

## **Datacoach SQL Case Study**

### **Customer Base Audit (Challenge-8)**

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#### **Introduction:**

As a Customer Insights Analyst, I've embarked on an essential task: conducting a comprehensive customer base audit. The objective is to ensure that our executives have a deep understanding of our customer base dynamics. This multifaceted challenge comprises two key components: first, utilizing SQL to retrieve pertinent data for addressing specific statistical inquiries; and second, extracting the data and employing a visualization tool of my choice to elucidate the data distributions.

Through this undertaking, I aim to underscore the critical importance of truly comprehending our customer base and the significant impact that different statistical approaches can have on our insights.

#### **Tables Used:**

Customer ID	Number of transactions	Units	Revenue	Margin
101	1	2	38	20
102	1	3	33	18
103	1	5	45	26
104	1	3	24	11
105	1	3	42	22
106	1	2	40	22
107	1	5	55	31
108	1	5	60	33
109	1	3	54	25
110	1	3	45	21
111	1	5	60	30
112	1	2	28	13
113	1	5	90	44
114	1	5	70	29
115	1	4	36	21
116	1	4	32	14
117	1	5	80	45
118	1	5	90	42
119	1	3	60	34

#### **Questions:**

1. Find the mean number of transactions per customer, mean number of units per customer, mean revenue per customer, mean margin per customer and mean margin rate per customer.
2. Find the median for all of the above.
3. How could the business be impacted if they only use the mean when discussing their customers?

4. Calculate the average item value and average order value for each customer. Then find the mean and median of these.
5. Calculate how the average order value changes for customers by the number of transactions they have.
6. What percentage of the revenue do the top 10% of customers account for?
7. Show the distributions of transactions, units, revenue, margin and margin rate.
8. Make a comment on the distributions and what it means for your business.

**Answers :**

1. Mean\_transactions\_per\_customer : 2.05

Mean\_units\_per\_customer: 7.04

Mean\_revenue\_per\_customer : 99.08

Mean\_margin\_per\_customer: 49.24

Mean\_margin\_rate\_per\_customer: 50.23

2. Median\_transactions\_per\_customer: 2.50

Median\_units\_per\_customer: 8.60

Median\_revenue\_per\_customer: 130.30

Median\_margin\_per\_customer: 66.00

Median\_margin\_rate\_per\_customer: 50.80

3. Answer:

- A. Inaccurate Picture: The mean can be skewed by extreme values, giving a misleading average that doesn't represent most customers.
- B. Ignoring Differences: Customers are diverse, and relying only on the mean overlooks important differences between them, like how often they buy or how much they spend.
- C. Risky Decisions: Basing decisions solely on the mean can lead to mistakes because it doesn't consider the full range of customer behavior, making it harder to set prices or run effective marketing campaigns.
- D. Falling Behind: Competitors who analyze their data more thoroughly might spot trends or opportunities that you miss if we only focus on the mean.
- E. Missing Changes: We might not notice shifts in customer behavior or market trends if we're only looking at the average, which could leave us unprepared to adapt.

4. Mean\_item\_value: 13.95

Mean\_order\_value: 47.70

5. Transaction wise Average Item Value and Average Order Value:

	number_of_transactions	avg_item_value	avg_order_value
0	1	13.562044	47.641026
1	2	13.428571	45.575758
2	3	14.390244	49.166667
3	4	14.872727	51.125000

6. Answer : 7.67

7.

Distribution of Transactions:

A. Total Count : 100

Distribution of Units:

A. Total Units : 704

B. Minimum Value: 2

C. Maximum Values: 20

D. Average Value: 7.040

Distribution of Revenue:

A. Total Revenue: 9908.00

B. Minimum Revenue: 16.00

C. Maximum Revenue: 380.00

D. Average Revenue: 99.08

Distribution of Margin:

A. Total\_margin: 4924.00

B. Average\_margin: 49.24

C. Min\_margin: 9.00

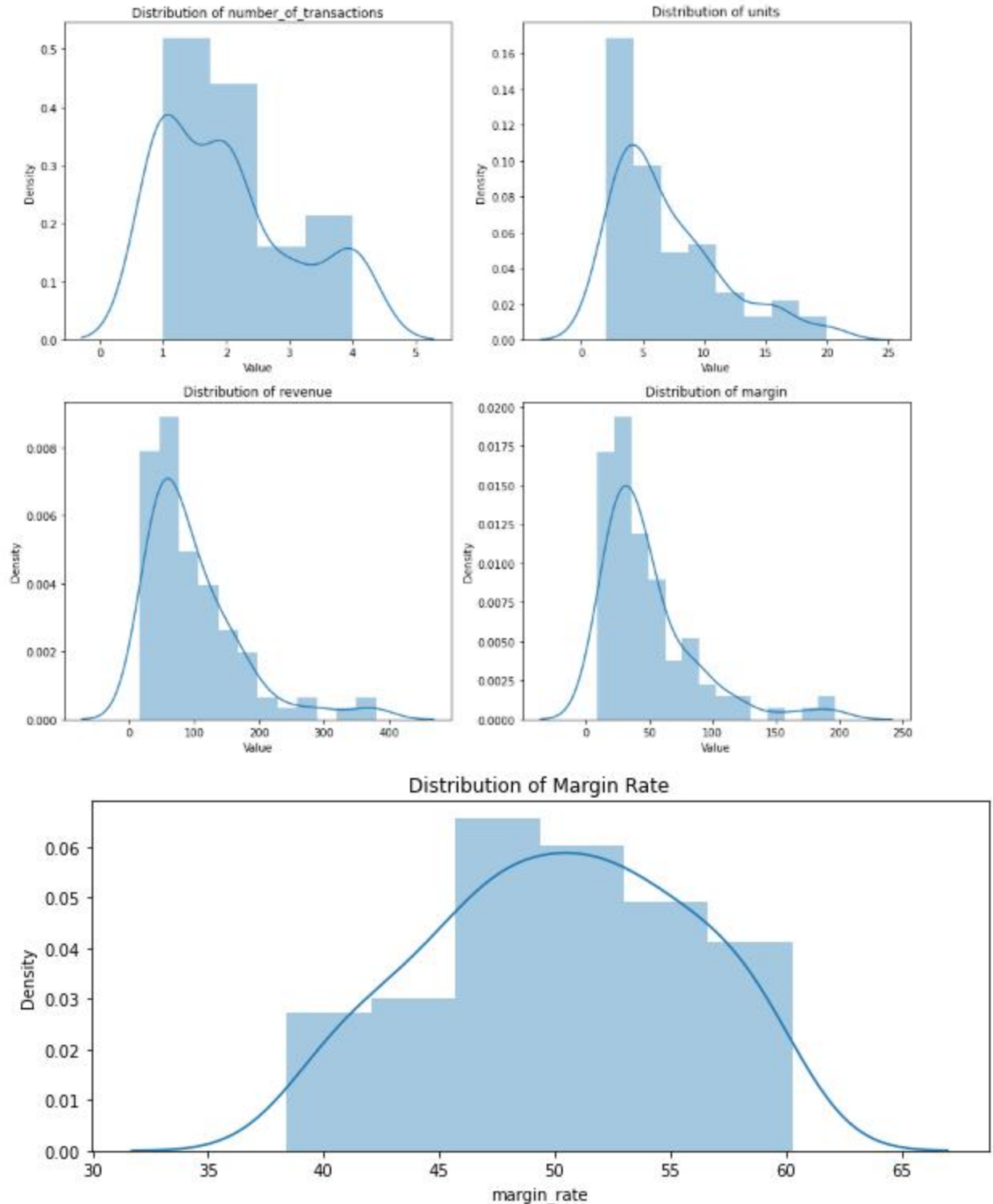
D. Max\_margin: 197.00

Distribution of Margin rate:

A. Average Margin Rate: 50.23

	number_of_transactions	units	revenue	margin	margin_rate
count	100.000000	100.000000	100.000000	100.000000	100.000000
mean	2.050000	7.040000	99.080000	49.240000	50.234853
std	1.076611	4.467435	74.352108	37.438467	5.611453
min	1.000000	2.000000	16.000000	9.000000	38.392857
25%	1.000000	4.000000	48.000000	25.000000	46.395503
50%	2.000000	6.000000	72.000000	36.500000	50.223214
75%	3.000000	9.250000	122.500000	57.000000	55.000000
max	4.000000	20.000000	380.000000	197.000000	60.294118

Graphical Representation:



8. Analyzing the distributions of transactions, units, revenue, margin, and margin rate can provide valuable insights into various aspects of your business. Here are some comments on each distribution and what it means for your business:

1. Transactions Distribution: The total number of transactions indicates the overall activity level of your business. A higher number of transactions suggests greater customer engagement and potentially higher revenue generation.
2. Units Distribution: Understanding the distribution of units sold helps assess product demand and popularity. A wide range of units sold may indicate variability in product preferences among customers.
3. Revenue Distribution: Examining the distribution of revenue provides insights into the revenue-generating potential of different customer segments or product categories. It helps identify high-value customers and areas for revenue growth.
4. Margin Distribution: Analyzing the distribution of margins helps assess the profitability of individual transactions or customer segments. It highlights areas where margins are high or low, indicating where optimization efforts may be needed.
5. Margin Rate Distribution: The distribution of margin rates reveals the profitability of sales relative to revenue. A higher average margin rate indicates better cost management and pricing strategies, contributing to overall profitability.

**Key findings from our analysis include:**

- ❖ The mean and median values of transactions, units, revenue, margin, and margin rate per customer provide a comprehensive overview of customer behavior and profitability.
- ❖ Utilizing only the mean when discussing customers can lead to inaccurate portrayals, overlooking important differences among customers and potentially resulting in risky decisions.
- ❖ Examining the average item value and order value sheds light on purchasing patterns and revenue generation per transaction.
- ❖ The percentage of revenue attributed to the top 10% of customers highlights the concentration of revenue among a select group.
- ❖ Analysis of distributions for transactions, units, revenue, margin, and margin rate uncovers valuable insights into business activity, product demand, revenue generation, profitability, and cost management.

**Conclusion:**

In conclusion, understanding our customer base through comprehensive data analysis is crucial for informed decision-making and strategic planning. By leveraging SQL and visualization tools, we've gained valuable insights into customer behavior, profitability, and revenue generation. Moving forward, continued analysis and adaptation will be essential for optimizing business processes and driving sustainable growth.