In [10]:
```
import pandas as pd
```

In [11]:
```
df = pd.read_csv("Data/Report_Data_cleaned.csv")
df
```

Out[11]:

	Company	Year	Total Revenue	Net Income	Total Assets	Total Liabilities	Cash F
0	Microsoft	2024	245,122,000,000	88,136,000,000	512,163,000,000	243,686,000,000	118,548,000
1	Microsoft	2023	211,915,000,000	72,361,000,000	411,976,000,000	205,753,000,000	87,582,000
2	Microsoft	2022	198,270,000,000	72,738,000,000	364,840,000,000	198,298,000,000	89,035,000
3	Tesla	2024	97,690,000,000	7,153,000,000	122,070,000,000	48,390,000,000	14,923,000
4	Tesla	2023	96,773,000,000	14,974,000,000	106,618,000,000	43,009,000,000	13,256,000
5	Tesla	2022	81,462,000,000	12,587,000,000	82,338,000,000	36,440,000,000	14,724,000
6	Apple	2024	391,035,000,000	93,736,000,000	364,980,000,000	308,030,000,000	118,254,000
7	Apple	2023	383,285,000,000	96,995,000,000	352,583,000,000	290,437,000,000	110,543,000
8	Apple	2022	394,328,000,000	99,803,000,000	352,755,000,000	302,083,000,000	122,151,000

In [12]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 9 entries, 0 to 8
Data columns (total 7 columns):
 #   Column             Non-Null Count  Dtype 
---  ------             --------------  ----- 
 0   Company            9 non-null      object
 1   Year               9 non-null      int64 
 2   Total Revenue      9 non-null      object
 3   Net Income         9 non-null      object
 4   Total Assets       9 non-null      object
 5   Total Liabilities  9 non-null      object
 6   Cash Flow          9 non-null      object
dtypes: int64(1), object(6)
memory usage: 632.0+ bytes
```

In [13]:
```
def remove_commas(value):
    value = value.split(',')
    value = ''.join(value)
    return int(value)
for col in df.columns:
    if col not in ["Company", "Year"]:
        df[col] = df[col].map(remove_commas)
```

In [14]:
```
1 df
```

Out[14]:

	Company	Year	Total Revenue	Net Income	Total Assets	Total Liabilities	Cash Flow
0	Microsoft	2024	245122000000	88136000000	512163000000	243686000000	118548000000
1	Microsoft	2023	211915000000	72361000000	411976000000	205753000000	87582000000
2	Microsoft	2022	198270000000	72738000000	364840000000	198298000000	89035000000
3	Tesla	2024	97690000000	7153000000	122070000000	48390000000	14923000000
4	Tesla	2023	96773000000	14974000000	106618000000	43009000000	13256000000
5	Tesla	2022	81462000000	12587000000	82338000000	36440000000	14724000000
6	Apple	2024	391035000000	93736000000	364980000000	308030000000	118254000000
7	Apple	2023	383285000000	96995000000	352583000000	290437000000	110543000000
8	Apple	2022	394328000000	99803000000	352755000000	302083000000	122151000000

In [15]:
```
1 df = df.sort_values(['Company','Year'],ascending=True).groupby('Company')
2 df
```

Out[15]:

	Company	Year	Total Revenue	Net Income	Total Assets	Total Liabilities	Cash Flow
8	Apple	2022	394328000000	99803000000	352755000000	302083000000	122151000000
7	Apple	2023	383285000000	96995000000	352583000000	290437000000	110543000000
6	Apple	2024	391035000000	93736000000	364980000000	308030000000	118254000000
2	Microsoft	2022	198270000000	72738000000	364840000000	198298000000	89035000000
1	Microsoft	2023	211915000000	72361000000	411976000000	205753000000	87582000000
0	Microsoft	2024	245122000000	88136000000	512163000000	243686000000	118548000000
5	Tesla	2022	81462000000	12587000000	82338000000	36440000000	14724000000
4	Tesla	2023	96773000000	14974000000	106618000000	43009000000	13256000000
3	Tesla	2024	97690000000	7153000000	122070000000	48390000000	14923000000

In [16]:
```
df_revenue = pd.DataFrame(columns=['Company','Year','Total Revenue','Reve
df_revenue['Company'] = df['Company']
df_revenue['Year'] = df['Year']
df_revenue['Total Revenue'] = df['Total Revenue']
df_revenue['Revenue Growth (%)'] = df.groupby(['Company'])['Total Revenue
df_revenue
```

Out[16]:

	Company	Year	Total Revenue	Revenue Growth (%)
8	Apple	2022	394328000000	NaN
7	Apple	2023	383285000000	-2.800461
6	Apple	2024	391035000000	2.021994
2	Microsoft	2022	198270000000	NaN
1	Microsoft	2023	211915000000	6.882030
0	Microsoft	2024	245122000000	15.669962
5	Tesla	2022	81462000000	NaN
4	Tesla	2023	96773000000	18.795267
3	Tesla	2024	97690000000	0.947578

Trends for each company based on revenue growth:

-Apple: Revenue dipped in 2023 but slightly rebounded in 2024, indicating modest recovery.
-Microsoft: Steady and accelerating revenue growth over the three years, showing strong momentum.
-Tesla: Explosive growth in 2023 slowed sharply in 2024, signaling a plateau in expansion.

In [17]:
```
df_income = pd.DataFrame(columns=['Company','Year','Net Income','Net Inco
df_income['Company'] = df['Company']
df_income['Year'] = df['Year']
df_income['Net Income'] = df['Net Income']
df_income['Net Income Growth (%)'] = df.groupby(['Company'])['Net Income'
df_income
```

Out[17]:

	Company	Year	Net Income	Net Income Growth (%)
8	Apple	2022	99803000000	NaN
7	Apple	2023	96995000000	-2.813543
6	Apple	2024	93736000000	-3.359967
2	Microsoft	2022	72738000000	NaN
1	Microsoft	2023	72361000000	-0.518299
0	Microsoft	2024	88136000000	21.800417
5	Tesla	2022	12587000000	NaN
4	Tesla	2023	14974000000	18.964010
3	Tesla	2024	7153000000	-52.230533

Insights for Net Income trends across the three companies:

-Apple: Net income has declined steadily over the past two years, signaling profitability pressure.
-Microsoft: After a slight dip in 2023, net income surged in 2024, reflecting strong earnings recovery.
-Tesla: Net income peaked in 2023 but plummeted in 2024, indicating significant profitability

In [18]:
```
df_assets = pd.DataFrame(columns=['Company','Year','Total Assets','Total A
df_assets['Company'] = df['Company']
df_assets['Year'] = df['Year']
df_assets['Total Assets'] = df['Total Assets']
df_assets['Total Assets Growth (%)'] = df.groupby(['Company'])['Total Asse
df_assets
```

Out[18]:

	Company	Year	Total Assets	Total Assets Growth (%)
8	Apple	2022	352755000000	NaN
7	Apple	2023	352583000000	-0.048759
6	Apple	2024	364980000000	3.516052
2	Microsoft	2022	364840000000	NaN
1	Microsoft	2023	411976000000	12.919636
0	Microsoft	2024	512163000000	24.318650
5	Tesla	2022	82338000000	NaN
4	Tesla	2023	106618000000	29.488207
3	Tesla	2024	122070000000	14.492862

Insights for Total Assets growth trends:

-Apple: Asset base remained nearly flat in 2023 but grew moderately in 2024, reflecting stability with slight expansion.
-Microsoft: Strong and accelerating asset growth over three years, indicating aggressive investment and scaling.
-Tesla: Rapid asset growth in 2023 continued in 2024, though at a slower pace, showing ongoing infrastructure buildup.

In [19]:
```
df_liability = pd.DataFrame(columns=['Company','Year','Total Liabilities'
df_liability['Company'] = df['Company']
df_liability['Year'] = df['Year']
df_liability['Total Liabilities'] = df['Total Liabilities']
df_liability['Total Liabilities Growth (%)'] = df.groupby(['Company'])['T
df_liability
```

Out[19]:

	Company	Year	Total Liabilities	Total Liabilities Growth (%)
8	Apple	2022	302083000000	NaN
7	Apple	2023	290437000000	-3.855232
6	Apple	2024	308030000000	6.057424
2	Microsoft	2022	198298000000	NaN
1	Microsoft	2023	205753000000	3.759493
0	Microsoft	2024	243686000000	18.436183
5	Tesla	2022	36440000000	NaN
4	Tesla	2023	43009000000	18.026894
3	Tesla	2024	48390000000	12.511335

Insights for Total Liabilities growth trends:

-Apple: Liabilities declined in 2023 but rose again in 2024, indicating short-term deleveraging followed by re-leveraging.
-Microsoft: Consistent rise in liabilities, with a notable jump in 2024, suggesting increased financing or expansion activities.
-Tesla: Liabilities grew steadily across all three years, reflecting continued scaling and capital expenditure.

In [20]:
```
df_cashflow = pd.DataFrame(columns=['Company','Year','Cash Flow','Cash Fl
df_cashflow['Company'] = df['Company']
df_cashflow['Year'] = df['Year']
df_cashflow['Cash Flow'] = df['Cash Flow']
df_cashflow['Cash Flow Growth (%)'] = df.groupby(['Company'])['Cash Flow'
df_cashflow
```

Out[20]:

	Company	Year	Cash Flow	Cash Flow Growth (%)
8	Apple	2022	122151000000	NaN
7	Apple	2023	110543000000	-9.502992
6	Apple	2024	118254000000	6.975566
2	Microsoft	2022	89035000000	NaN
1	Microsoft	2023	87582000000	-1.631942
0	Microsoft	2024	118548000000	35.356580
5	Tesla	2022	14724000000	NaN
4	Tesla	2023	13256000000	-9.970117
3	Tesla	2024	14923000000	12.575438

Insights for Cash Flow from Operating Activities trends:

Apple: Cash flow dipped in 2023 but recovered in 2024, indicating renewed operational strength.
Microsoft: Slight decline in 2023 was followed by a major surge in 2024, reflecting robust business performance.
Tesla: Operational cash flow dropped in 2023 but bounced back in 2024, showing resilience despite profitability issues.

In [ ]:
```
1
```