PROJECT INSIGHTS

Customer Purchase Behavior

Observation:
Transaction amounts are heavily right-skewed.

Insight:
Most customers spend small amounts while very few customers spend very large amounts.

Business Meaning:
This is typical **e-commerce behavior** →
80% revenue comes from ~20% customers (High Value Customers)

Decision:

- Create VIP loyalty program
- Target big spenders with premium offers

Payment Success Rate (Bernoulli Distribution)

Observation:
We calculated probability of successful transactions.

Insight:
Platform reliability can be measured using success probability.

Business Meaning:

- High success → good payment gateway
- Low success → customers abandoning checkout

Decision:
Improve payment gateway if success < 95%

Weekly Purchase Pattern (Binomial Distribution)

Observation:
Number of weekly purchases follows binomial behavior.

Insight:
Customers have fixed probability of buying per visit.

Business Meaning:
Purchasing is **habit-based**, not random.

Decision:
Send weekly reminder notifications & coupons

Daily Order Arrival (Poisson Distribution)

Observation:
Orders per day follow Poisson distribution.

Insight:
Orders occur randomly but at predictable average rate.

Business Meaning:
Company can predict server load & delivery demand.

Decision:

- Schedule staff shifts
- Plan inventory automatically

Spending Pattern (Log-Normal Distribution)

Observation:
Transaction amount best fits Log-Normal distribution.

Insight:
Prices cannot be negative and grow multiplicatively.

Business Meaning:
Customers increase spending gradually over time.

Decision:
Upsell strategy works (recommend related products)

Power Law Behaviour (Whales Customers)

Observation:
Few customers generate huge revenue.

Insight:
High spenders dominate business profit.

Business Meaning:
Losing 1 VIP customer = losing 100 normal customers

Decision:
Create retention program for premium users

Normality Test (Q-Q Plot)

Observation:
Points do NOT form straight line.

Insight:
Transaction data is NOT normally distributed.

Business Meaning:
Mean value is misleading — median is better metric.

Decision:
Use median revenue KPI instead of average revenue

Box-Cox Transformation

Observation:
After transformation data became closer to normal.

Insight:
Skewed financial data needs transformation before ML models.

Business Meaning:
Improves prediction models accuracy

Decision:
Always transform monetary features before AI models

High Value Purchase Probability (Z-Score)

Observation:
Probability of transaction > ₹5000 is low.

Insight:
Large purchases are rare events.

Business Meaning:
Discounts on expensive items can significantly boost revenue.

Decision:
Provide EMI / offers on high-price products

PDF & CDF Interpretation

Observation:
CDF increases slowly then rapidly.

Insight:
Majority customers fall in low price range.

Business Meaning:
Affordable products drive volume sales.

Decision:
Focus marketing on mid-range pricing products

FINAL BUSINESS CONCLUSION

The dataset shows typical e-commerce behavior where transaction amounts follow a log-normal and power-law pattern. A small percentage of customers contribute majority of revenue, while most customers make low-value purchases. Orders arrive randomly but at a stable rate, and purchase decisions follow probabilistic patterns. Therefore, the company should focus on high-value customer retention, mid-range product promotion, and payment success optimization to maximize revenue.