Supply chain analysis

USING PYTHON

Importing important Libraries

```
import pandas as pd
import plotly.express as px
import plotly.io as pio
import plotly.graph_objects as go
pio.templates.default = "plotly_white"
```

Importing dataset

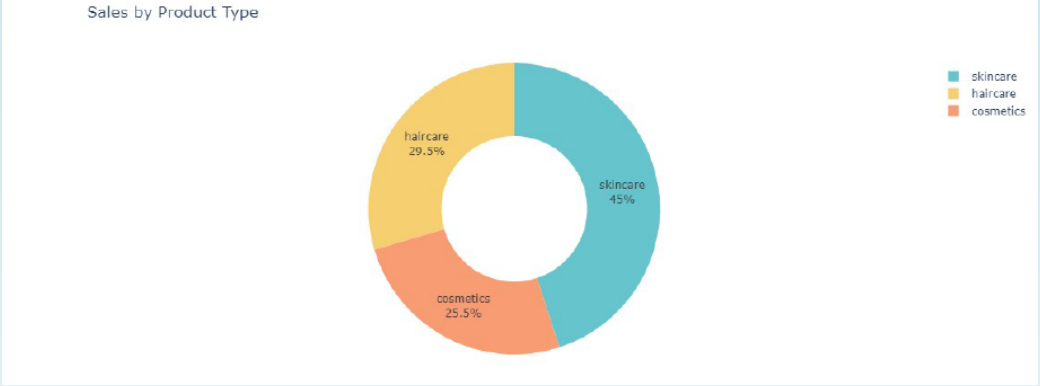
```
data = pd.read_csv("supply_chain_data.csv")

data
```

Relationship between the price of the products and the revenue generated by them

```
fig = px.scatter(data, x='Price',
                 y='Revenue generated',
                 color='Product type',
                 hover_data=['Number of products sold'],
                 trendline='ols')
fig.show()
```

Finding sale percentage by product type

```
sales_data = data.groupby('Product type')['Number of products
sold'].sum().reset_index()
pie_chart = px.pie(sales_data,values = 'Number of products sold',
                   names = 'Product type',
                   title = 'Sales by Product Type',
                   hover_data = ['Number of products sold'],
                   hole = 0.5,
                   width = 500,
                   height = 500,
                   color_discrete_sequence =
px.colors.qualitative.Pastel)

pie_chart.update_traces(textposition='inside',
textinfo='percent+label')
pie_chart.show()
```



Total revenue generated from shipping carriers

```
total_revenue = data.groupby('Shipping carriers')['Revenue
generated'].sum().reset_index()
fig = go.Figure()
fig.add_trace(go.Bar(x=total_revenue['Shipping carriers'],
                     y=total_revenue['Revenue generated']))
fig.update_layout(title='Total Revenue by Shipping Carrier',
                  xaxis_title='Shipping Carrier',
                  yaxis_title='Revenue Generated')
fig.show()
```

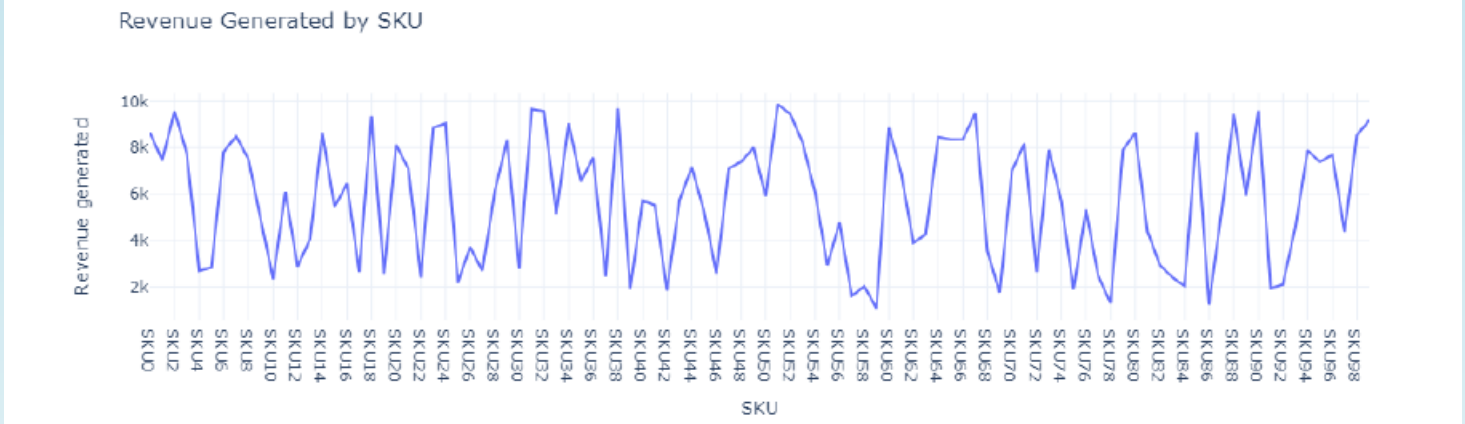
Average lead time and Average Manufacturing Costs for all products of the company

```
avg_lead_time = data.groupby('Product type')['Lead
time'].mean().reset_index()
avg_manufacturing_costs = data.groupby('Product type')['Manufacturing
costs'].mean().reset_index()
result = pd.merge(avg_lead_time, avg_manufacturing_costs, on='Product
type')
result.rename(columns={'Lead time': 'Average Lead Time',
'Manufacturing costs': 'Average Manufacturing Costs'}, inplace=True)

result
```

	Product type	Average Lead Time	Average Manufacturing Costs
0	cosmetics	13.538462	43.052740
1	haircare	18.705882	48.457993
2	skincare	18.000000	48.993157

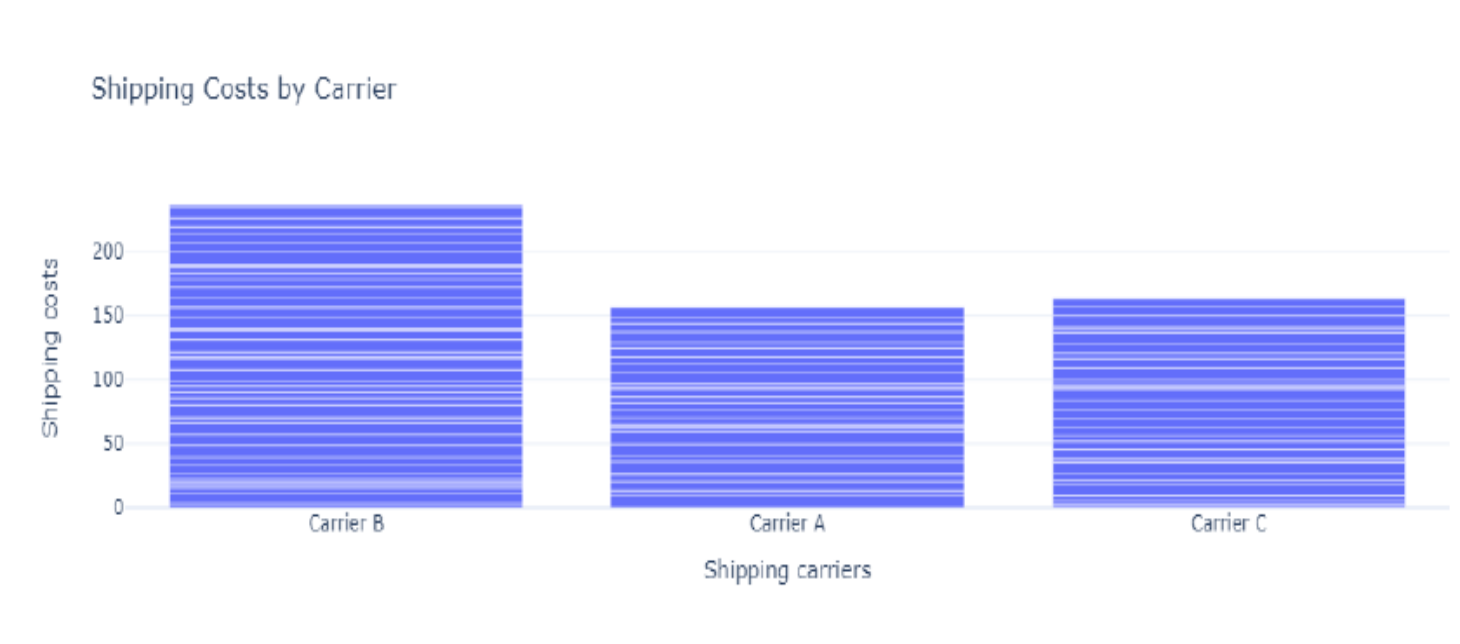
Revenue generated by SKU's

```
# lets analyze the revenue generated by each SKU's
revenue_chart = px.line(data, x='SKU',
                        y='Revenue generated',
                        title='Revenue Generated by SKU')
revenue_chart.show()
```



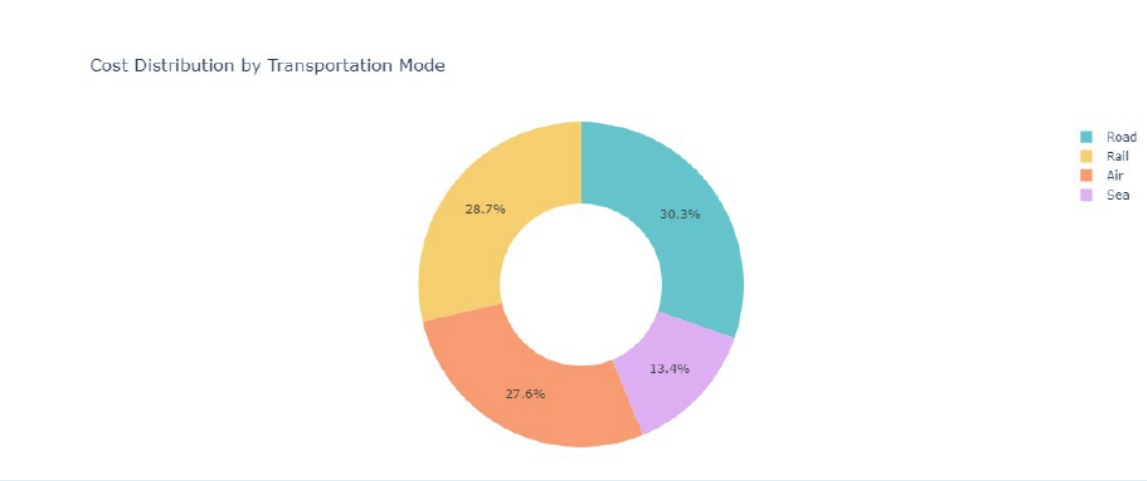
Cost analysis

```
# Shipping cost
shipping_cost_chart = px.bar(data, x='Shipping carriers',
                             y='Shipping costs',
                             title='Shipping Costs by Carrier')
shipping_cost_chart.show()
```



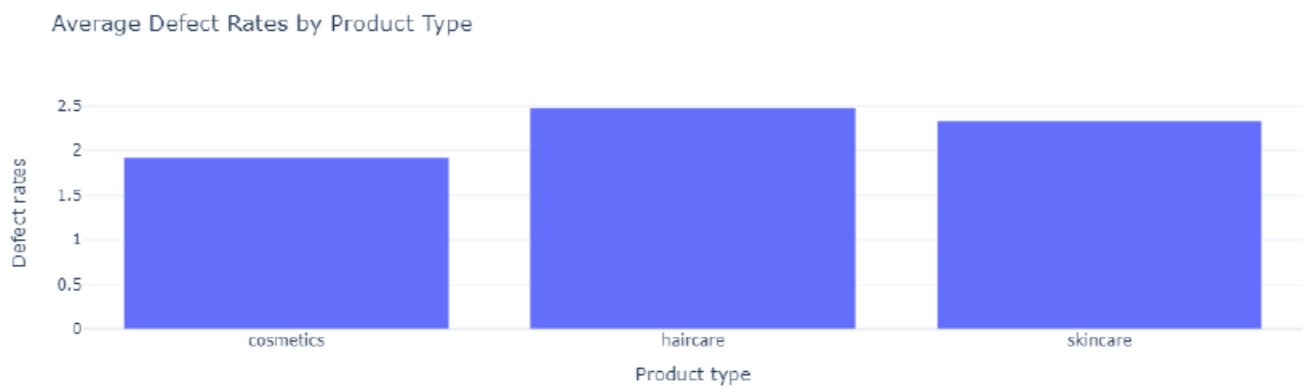
Cost distribution by transportation

```
# let's have a look at the cost distribution by transportation mode
transportation_chart = px.pie(data,
                              values='Costs',
                              names='Transportation modes',
                              title='Cost Distribution by
Transportation Mode',
                              hole=0.5,
                              width = 500,
                              height = 500,

color_discrete_sequence=px.colors.qualitative.Pastel)
transportation_chart.show()
```



Defect rate by product

```
defect_rates_by_product = data.groupby('Product type')['Defect
rates'].mean().reset_index()

fig = px.bar(defect_rates_by_product, x='Product type',
             y='Defect rates',
             title='Average Defect Rates by Product Type')
fig.show()
```



Defect rate by mode of transportation

```
pivot_table = pd.pivot_table(data, values='Defect rates',
                             index=['Transportation modes'],
                             aggfunc='mean')

transportation_chart = px.pie(values=pivot_table["Defect rates"],
                              names=pivot_table.index,
                              title='Defect Rates by Transportation
Mode',
                              hole=0.5,
                              width = 800,
                              height = 500,

color_discrete_sequence=px.colors.qualitative.Pastel)
transportation_chart.show()
```