BVA PROJECT REPORT

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Chapter 1 : Problem Statement
As an analyst for a new toy company, I have conducted a comparative study
using two existing company datasets, Toy Insight Company in SAS Viya.
The aim of this study was to identify key insights that can help our new
company to succeed in the highly competitive toy industry.
Using SAS Viya, I have created two different dashboards to analyse the
datasets. The first dashboard compares the sales performance, customer
demographics, vendor analytics , and product categories of Toy Insight
Company .
Through this comparative study, I have identified several challenges and
opportunities for our new company. While Toy Insight Company has a strong
customer base among young children and their parents.
Based on our results,our new toy company can develop a unique product
portfolio that caters to both young children and teenagers/young adults while
leveraging effective marketing strategies to build a loyal customer base. By
doing so, we can differentiate ourselves from the existing players in the toy
industry and achieve sustainable growth.

Insight Toy company – The INSIGHT TOY SALES data set, contains 57
variables and
1,416,058 observations.

Name	Type	Class	Description
Facility	Character	Category	Unique identifier of the selling facility
Facility City	Character	Category	City where the selling facility is located
Facility Continents	Character	Category	Continent where the selling facility is located
Facility Country/Region	Character	Category	Country where the selling facility is located
Facility Country/Region Code	Character	Category	Unique 2-letter code for each country
Facility Date Closed	Date	Category	If a facility were ever to be closed, none are in this dataset
Facility Date Opened	Date	Category	Date the manufacturing facility was opened, varies from 1980 to 2010
Facility State/Province	Character	Category	State or Province where the selling facility is located
Manufacturing Batch	Character	Category	Manufacturing batch corresponding to each transaction
Manufacturing Batch SKU	Character	Category	Stock Keeping Unit of various Manufacturing Batches
Manufacturing Facility	Character	Category	Identifier and location of the manufacturing facility
Order	Character	Category	Unique identifier of the order
Order note	Character	Document Collection	Free form text – notes taken at the moment the vendor ordered items. This can be used in Text Analytics
Product Brand	Character	Category	2 brands of products: Novelty and Toys
Product Line	Character	Category	8 lines of products, falling in the two product brands
Product Make	Character	Category	77 product make, falling into the 8 product lines
Product SKU	Character	Category	779 product SKUs produced, falling into the various product styles
Product Style	Character	Category	355 product styles, falling into the various product makes
Sales Rep	Character	Category	Identification of the sales representative who made the sale
Transaction Date	Date	Category	Date of the sale
Transaction Day of Week	Date	Category	Day of the week of the sale
Transaction Month of Year	Date	Category	Month of the sale
Vendor	Character	Category	Identifier and location of the vendor (customer)

Vendor Date Ended	Date	Category	When the vendor stopped doing business with us
Vendor Date Started	Date	Category	When the vendor started doing business with us
Vendor Loyalty Program	Character	Category	Binary field (Y/N) representing whether or not this vendor is in our loyalty program
Vendor Type	Character	Category	5 types of vendors: Convenience store, Discount store, Department store, Kiosk or Other
Market Penetration	Numeric	Measure	For each transaction, the corresponding % of market share in that particular region at that time.
Order Distribution Cost	Numeric	Measure	Distribution cost associated with that transaction
Order Marketing Cost	Numeric	Measure	Marketing cost assigned to that transaction (through an activity-based costing exercise)
Order Product Cost	Numeric	Measure	Direct manufacturing costs associated with that transaction. Included I the calculation of gross Margin
Order Sales Cost	Numeric	Measure	Sales-related costs assigned to that transaction (through an activity-based costing exercise)
Order Total	Numeric	Measure	Revenue from that sale
Sales Rep % of Target	Numeric	Measure	A ratio of Sales Rep Actual sales divided by Sales Rep target. Calculated DAILY
Sales Rep Actual	Numeric	Measure	Cumulative DAILY sales for each sales representative. This value should not be summed across the transactions (since it has already been aggregated)
Sales Rep Orders	Numeric	Measure	Number of orders assigned to the sales representative on a given period.
Sales Rep Rating	Numeric	Measure	Subjective evaluation of the sales representative by the vendors - from 0% to 100%.
			Daily sales Target (goal) for each sales representative. This value should

Sales Rep Vendor Base	Numeric	Measure	Potential revenue (funnel) from all the vendors assigned to a sales representative. This value should not be summed across the transactions (since it has already been aggregated)
Sales Rep Vendors	Numeric	Measure	Number of vendors assigned to a sales representative. This value should not be summed across the transactions (since it has already been aggregated)
Vendor Distance	Numeric	Measure	Distance from the vendor location to our selling facility
Vendor Rating	Numeric	Measure	Subjective evaluation, from 0% to 100%, representing the potential value of a customer (vendor) for insight Toy.
Vendor Satisfaction	Numeric	Measure	Satisfaction of the customer (vendor) based on a marketing survey. From 0% to 100%.
xyFacility City Lat	Numeric	Measure	Latitude of the city where the selling facility is located
xyFacility City Lon	Numeric	Measure	Longitude of the city where the selling facility is located
xyFacility Continent Lat	Numeric	Measure	Latitude of the continent where the selling facility is located
xyFacility Continent Lon	Numeric	Measure	Longitude of the continent where the selling facility is located
xyFacility Country/Region Lat	Numeric	Measure	Latitude of the country where the selling facility is located
xyFacility Country/Region Lon	Numeric	Measure	Longitude of the country where the selling facility is located
xyFacility Lat	Numeric	Measure	Latitude where the selling facility is located
xyFacility Lon	Numeric	Measure	Longitude where the selling facility is located
xyFacility State/Province Lat	Numeric	Measure	Latitude of the state where the selling facility is located
xyFacility State/Province Lon	Numeric	Measure	Longitude of the state where the selling facility is located
xyManufacturing Facility Lat	Numeric	Measure	Latitude where the manufactory facility is located
xyManufacturing Facility Lon	Numeric	Measure	Longitude where the manufactory facility is located
xyVendor Lat	Numeric	Measure	Latitude where the vendor is located
xyVendor Lon	Numeric	Measure	Longitude where the vendor is located

Chapter 3: Dashboard Design Process Manual

Step 1 : Importing dataset Megacorp and Insight toy_sales company dataset
1. Log in to your SAS Viya environment and open SAS Visual Analytics.
2. Click on "Create Report" or "Create Dashboard" to start a new project.
3. In the "Data" tab on the right-hand side of the interface, click on "Add Data".
4. In the "Add Data" window, select "Data Table" and choose the library where you saved the Toy Insight Company dataset (either the "SASHELP" library or a library where you imported the dataset).
5. Select the "INSIGHT_TOY_SALES"/ "MegaCorp" dataset and click "Add".
6. Once the dataset is added, it will appear in the "Data" tab under the "Tables" section. You can preview the data by clicking on the dataset name.

Step 2 : creating measures for our dataset

Geography Item:
For a geography item to display the vendor locations, follow these steps:

a. Click on the "Visualisations" tab.
b. Under the "Advanced Charts" section, select the "Map" chart.
c. Drag the "Vendor Latitude" variable to the "Latitude" section and the "Vendor Longitude" variable to the "Longitude" section of the map chart configuration.
d. In the right-hand pane, under "Geo Maps", click on "Geography Items" and
then click "Create New".
e. In the "Create New Geography Item" window, select "Point" as the item type.
f. In the "Latitude" field, select the "Vendor Latitude" variable from the dropdown menu.
g. In the "Longitude" field, select the "Vendor Longitude" variable from the
dropdown menu.

Extracting year value from transaction date using calculated item:

To create a calculated item to extract the year from the transaction date, follow
these steps:
a. Click on the "Data" tab.
b. Locate the "Transaction Date" variable and click on the drop-down arrow.
c. Select "Calculated Item" and give the item a name (e.g. "Transaction Year").
d. In the calculation editor, enter the following formula: year(Transaction Date)

Create a hierarchy:

a. In the Report Designer, select the "Hierarchy" option from the "Objects" panel on the left-hand side.
b. Drag and drop the "Product Brand" variable into the "Parent" field of the
hierarchy.
c. Drag and drop the "Product Line" variable into the "Child" field of the hierarchy.
d. Drag and drop the "Product" variable into the "Grandchild" field of the hierarchy.
e. Customise the appearance of the hierarchy by selecting the "Hierarchy Settings" button in the "Objects" panel.
f. In the "Hierarchy Settings" dialog box, you can adjust the font size,

color,
and style of the hierarchy.

Use of Gauge to display four different types of order cost:

For a gauge chart to display the four different order costs, follow these steps:
a. Click on the "Visualisations" tab.
b. Under the "Basic Charts" section, select the "Gauge Chart".
c. Click and drag each of the four cost variables to the "Value" section of the
gauge chart configuration, one at a time.
d. Customize the gauge chart by adjusting the maximum and minimum values
for each variable, adding titles and labels, or changing the color scheme.
e. To display the gauge chart for a specific order, select any other chart or visualization on the canvas and click on "Interactions" in the right-hand pane.
f. Under "Source", select the variable that represents the order (such as "Order
ID" or "Order Date") and under "Target", select the gauge chart.

Parallel coordinate
To create a parallel coordinate visualisation for product brand vs product

line vs
product make, follow these steps:
a. Click on the "Report Objects" tab on the left-hand side of the interface.
b. Click on "Charts" and select "Parallel Coordinates".
c. Drag and drop the "Product Brand", "Product Line", and "Product Make"
variables from the "Data" tab onto the "Columns" section of the parallel
coordinates chart.
d. Customize the chart by adding titles, labels, or changing the visualization
types.
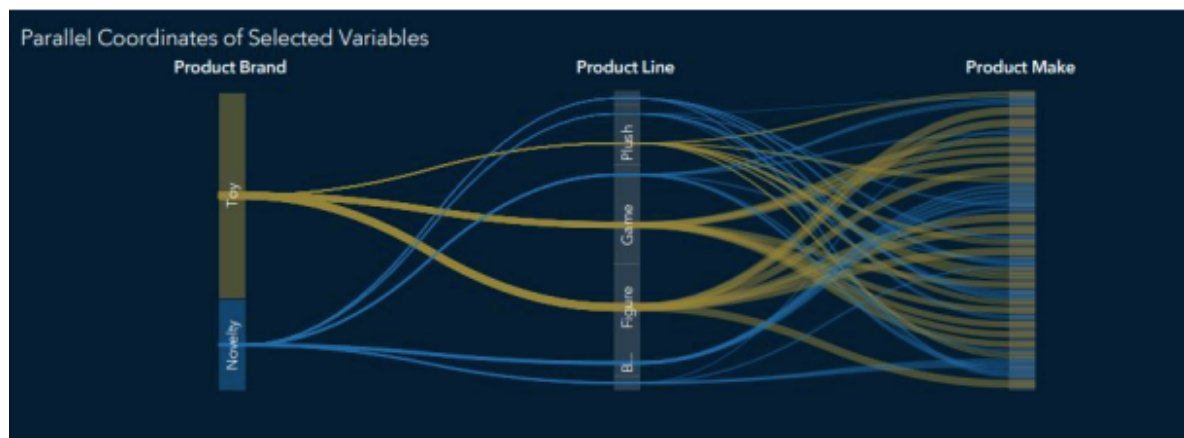
Tree Map
a. In the Report Designer, select the "Tree Map" option from the
"Objects" panel on the left-hand side.
b. Drag and drop the "Hierarchy" object you created in the previous
steps into the "Data" field of the tree map.
c. Drag and drop the "Profit" variable into the "Size" field of the
tree map.
d. Customise the appearance of the tree map by selecting the "Tree
Map Settings" button in the "Objects" panel.
e. In the "Tree Map Settings" dialog box, you can adjust the color
palette, font size, and other display options for the tree map.

Geo coordinate map of facility location:

a. In the Report Designer, select the "Geo–Coordinate Map" option from the "Objects" panel on the left-hand side.
b. Drag and drop the "Latitude" and "Longitude" variables into the "Latitude" and "Longitude" fields of the Geo-Coordinate Map.
c. Drag and drop any other relevant variables into the "Tooltip" field to display information when the user hovers over the location on the map.

d. Customise the appearance of the map by selecting the "Map Settings" button in the "Objects" panel.

Correlation object
a. Click on "Charts" and select "Correlation".
b. Drag and drop the "Order Cost", "Sales Cost", "Product Cost", "Marketing Cost", and "Distribution Cost" variables from the "Data" tab onto the "Columns" section of the correlation chart.
c. Drag and drop the "Sales Rep" variable from the "Data" tab onto the "Rows" section of the correlation chart.
d. Customise the chart by adding titles, labels, or changing the visualisation types

Word Cloud :
a. In the Report Designer, select the "Word Cloud" option from the "Objects" panel on the left-hand side.
b. Drag and drop the variable you want to create a word cloud for (e.g., Product Brand, Product Line, or Product) into the "Text" field of the Word Cloud.
c. Customise the appearance of the word cloud by selecting the "Word Cloud Settings" button in the "Objects" panel.
d. In the "Word Cloud Settings" dialog box, you can adjust the font size, colour, and other display options for the word cloud.
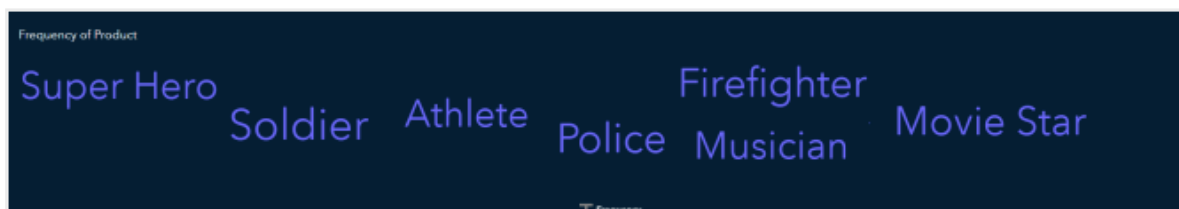
Pie Chart order total vs Product Line
a. In the Report Designer, select the "Pie Chart" option from the "Objects" panel on the left-hand side.
b. Drag and drop the "Product Line" variable into the "Category" field of

the
Pie Chart.
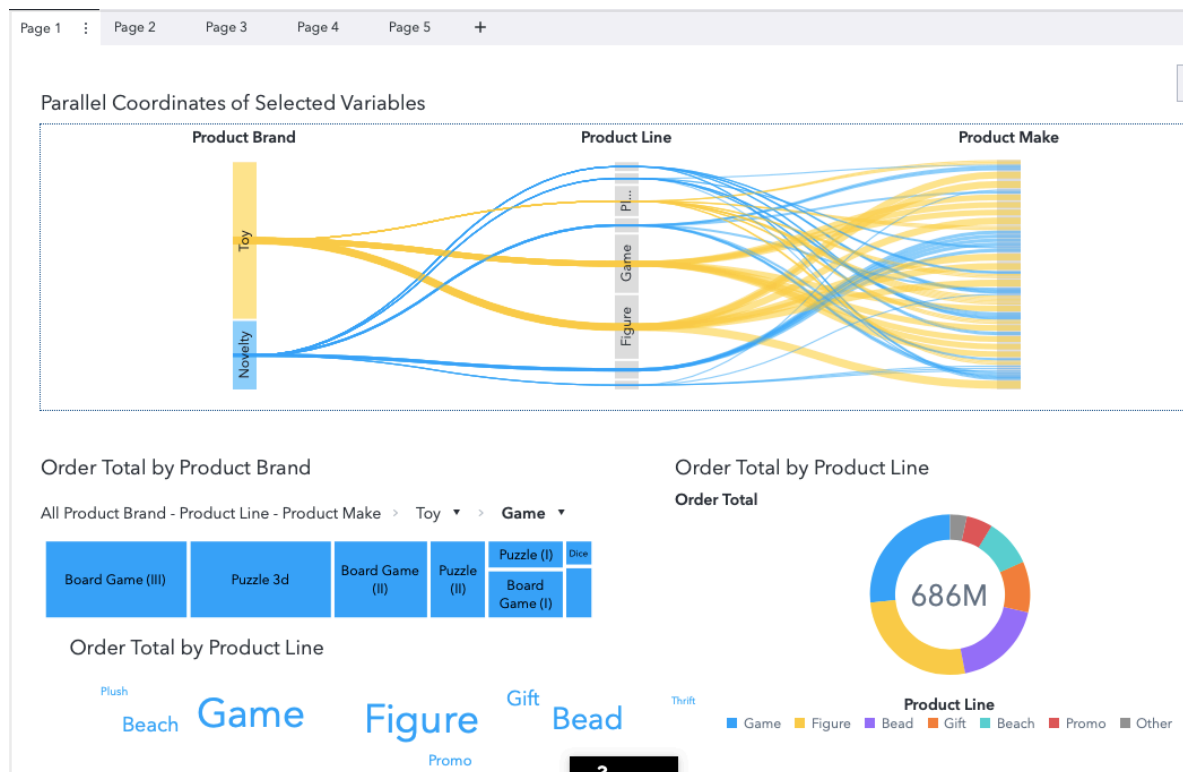c. Drag and drop the "Order Total" variable into the "Values" field of the
Pie
Chart.
d. Customise the appearance of the pie chart by selecting the "Pie Chart
Settings" button in the "Objects" panel.
e. In the "Pie Chart Settings" dialog box, you can adjust the colour palette,
labels, and other display options for the pie chart.
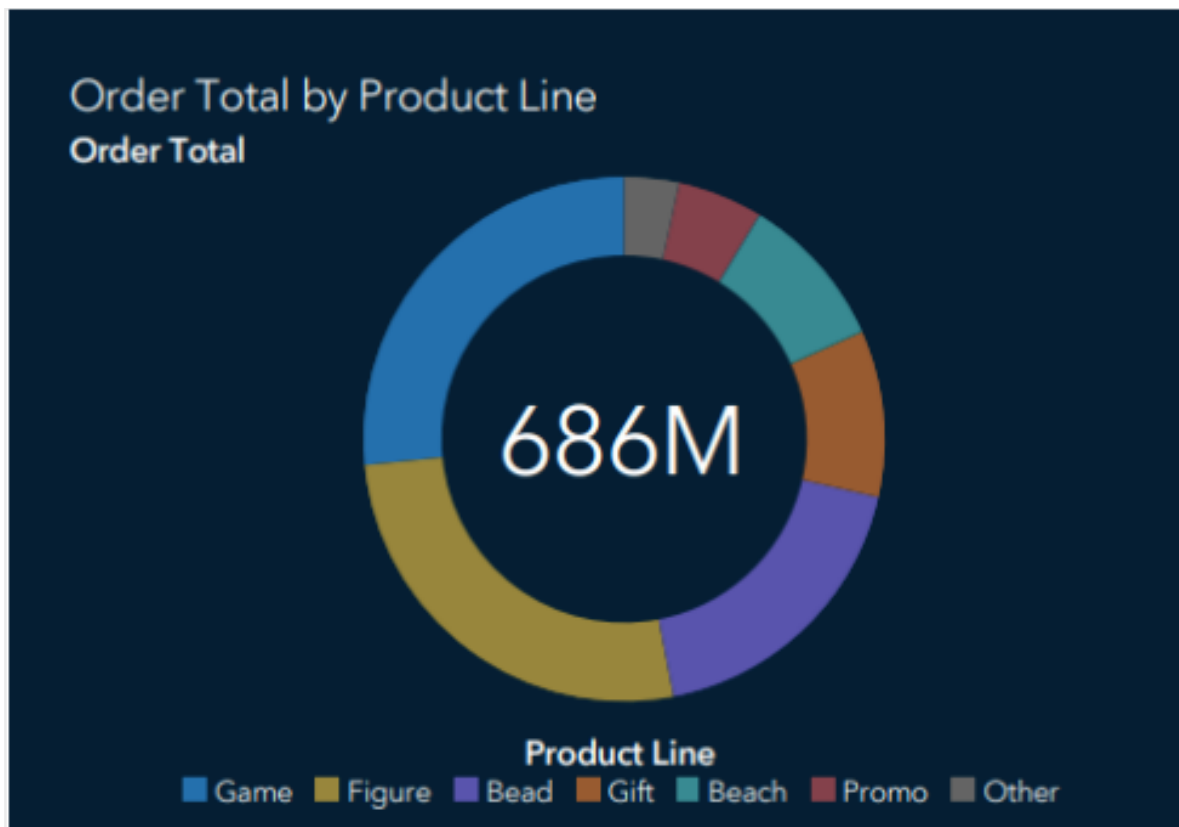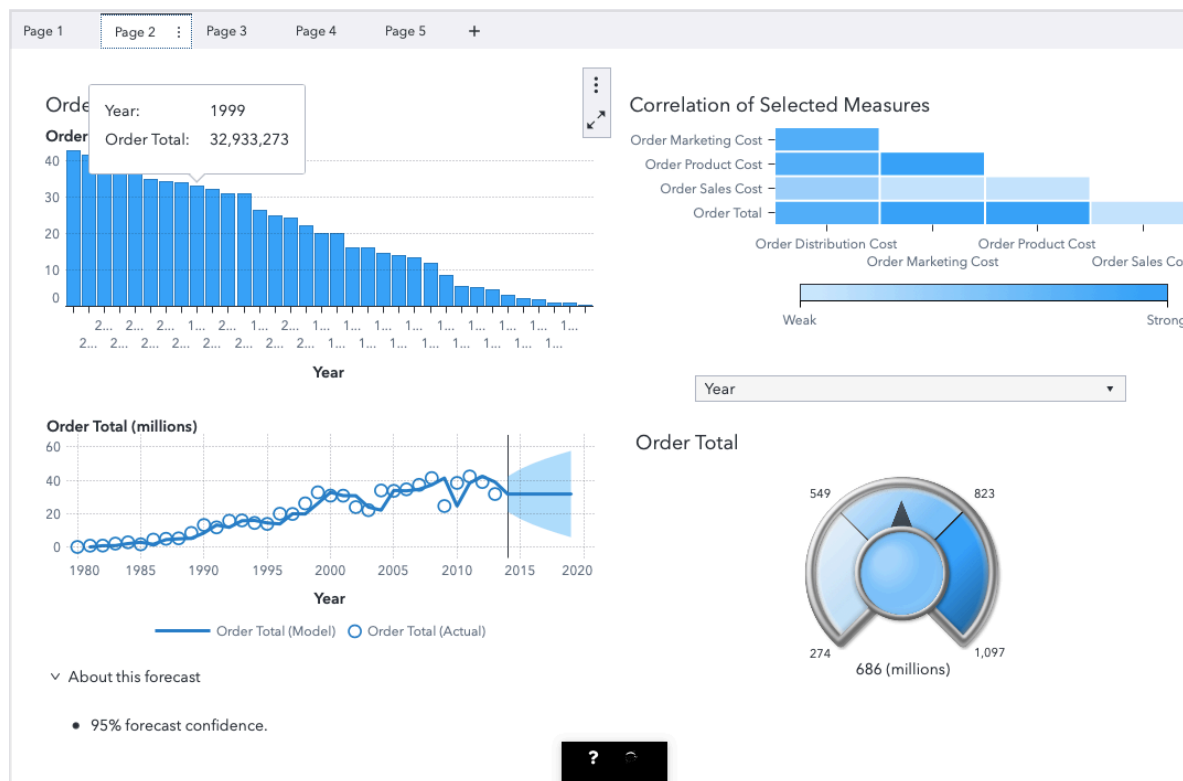

Chapter 4 : Dash Board Output

Page 1:

On the first page of our product we use a parallel coordinate graph, a tree map, a word cloud and a pie chart to depict the different statistics.
The parallel coordinate graph tell us about the different categories of the products sold.The tree map shows us the contribution of each category of the toy to the total order sales(greater the size of the rectangle greater the contribution) while the pie chart is also a representation of the same .
On the first page we get a clear idea of all the products and how much they contribute to the total order sales.

Page 2:

Order
Year: 1999
Order Total: 32,933,273

Correlation of Selected Measures

Order Marketing Cost
Order Product Cost
Order Sales Cost
Order Total

Order Distribution Cost   Order Product Cost
        Order Marketing Cost   Order Sales Co

Weak   Strong

Year ▾

Order Total (millions)

1980 1985 1990 1995 2000 2005 2010 2015 2020
Year

— Order Total (Model)   ○ Order Total (Actual)

⌄ About this forecast

• 95% forecast confidence.

Order Total

549   823

274   1,097
686 (millions)

The second page of our product uses a histogram to show the yearly sales of the company by which we can analyse the trend.
For example if the company's sales have been decreasing the past few years there could be several reasons for the increasing expenses
over the years in the four categories mentioned – order, material, operational, and stalling
expenses.

1. Increased demand: If there has been an increase in demand for Megacorp's products
over the years, it could lead to increased order expenses, as the company may need to
spend more on things like packaging, shipping, and handling to fulfill orders. This could
also result in increased material expenses, as Megacorp may need to purchase more raw
materials to keep up with production.
2. Inflation: Inflation can also play a role in increasing expenses over time. If the cost of
materials, labor, or other expenses associated with production have increased due to
inflation, it could lead to increased expenses in all four categories.
3. Expansion: If Megacorp has expanded its operations over the years, it could lead to

increased operational expenses. This could be due to things like hiring more employees,
opening new production facilities, or investing in new technology to improve efficiency.
4. Maintenance: If Megacorp's production facilities or equipment have aged over the years,
it could result in increased stalling expenses as the company may need to spend more on
maintenance and repairs to keep them running.

We also use the correlation tool to find the the correlation between the independent variables like order sales cost, marketing cost, product cost and order total.
We find that the highest correlation exists between the order total and order production cost as it is represented by the darkest shade.

We then use the forecast tool to predict the future order total sales of the company by plotting the years on x-axis versus the order total on y-axis.
In toy insight company's case the prediction is higher than all the previous years hence the company is most likely to make a profit in the upcoming years.

Page 3:
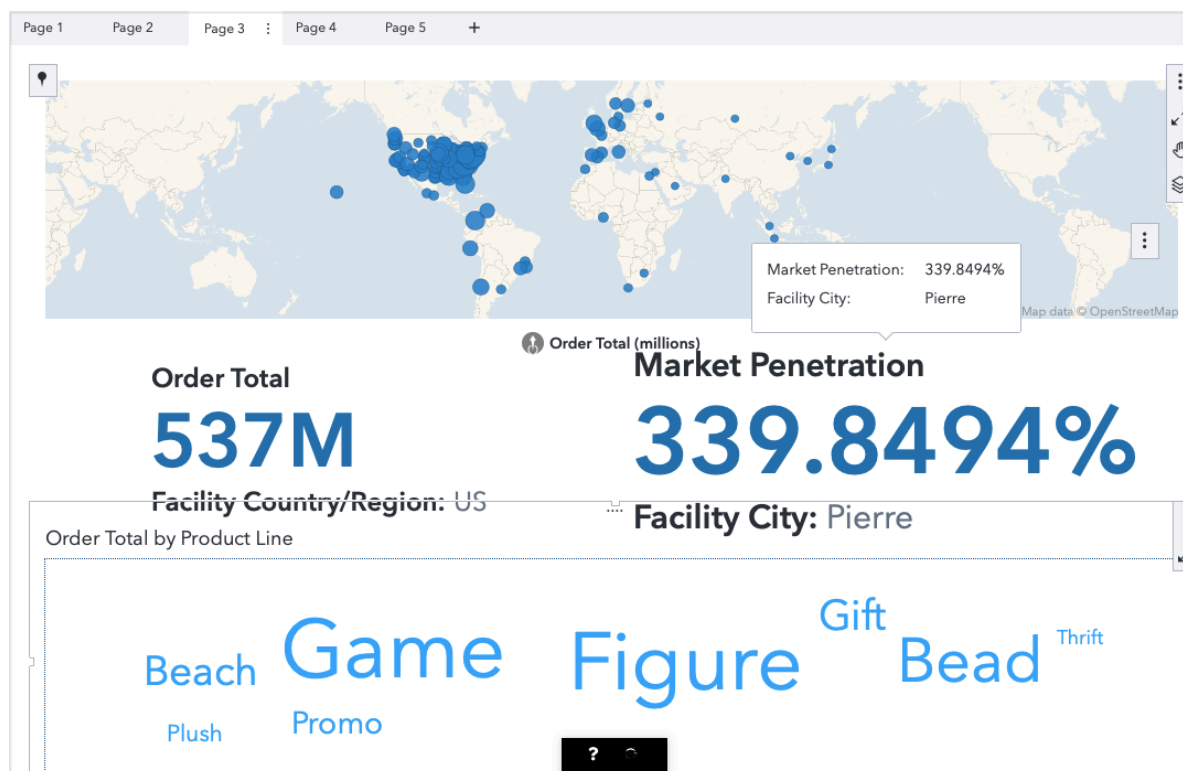
On our 3rd page we use the geo map, which shows the different facility locations on the map and the size of the facility on the map denotes the total order sales that is bigger the marker greater the sales of that facility. When the user selects a particular facility the order total ,facility region, market penetration and facility city are displayed.
This is achieved by using a key value tool and linking it with the geo map. We also use the word cloud tool to show the the contribution of each type of product to the total order sales in that facility.
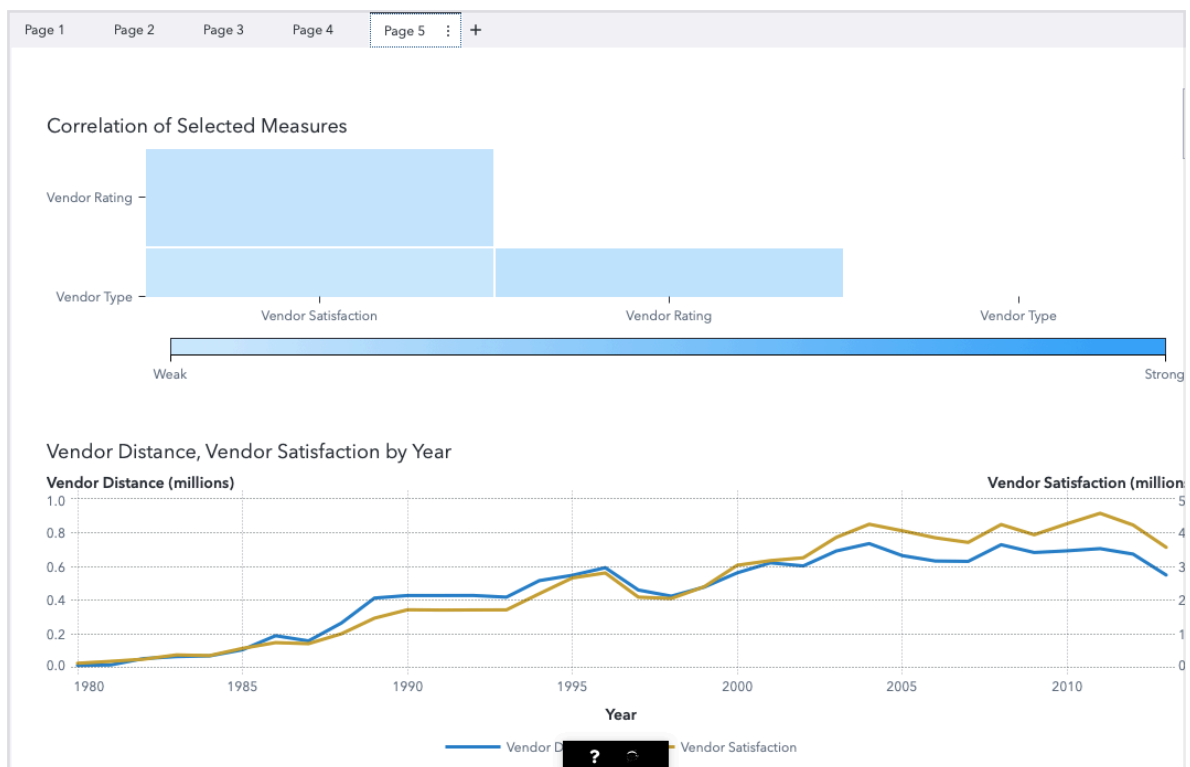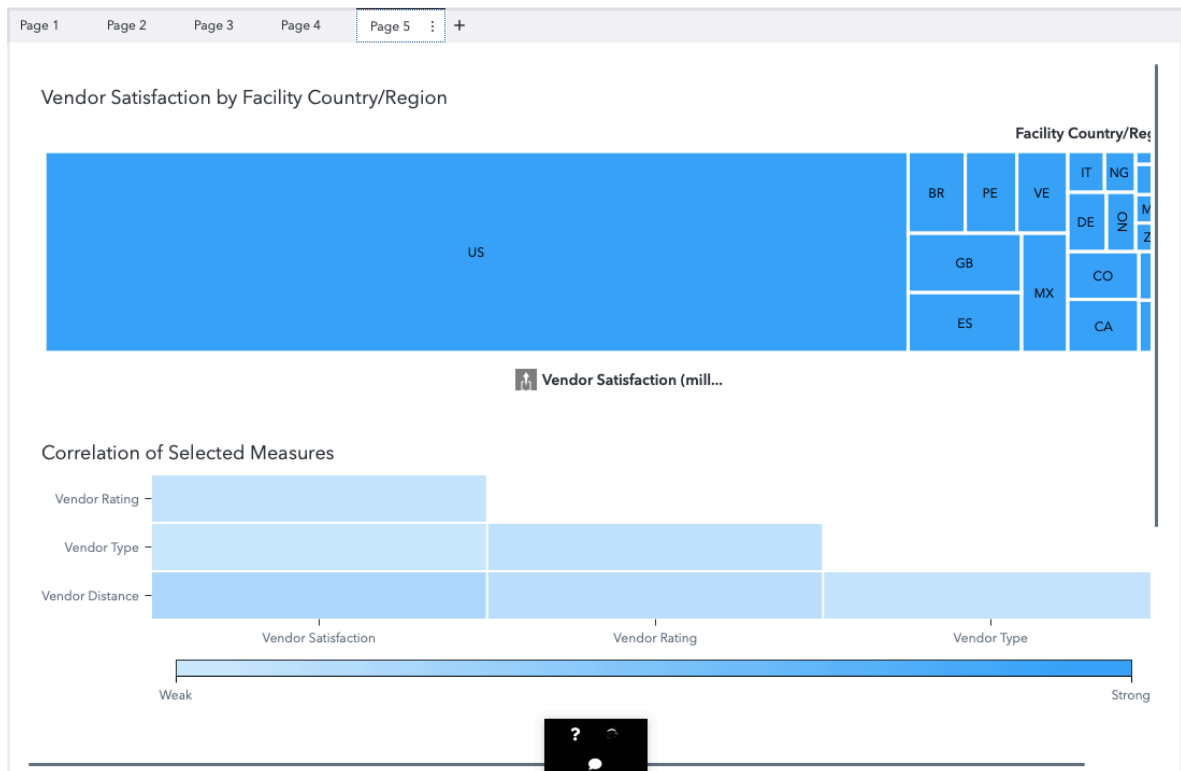
Page4:
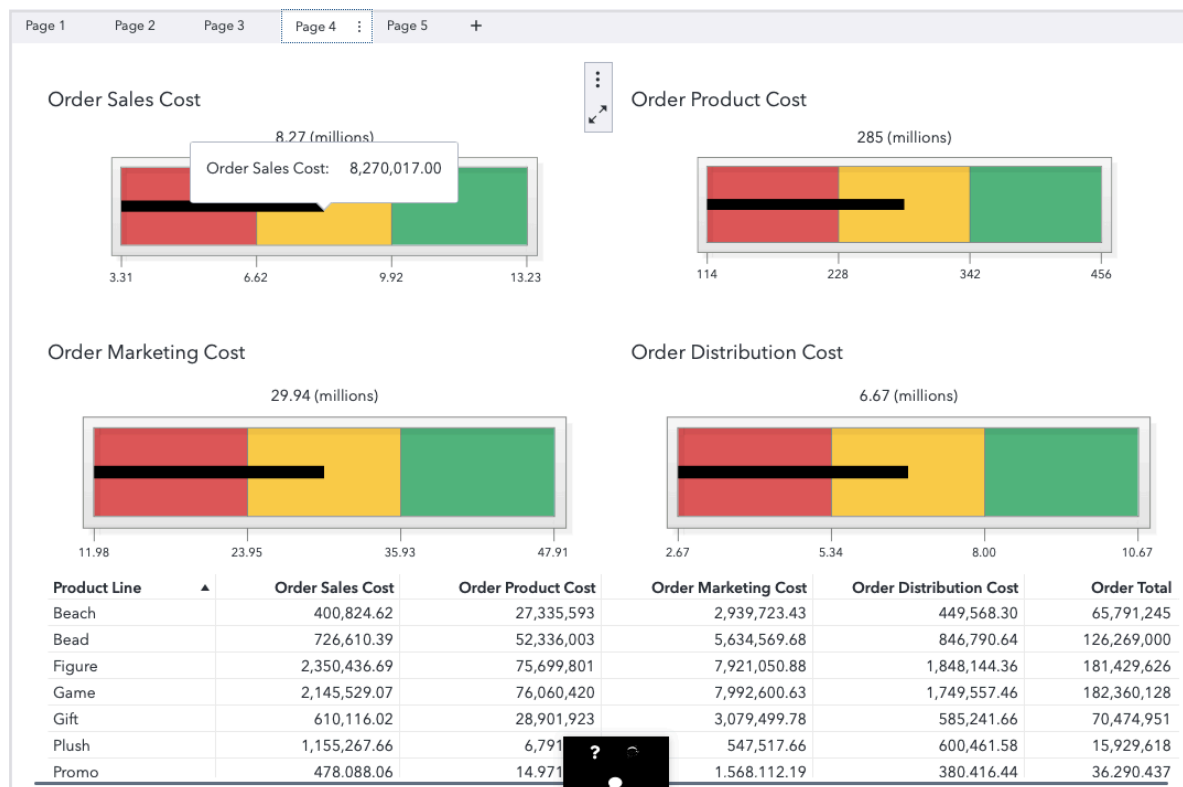
The fourth page is basically to analyse the total order value (order analysis).
On the fourth page we use the gauge tool to show the order sales cost, order product cost, order marketing cost, order distribution cost.
We finally print a table consisting of 6 columns namely product line, order sales cost, order product cost, order marketing cost, order distribution cost and total order cost.
This is done to analyse the different order costs for type of product in a facility to get an idea of the different types of costs curtailed by the company to sell each product.

Page 5:

Vendor Satisfaction by Facility Country/Region

Facility Country/Reg

Vendor Satisfaction (mill...

Correlation of Selected Measures

Weak   Strong

Correlation of Selected Measures

Weak   Strong

Vendor Distance, Vendor Satisfaction by Year

On the fifth page we find the relationship between the vendor satisfaction and different
Variables such as vendor rating, vendor type ,vendor distance.
In the first part we use a tree map to find the country or region which has the most no of satisfied employees (the bigger the rectangle the more satisfied the vendor is).

This shows us that US has the maximum no of satisfied employees.
In the second part we use the correlation tool which gives us the correlation between different variables such as vendor satisfaction, rating, type.
The correlation matrix shows us that the vendor satisfaction is highly correlated to the vendor distance.
Hence in the last part we depict the same reaction through a double axis line graph which shows us that the two variable are highly correlated which is basically the graphical representation of the correlation matrix.