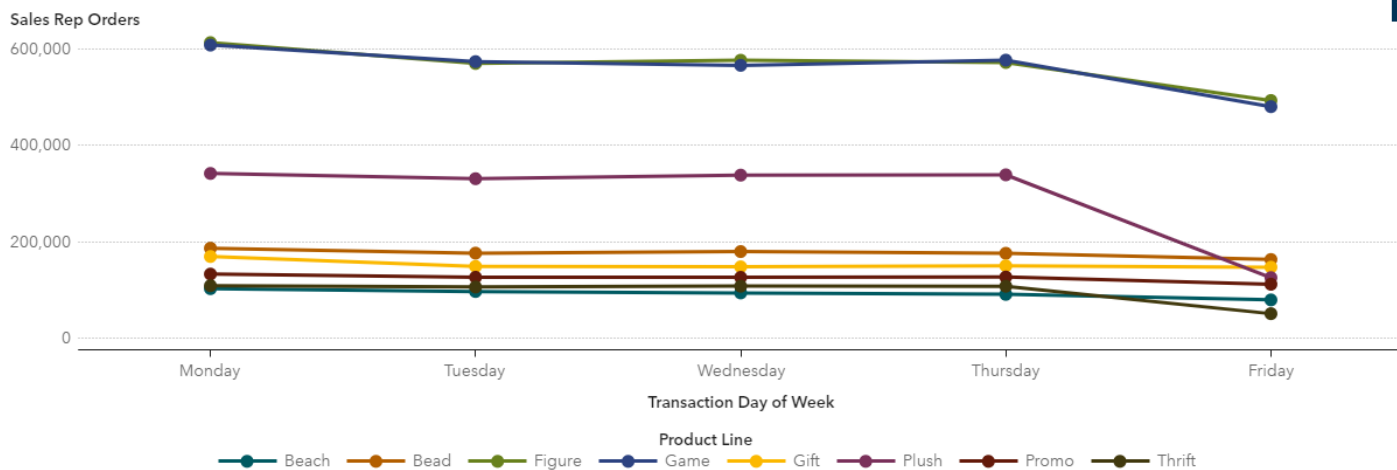
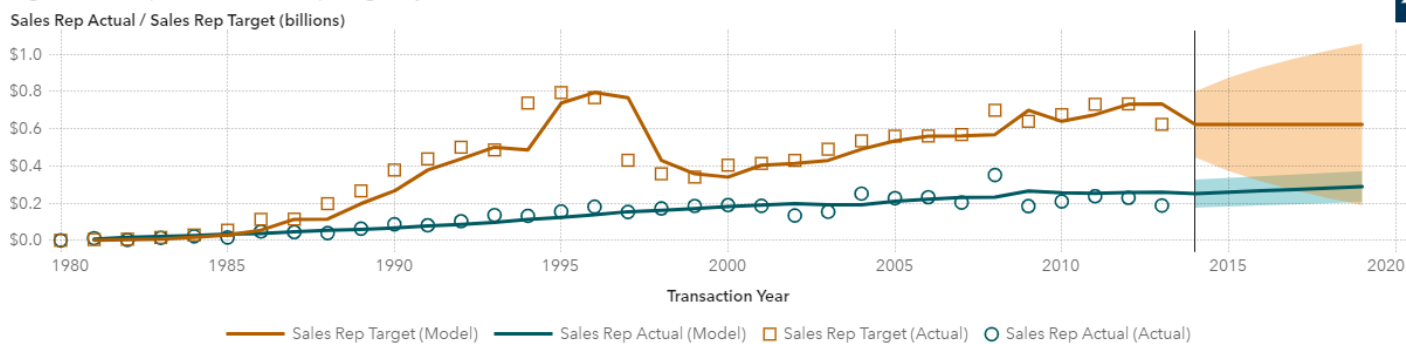


Fig: 4 Sales Rep Actual, Sales Rep Target by Transaction Year



▼ About this forecast

- 95% forecast confidence.

# Customer Analysis

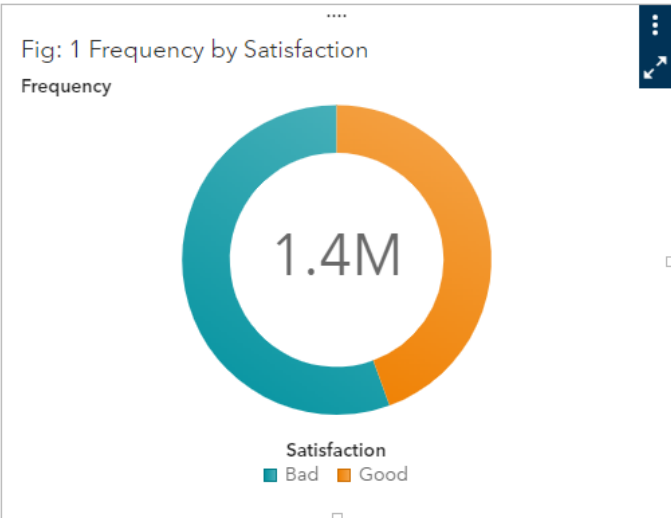


Fig: 2 Bottom 5 Product Make Frequency agg by Satisfaction

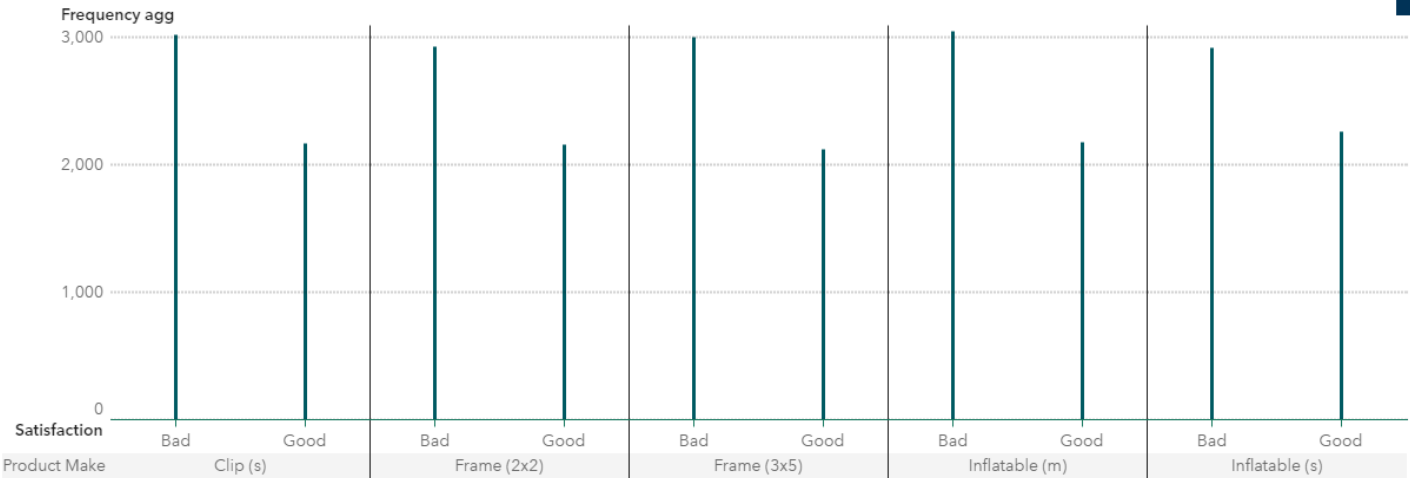
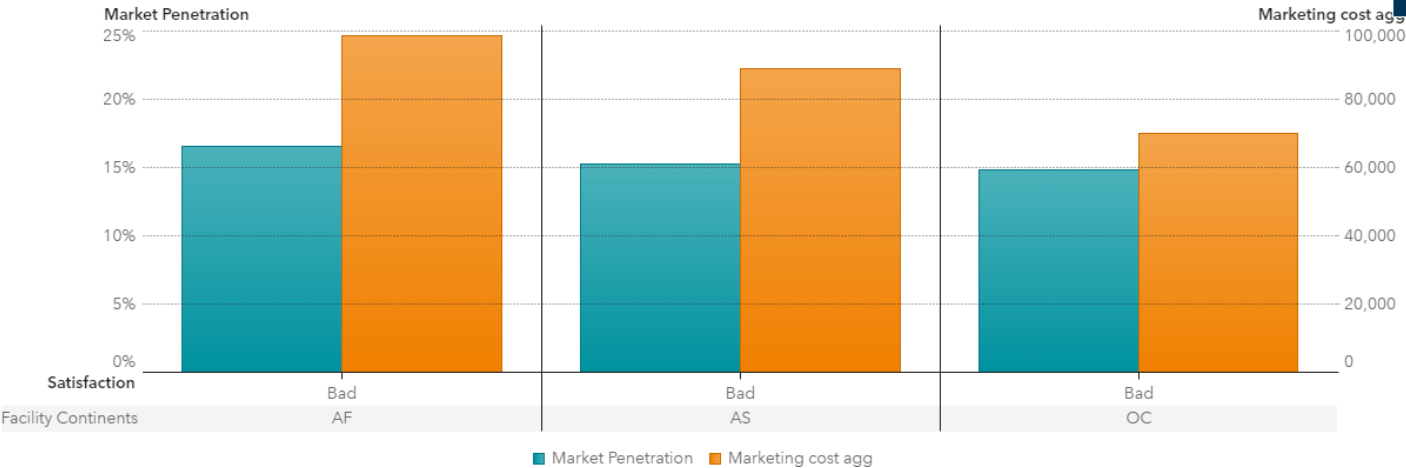


Fig: 3 Bottom 3 Facility Continent's Market Penetration, Marketing cost agg by Satisfaction



## Part 2

a)

While investigating the dataset InsightToy\_sales, first we created the list table to view the summary of the data source. which we achieved by following steps.

step1: click the top left editing button on the report

step2: click on Objects

step3: drag and drop list table from tables

step4: then click on data roles and select the columns and remove autogenerated columns

By just holding the click on vertical and horizontal slider we found out that the table has 4000 rows and 62 columns.

we checked the content of the dataset by following steps

step1: click the top left editing button on the report

step2: click on the data option

step3: expand and collapse different data item classifications.

In our inspection, we found out that data times are distributed in 5 different classifications categories, geography, hierarchy, measure, and aggregated measure. where there are 23 data items in the category which consist of different formats of categories that include currency, date & numeric. Geography classification contains 7 data items, hierarchy 2, and aggregated measure 2 data items. For measure classification, there are 32 data items, the most common format is either dollar or numeric, whereas aggregation on them are count, sum, and average. In hierarchy classification, one data item consists of geographical attributes and the other contains production attributes from other classifications.

b)

In the preparation phase of Visual Analytics, we didn't find any missing values but we created a few new data items for our analysis. We encountered an issue with the size of the dataset as it is very big which made it difficult for us to create a comparison between different measures with specific or combination of categories, so we aggregated Frequency as Frequency agg to analyze the satisfaction of product make similarly we applied sum aggregation on Marketing Cost as Marketing Cost agg to analyze the relation of Facility continents with market penetration and marketing cost. To analyze different aspects of data in terms of revenue we created a new data item Revenue with a formula :

$$\text{Gross Product Margin} = \frac{(\text{Revenue} - \text{Order Total Cost}) \times 100}{\text{Revenue}}$$

Which we converted into the following form in order to achieve our objective :

$$\text{Revenue} = \frac{\text{Order Total Cost} * 100}{100 - \text{Gross Product Margin}}$$

c)

## Story Line

The main objective of the report is to understand the current status of the company by analyzing its facilities, sales, and customer status concerning orders, revenue, and cost. The presentation is made for non-technical users and it intends to give a deep understanding of the current position of the company which allows users to make better business plans and strategies to improve future performance. In this report, the user will get the performance information of different facilities for products, profit, and marketing analysis. A business needs to understand the performance of its company in different facilities by continent and country level, which allows them to identify and address the issues by preparing better strategies for facilities with lower profit margins and market penetration. It is vital to understand the sales pattern which helps users to get information concerning the performance of products in the market, at what time the sales faces decline and least performing facilities. Here we also address the possibility of sales and demand in the future. Apart from inspecting different aspects of business, one of the most important aspects is "How a company is targeting its customers?", which means how well a company is addressing the needs of their customers. Customer needs differ from region to region, people in one country may require a product with certain attributes which might not be desired in another country.

## Alternative Story Line

It is important to analyze the correlation of vendors with other parameters based on different facilities by analyzing their effect on sales and revenue. Apart from a marketing strategy, a company must control the product quality by putting a check on vendors which in turn helps the company to increase profit and distribution costs. This check is very important from a financial and company expansion perspective.

We didn't consider this storyline because understanding the revenue based on geographical location is more important as quality may differ from region to region as per the customer purchasing power. Finding out how and where sales are being affected for different products is essential. Also, any company must make good relations with its customer to sustain and grow in the future.

d)

## Site Analysis

In the site analysis page of the report will provide the Facility site details. This report page will allow user to view facility site details by allowing them to filter the plots by the Facility Continent/Region and Facility city. To achieve this interactive feature we added 6 buttons of Facility Continent/Region on the top of Site Analysis report page which makes all the plots Continent specific.

### Fig: 1 Gross Profit Margin by Facility Country/Region sized by Order Margin

The geo map provides us details of Gross Profit Margin and Order Margin by Facility Country/Region, where the size of the circle in each country represents order margin and the shade represents Gross Profit Margin. After selecting the continent from the button user can see the details about the countries for the selected continent. On clicking a country circle in a

selected continent user can make Fig 3 country-specific. This interactive feature allows users to be flexible with facility sites for details.

As per the plot, most European, American, and Oceania countries have good profit margins concerning their order margin, on the other hand, African and Asian nations show lower profits. The US is showing the largest order margin 360mn with good profit margins which is above than average profit margin. ID is showing the least order margin of 45K and gross profit margin of 33% only.

### **Fig: 2 Order Total by Product Line**

The bar graph helps the user to depict the Order Total cost for every product line. Upon clicking the button of Facility continent users can observe Order Total cost for every product line by continent.

Upon selecting the continents EU, NA, and OC we found out that almost all the products are being ordered in the countries of these 3 continents, whereas only 3 products are being sold in other continents. And also there is a huge difference in order total of these 2 groups of continents. This indicates that the company has to devise a plan to increase its sales of other product lines.

### **Fig: 3 Market Penetration, Order Marketing Cost by Facility Country/Region**

The dual-axis bar line chart provides a comparative analysis of Market Penetration and Order Marketing costs for every Facility country in the selected continent. Users can also check the same analysis for a specific country by selecting a country from the geo map.

From this plot, we can see that the market penetration is very less in comparison to the marketing cost in Asian countries, which could be the reason why they have a very low order margin in Asian countries. To compete in the market company has to change its strategies.

## **Sales Analysis**

In the sales analysis page of the report provides the sales details. This part of report will help user to understand the how sales are correlated to other aspects of data items.

### **Fig: 1 Order Margin, Sales Rep Rating by Product Line**

The Tree map visualizes every product line as per shade of Sales Rep Rating and size of Order margin. The intensity of the shade represents the overall Sales Rep Rating given for every product line i.e darker the shade, the better is the rating. The size of every tile represents the Order margin for every product line i.e bigger the tile, more Order Margin.

In this map, we can see that game and figure have the highest order margin and sales rep rating, whereas thrift, promo, plush, and beach have the lowest order margin. the Sales rep rating is approximately the same all across the product line which is a good indication.



### **Fig: 2 Bottom 10 Revenue by Facility Country/Region Code**

The bar graph depicts the aggregated revenue earned by every Facility country.

Through this plot, we observed that the in bottom 10 countries in terms of revenue generation, most of the Asian nations generate the least amount of revenue. This will help to put more emphasis on strategy for Asia.

### **Fig: 3 Sales Rep Orders by Transaction Day of Week grouped by Product Line**

The line chart represents sales rep orders for every product on a weekly basis. Here every color denotes a different product line.

We can see that the sales of product lines like game, plush, figure and thrift faces a decrease in the sales during the last working day of week i.e. Friday whereas gift, figure and game see an increase in sales during Mondays.

### **Fig: 4 Sales Rep Actual, Sales Rep Target by Transaction Year**

The analytic chart shows the forecast of Sales Rep Actual and Sales Rep Target for the next 5 transaction years.

With this plot, we can say that the sales rep actual has been increasing slowly but steadily since the mid-1980s, and the company was not able to meet their set sales targets till now after mid-1985s. This means the company has to set realistic and achievable targets. In forecasting for the next 5 years, the company can reduce the difference between target and actual sales, as per the forecast actual sales will remain the same unless the company makes some organizational changes.

## **Customer Analysis**

In the Customer Analysis page of report provides the satisfaction of customer.

### **Fig: 1 Frequency by Satisfaction**

The pie chart provides frequency of Satisfaction category.

In this chart, we observed that there is a small difference between the Satisfaction category, but it is significant to know that the Bad category is more than of Good category, which is important to address as this indicates that the company brand has a mediocre image and level of satisfaction level among customers.

### **Fig: 2 Bottom 5 Product Make Frequency agg by Satisfaction**

The needle chart provides a visualization of bottom 5 product make frequency by satisfaction category.

Through this chart product make which has more bad reviews can be observed like clips, frames, and inflatable, the company can make some changes on the products as per customer reviews or even drop from the production.

### **Fig: 3 Bottom 3 Facility Continent's Market Penetration, Marketing cost agg by Satisfaction**

The Dual axis bar graph depicts the comparative analysis of market penetration and marketing cost for bottom 3 continents where satisfaction category is bad.

Due to bad satisfaction level in continents like AS, AF and SA market penetration is least even though the marketing cost is high where as in other continents market penetration is better.

## e) Step-by-step explanations of the report built

### Site Analysis

#### Button bar

>objects

-controls

-button bar

> Assign data

-roles

-category : facility continents

>Actions

-object links (linked bar chart and geo map)

#### Fig: 1 Gross Profit Margin by Facility Country/Region sized by Order Margin

>objects

-geo maps

-geo coordinate

>Assign data

-roles

-geography : facility country/region

- size : order margin

-color : gross profit margin

>Actions

-object links (linked dual axis bar chart)

#### Fig: 2 Order Total by Product Line

>objects

-graph

-bar chart

>Assign data

-roles

-category : product line

-measure : order total

- lattice rows : facility continents

### **Fig: 3 Market Penetration, Order Marketing Cost by Facility Country/Region**

```
>objects
  -graphs
    -dual axis bar line chart
>Assign data
  -roles
    -category : facility country/region
    -measure(bar) : market penetration
    -measure(line) : order marketing cost
```

## **Sales Analysis**

### **Fig: 1 Order Margin, Sales Rep Rating by Product Line**

```
>objects
  -graph
    -treemap
> Assign data
  -roles
    - tiles : product line-size : order margin
    -color : sales rep rating
```

### **Fig: 2 Bottom 10 Revenue by Facility Country/Region Code**

```
>objects
  -graph
    -bar chart
>Assign data
  -roles
    -category : facility country/region continents
    -measure : revenue
>ranks
  -new rank : facility country/region
    {bottom count, count= 10, by revenue}
```

### **Fig: 3 Sales Rep Orders by Transaction Day of Week grouped by Product Line**

```
>Objects
  -graphs
    -line chart
>Assign data
  -roles
```

- category : transaction day of week
- measure : sales rep order
- group : product line

**Fig: 4 Sales Rep Actual, Sales Rep Target by Transaction Year**

>Objects

- analytics
- forecasting

>Assign data

- roles
- time axis : transaction year
- measure : sales rep actual : sales rep target

## Customer Analysis

**Fig: 1 Frequency by Satisfaction**

>objects

- graph
- pie chart

>Assign data

- roles
- category : satisfaction
- measure frequency

**Fig: 2 Bottom 5 Product Make Frequency agg by Satisfaction**

>objects

- graph
- needle plot

>Assign data

- roles
- x axis : satisfaction
- y axis : frequency agg
- lattice columns : product make

>ranks

- new rank : product make
- { bottom count, count = 5 , by frequency }

**Fig: 3 Bottom 3 Facility Continent's Market Penetration, Marketing cost agg by Satisfaction**

>objects

```
-graphs
  -dual axis bar chart
>Assign data
  -roles
    -category : satisfaction-measure(bar1) : market penetration
    - measure(bar2) : Marketing cost agg
    -lattice columns : facility continents
>filters
  -new filter : satisfaction
    { bad }
>ranks
  -new rank : facility continents
    { bottom count , count = 3, by marketing cost agg }
```