Introduction

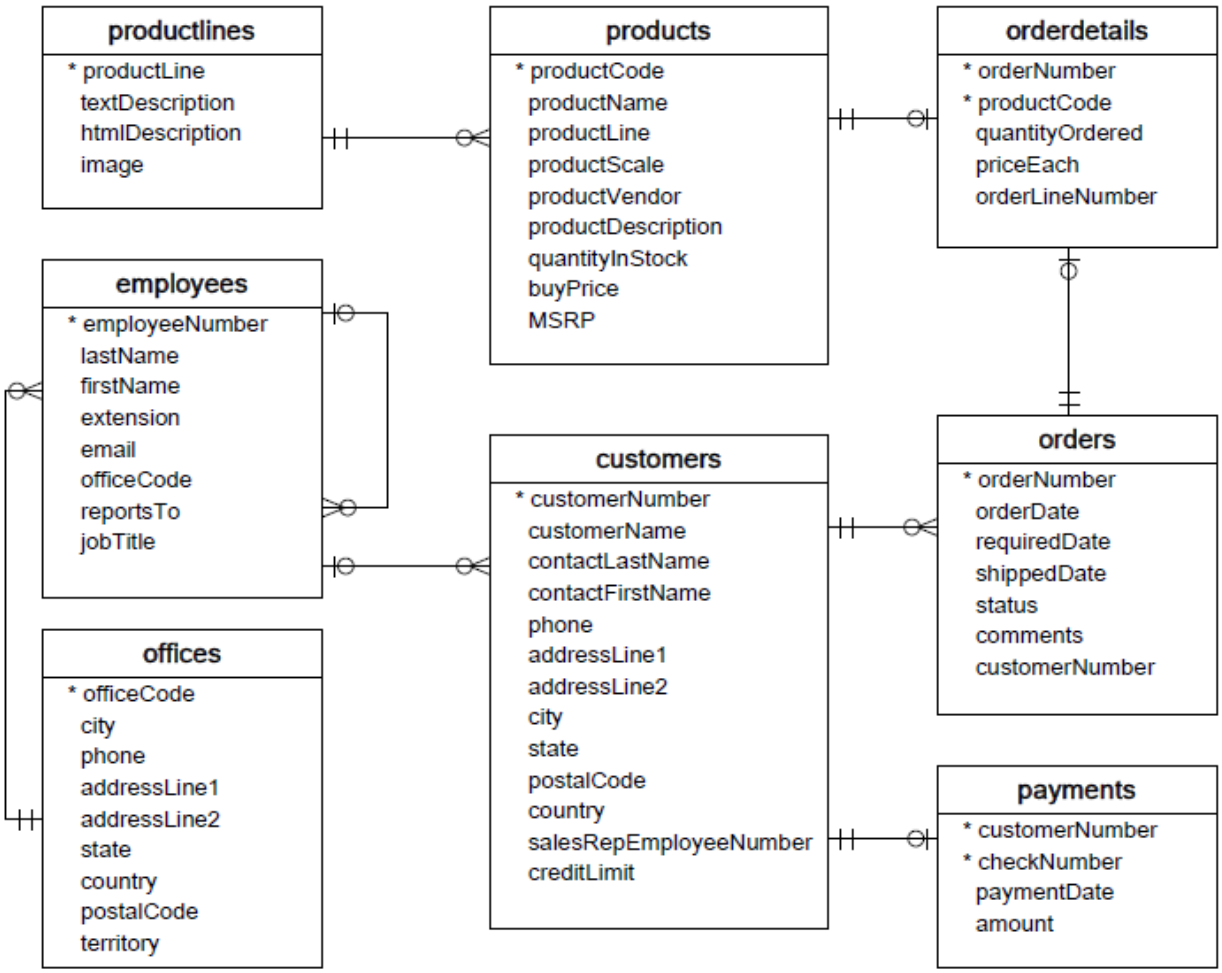
This report analyzes the financial performance of a business by calculating key metrics such as ROI, total cost of production, profit margins, and total revenue. The analysis is based on a dataset that includes information on product sales, production costs, and other relevant financial data. By examining these metrics, the report aims to identify areas of strength and weakness within the business and provide recommendations for improving its financial performance. The findings of this report can be used to inform strategic decision-making and drive the company towards greater profitability and success.

In [13]:
```
import pandas as pd
```

In [27]:
```
%%capture
!pip install ipython-sql sqlalchemy
from sqlalchemy import create_engine
engine = create_engine('sqlite:///data2.sqlite')
%load_ext sql
%sql sqlite:///data2.sqlite
```

CRM Database ERD

Once again, here's the schema for the CRM database you'll continue to practice with.



In [22]:
```
## This will display the table contained in the dataset.
from sqlalchemy import inspect
insp=inspect(engine)
insp.get_table_names()
```

Out[22]:
```
['customers',
 'employees',
 'offices',
 'orderdetails',
 'orders',
 'payments',
 'productlines',
 'products']
```

Total number of Orders for each product name

In [4]:
```
%%sql
    SELECT p.productName,count(od.quantityOrdered) as totalNumberOrder
    FROM products as p
    INNER JOIN orderdetails as od on p.productCode=od.productCode
    GROUP BY p.productName
    ORDER BY totalNumberOrders DESC
;
```

```
 * sqlite:///data2.sqlite
Done.
```

Out[4]:

productName	totalNumberOrders
1992 Ferrari 360 Spider red	53
P-51-D Mustang	28
HMS Bounty	28
F/A 18 Hornet 1/72	28
Diamond T620 Semi-Skirted Tanker	28
Corsair F4U (Bird Cage)	28
Boeing X-32A JSF	28
American Airlines: MD-11S	28
American Airlines: B767-300	28
America West Airlines B757-200	28

From the above query, we can see that 1992 Ferrari 360 Spider red is the most popular products, followed by P-51-D

What is the total Revenue of each product in the inventory

In [75]:
```
%%sql
    SELECT p.productName, ROUND(SUM(od.priceEach * od.quantityOrdered)
    FROM products as p
    INNER JOIN orderdetails as od on p.productCode=od.productCode
    GROUP BY p.productName
    ORDER BY totalRevenue DESC
;
```

```
 * sqlite:///data2.sqlite
Done.
```

Out[75]:

productName	totalRevenue
1992 Ferrari 360 Spider red	276839.98
2001 Ferrari Enzo	190755.86
1952 Alpine Renault 1300	190017.96
2003 Harley-Davidson Eagle Drag Bike	170686.0
1968 Ford Mustang	161531.48
1969 Ford Falcon	152543.02
1980s Black Hawk Helicopter	144959.91
1998 Chrysler Plymouth Prowler	142530.63
1917 Grand Touring Sedan	140535.6
2002 Suzuki XREO	135767.03

What is the total Cost of producing each product in the inventory

In [31]:
```
%%sql
SELECT p.productName, ROUND(SUM(p.buyPrice * od.quantityOrdered),3) as
FROM products as p
INNER JOIN orderdetails as od on p.productCode=od.productCode
GROUP BY p.productName
ORDER BY totalCost DESC
;
```

```
 * sqlite:///data2.sqlite
Done.
```

Out[31]:

productName	totalCost
1992 Ferrari 360 Spider red	140843.2
1956 Porsche 356A Coupe	103411.6
1998 Chrysler Plymouth Prowler	100088.86
2001 Ferrari Enzo	97406.21
1962 LanciaA Delta 16V	96387.44
1952 Alpine Renault 1300	94735.38
1940s Ford truck	89930.36
2003 Harley-Davidson Eagle Drag Bike	89654.7
1968 Ford Mustang	88952.22
1972 Alfa Romeo GTA	88250.4

What is the profit of each product in the inventory?

In [36]:
```
%%sql
   WITH totalCost AS (
    SELECT p.productName, SUM(p.buyPrice * od.quantityOrdered) AS tota
    FROM products AS p
    INNER JOIN orderdetails AS od ON p.productCode = od.productCode
    GROUP BY p.productName
), totalRevenue AS (
    SELECT p.productName, SUM(od.priceEach * od.quantityOrdered) AS to
    FROM products AS p
    INNER JOIN orderdetails AS od ON p.productCode = od.productCode
    GROUP BY p.productName
)

SELECT p.productName, ROUND(totalRevenue - totalCost, 2) AS totalProfi
FROM products AS p
INNER JOIN totalCost tc ON p.productName = tc.productName
INNER JOIN totalRevenue tr ON p.productName = tr.productName
ORDER BY totalProfit DESC;
```

```
 * sqlite:///data2.sqlite
Done.
```

Out[36]:

productName	totalProfit
1992 Ferrari 360 Spider red	135996.78
1952 Alpine Renault 1300	95282.58
2001 Ferrari Enzo	93349.65
2003 Harley-Davidson Eagle Drag Bike	81031.3
1968 Ford Mustang	72579.26
1969 Ford Falcon	72399.77
1928 Mercedes-Benz SSK	68423.18
2002 Suzuki XREO	67641.47
1980s Black Hawk Helicopter	64599.11
1948 Porsche Type 356 Roadster	62725.78

The products with higher profit are "1992 Ferrari 360 Spider red", "1952 Alpine Renault 1300",and "2001 Ferrari Enzo"

What is the profit margins of each product

In [ ]:
```
##profit margins= (totalProfit/TotalRevenue)*100%
```

In [35]:
```
%%sql
   WITH totalProfit AS (
    SELECT p.productName, SUM(od.priceEach * od.quantityOrdered) - SUM
    FROM products AS p
    INNER JOIN orderdetails AS od ON p.productCode = od.productCode
    GROUP BY p.productName
), totalRevenue AS (
    SELECT p.productName, SUM(od.priceEach * od.quantityOrdered) AS to
    FROM products AS p
    INNER JOIN orderdetails AS od ON p.productCode = od.productCode
    GROUP BY p.productName
)

SELECT tp.productName, ROUND((tp.totalProfit / tr.totalRevenue) * 100,
FROM totalProfit tp
INNER JOIN totalRevenue tr ON tp.productName = tr.productName
ORDER BY profitMargins DESC;
```

```
 * sqlite:///data2.sqlite
Done.
```

Out[35]:

productName	profitMargins
1961 Chevrolet Impala	55.99
1937 Horch 930V Limousine	55.97
1926 Ford Fire Engine	55.46
1970 Plymouth Hemi Cuda	54.75
1936 Harley Davidson El Knucklehead	54.2
2002 Yamaha YZR M1	53.99
1950's Chicago Surface Lines Streetcar	53.61
1982 Lamborghini Diablo	52.18
1999 Indy 500 Monte Carlo SS	51.84
1928 Mercedes-Benz SSK	51.73

The profit margin of the 1961 Chevrolet Impala, which was calculated to be 55.99%, it means that for every dollar of revenue generated by the sale of the car, 55.99 cents were profit.

Although "1992 Ferrari 360 Spider red" have a higher total profit and higher amount of order , it has a low profit margins compare to other products in the automobile industry. The reason is that it has a high production cost. The cost of producing that car is $140843.2. It is higher than other products in the luxury cars.

After analyzing the profit margins of each product, we will examine the return on investment of each one to determine the best investment opportunities.

In [ ]:
```
## ROI = (final sale price - initial investment) / initial investment
```

In [39]:
```
%%sql
   WITH totalRevenue AS (
    SELECT p.productName, SUM(od.priceEach * od.quantityOrdered) AS to
    FROM products AS p
    INNER JOIN orderdetails AS od ON p.productCode = od.productCode
    GROUP BY p.productName
),totalCost AS (
    SELECT p.productName, SUM(p.buyPrice * od.quantityOrdered) AS tota
    FROM products AS p
    INNER JOIN orderdetails AS od ON p.productCode = od.productCode
    GROUP BY p.productName
)

SELECT tr.productName, ROUND((tr.totalRevenue - tc.totalCost) / tc.tot
FROM totalRevenue tr
INNER JOIN totalCost tc ON tr.productName = tc.productName
ORDER BY returnOnInvestments DESC;
```

```
 * sqlite:///data2.sqlite
Done.
```

Out[39]:

productName	returnOnInvestments
1961 Chevrolet Impala	127.2
1937 Horch 930V Limousine	127.12
1926 Ford Fire Engine	124.51
1970 Plymouth Hemi Cuda	121.0
1936 Harley Davidson El Knucklehead	118.33
2002 Yamaha YZR M1	117.34
1950's Chicago Surface Lines Streetcar	115.54
1982 Lamborghini Diablo	109.12
1999 Indy 500 Monte Carlo SS	107.65
1928 Mercedes-Benz SSK	107.16

The Return on Investment(ROI) on the 1961 Chevrolet Impala is approximately 127.2 %. An ROI of 127.2% indicates that the investment in the 1961 Chevrolet Impala has yielded a profit of 127.2% of the initial investment of 30,422.53. It has generated a significant profit compared to initial investment. Looking at the total revenue of this product, 1961 Chevrolet Impala total revenue is quite high. It generate 69,120.97 of total revenue. This suggest that this product is a potentially lucrative for future investment.