

BUSINESS PERFORMANCE REPORT



INTRODUCTION

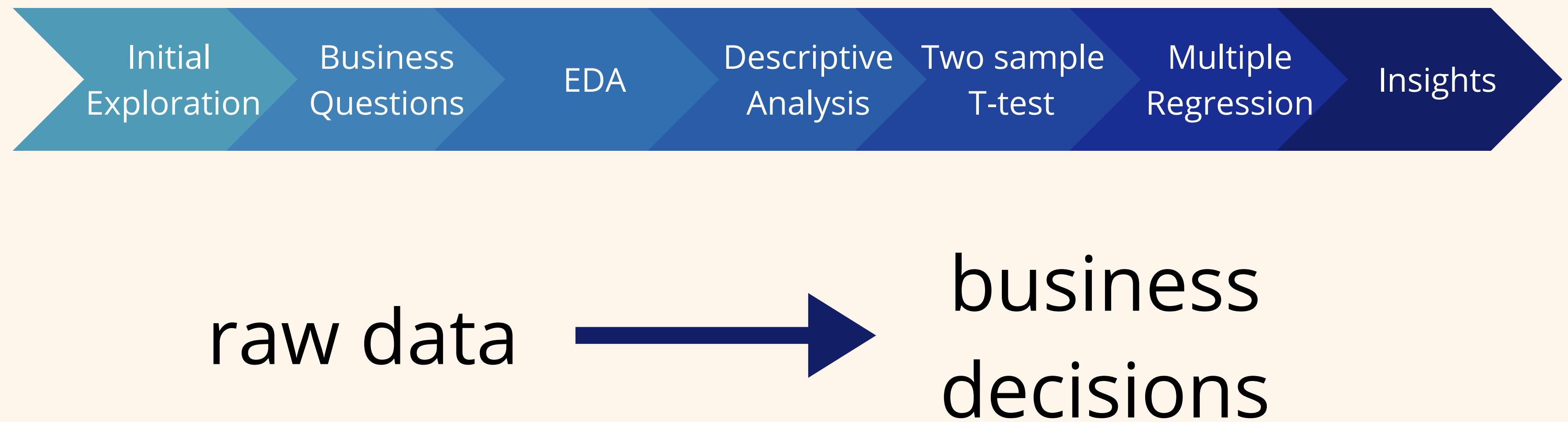
Overview

- **LuminaTech Lighting** is an Australian company specializing in lighting solutions, offering a diverse product range to customers across different regions and market segments

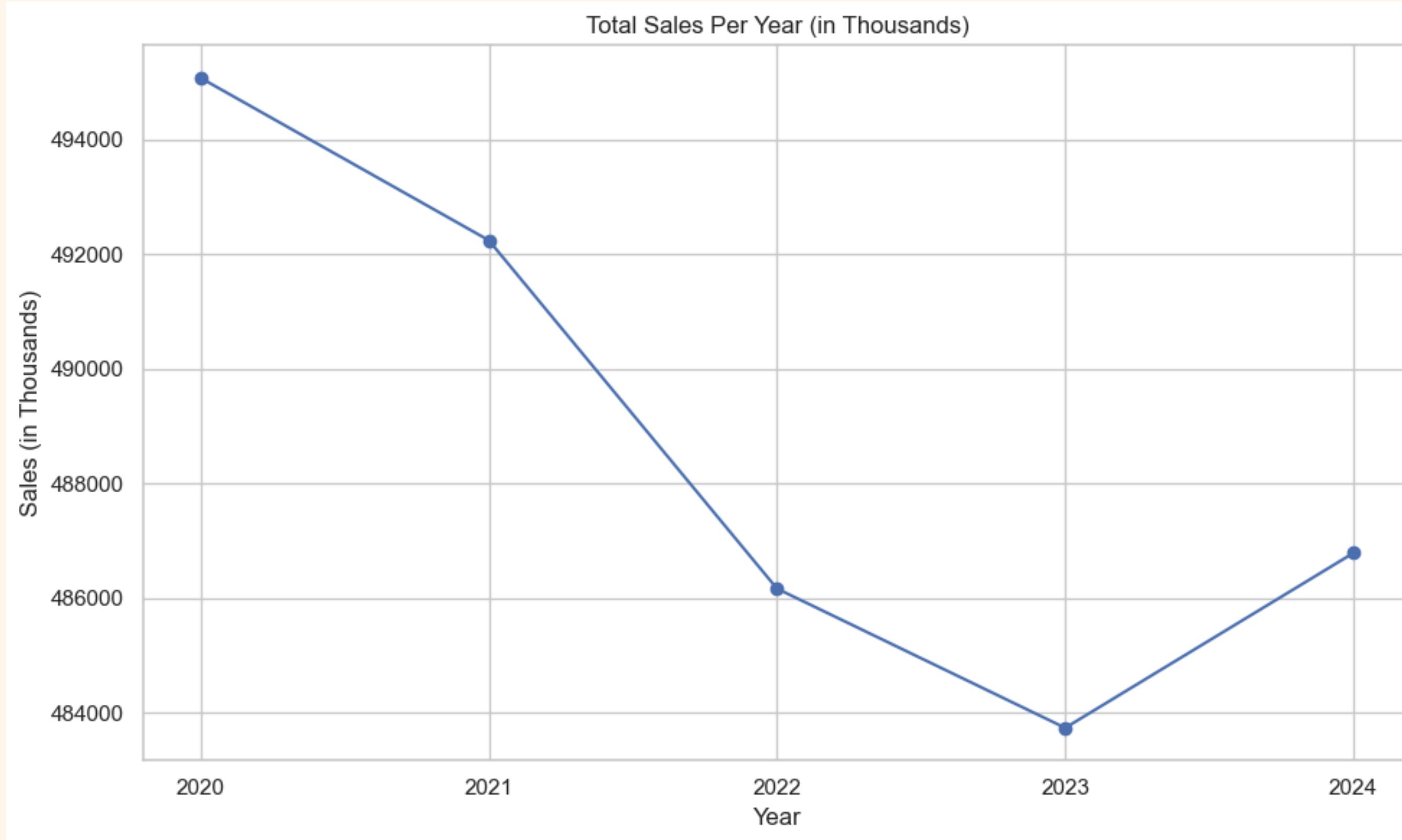
Objective

- Identify the key drivers of sales and cost across **customer types, regions, and product lines**
- **Develop data-backed recommendations** to improve growth and operational efficiency

PROJECT PROCESS

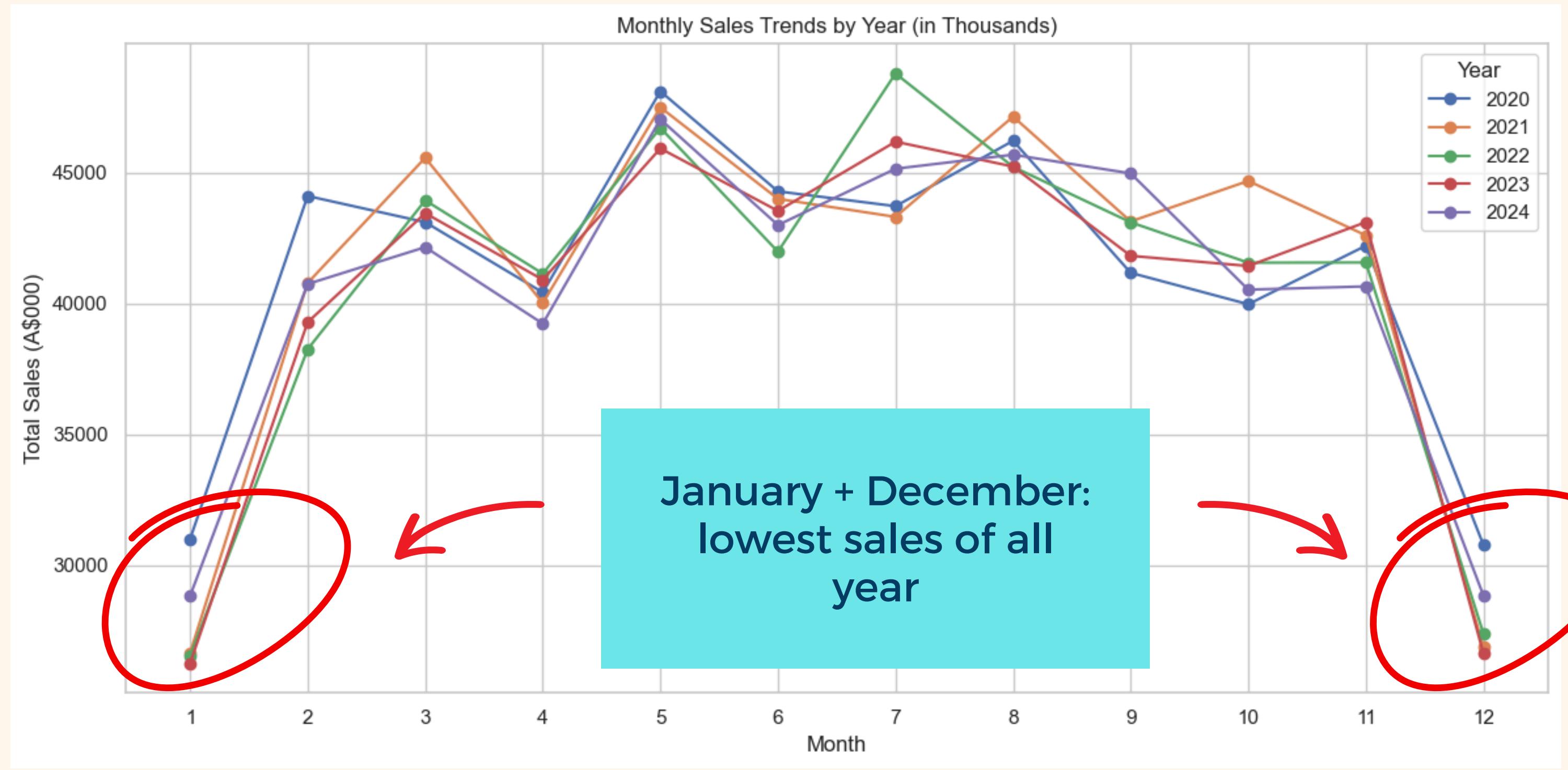


SETTING THE SCENES

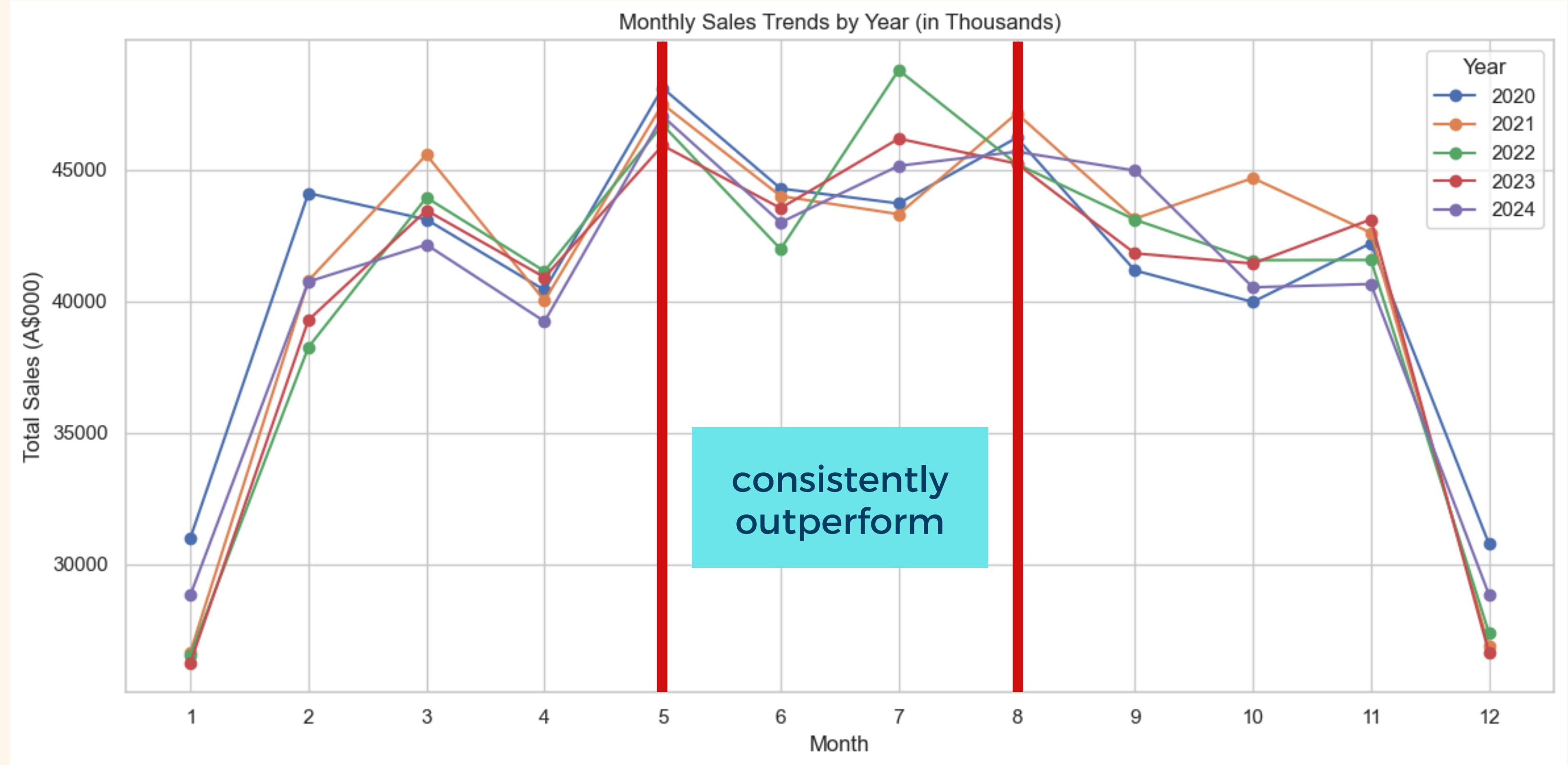


- Annual sales:**
- 2020-2023:
--> Declined continuously
 - 2023-2024:
--> Minor recovery

A ZOOM IN SALES BY MONTH PER YEAR



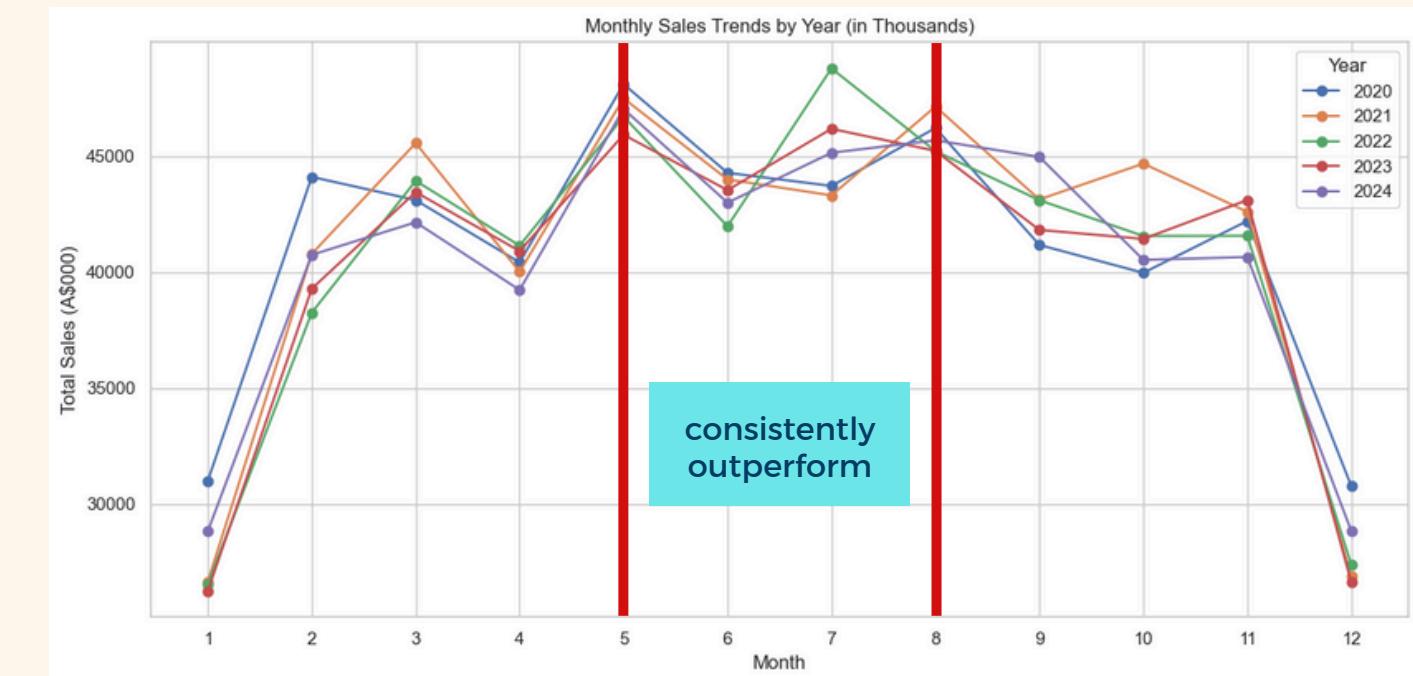
A ZOOM IN SALES BY MONTH PER YEAR



A ZOOM IN SALES BY MONTH PER YEAR

! Seasonal pattern:

- Capitalize on Peak Season (May-Aug)
 - Focus major campaigns, product launches, and promotions
- Boost off-peak season Performance (Jan-Feb and Nov-Dec)
 - Special New Year and re-engagement offers, early-access discounts
 - End-of-year clearance campaigns to reduce excess stock.
- Allocate inventory, logistics, and staffing effectively and efficiently



GEOGRAPHY MATTERS

WHERE WE WIN, AND WHERE WE COULD WIN MORE



“ — **BIG CITY = BIG OPPORTUNITY** — ”

GEOGRAPHY MATTERS

WHERE WE WIN, AND WHERE WE COULD WIN MORE

SUMMARY OF SALES PER TRANSACTION TEST	
GROUP	AVG. LOG
SYDNEY + MELBOURNE	5.42
OTHER CITIES	5.61

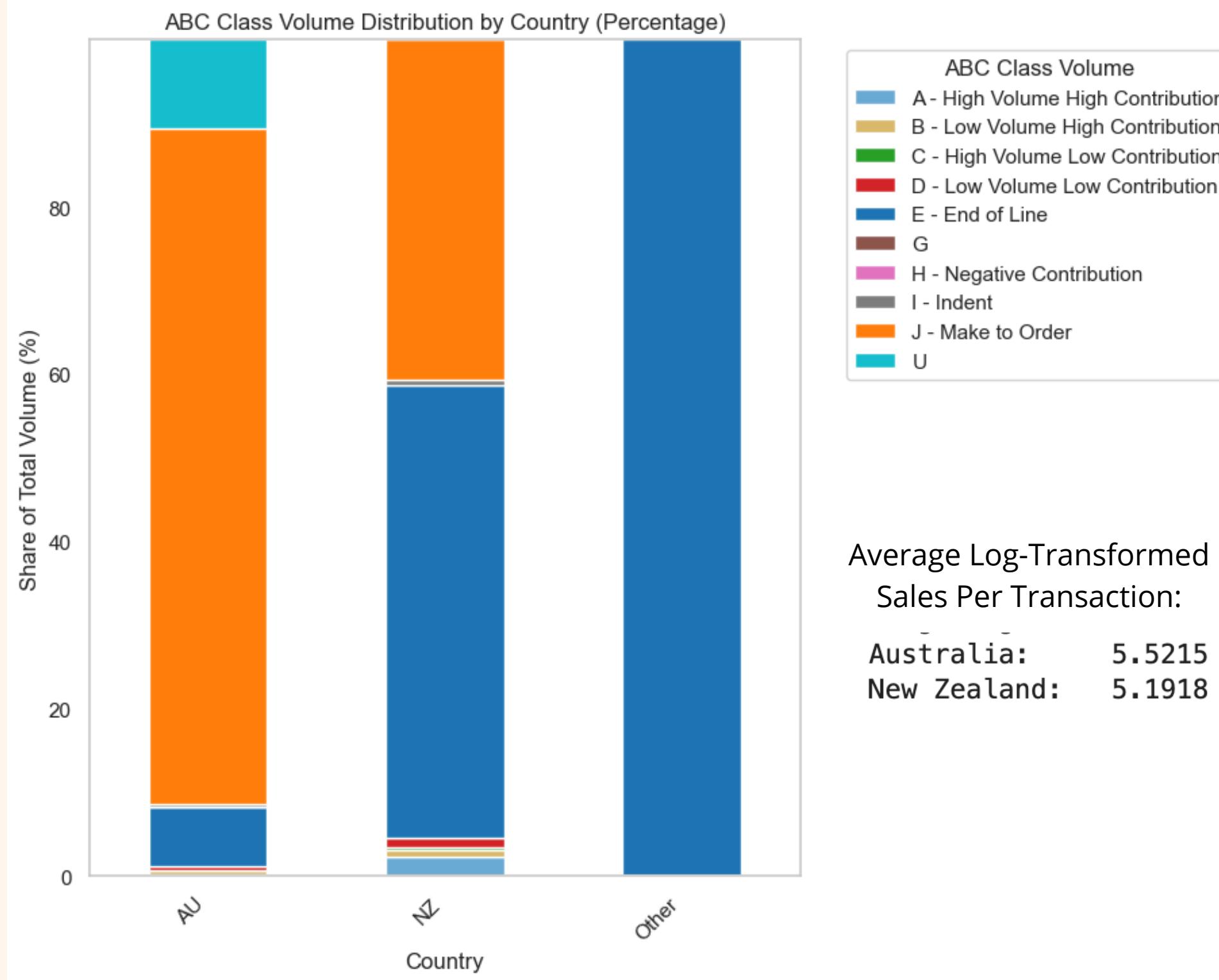
There is a significant difference in average sales per transaction between Sydney/Melbourne and other cities.

Sydney & Melbourne combined have lower average sales per transaction

→ Sydney/Melbourne have higher transaction frequency but smaller order sizes

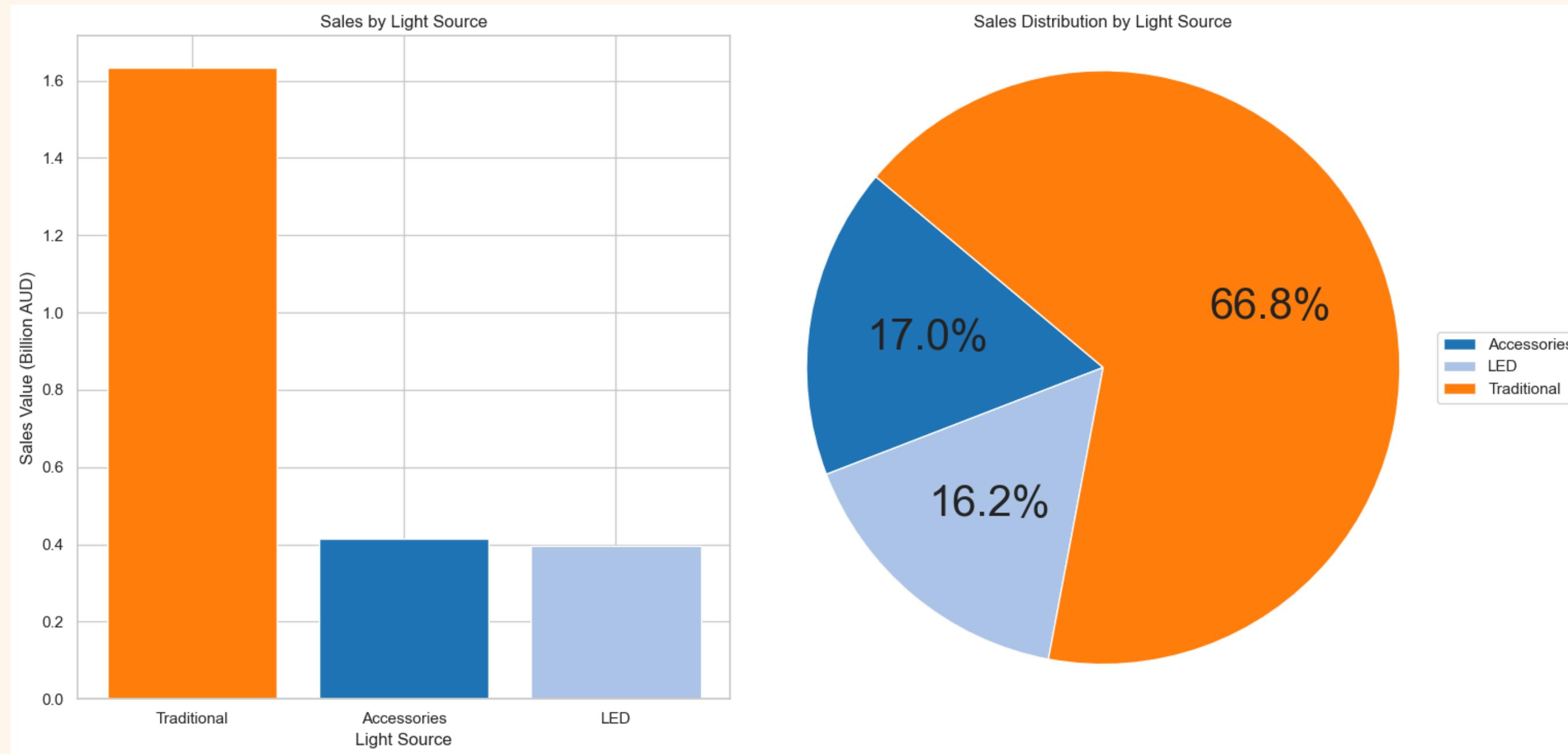
→ Boost basket size through bundling, upselling, or product mix strategies.

WHAT WE SELL SHAPES EVERYTHING



- Australia focuses on A class (high volume, high contribution) and J class (make to order) products
 - Support its higher transaction value
- NZ has a higher share of E-class (end of line - discounted items) and fewer high contribution class,
 - Lower average transaction value
 - Focus on reducing and promoting high-contribution items to improve NZ performance in sales per transaction.

WHAT WE SELL SHAPES EVERYTHING



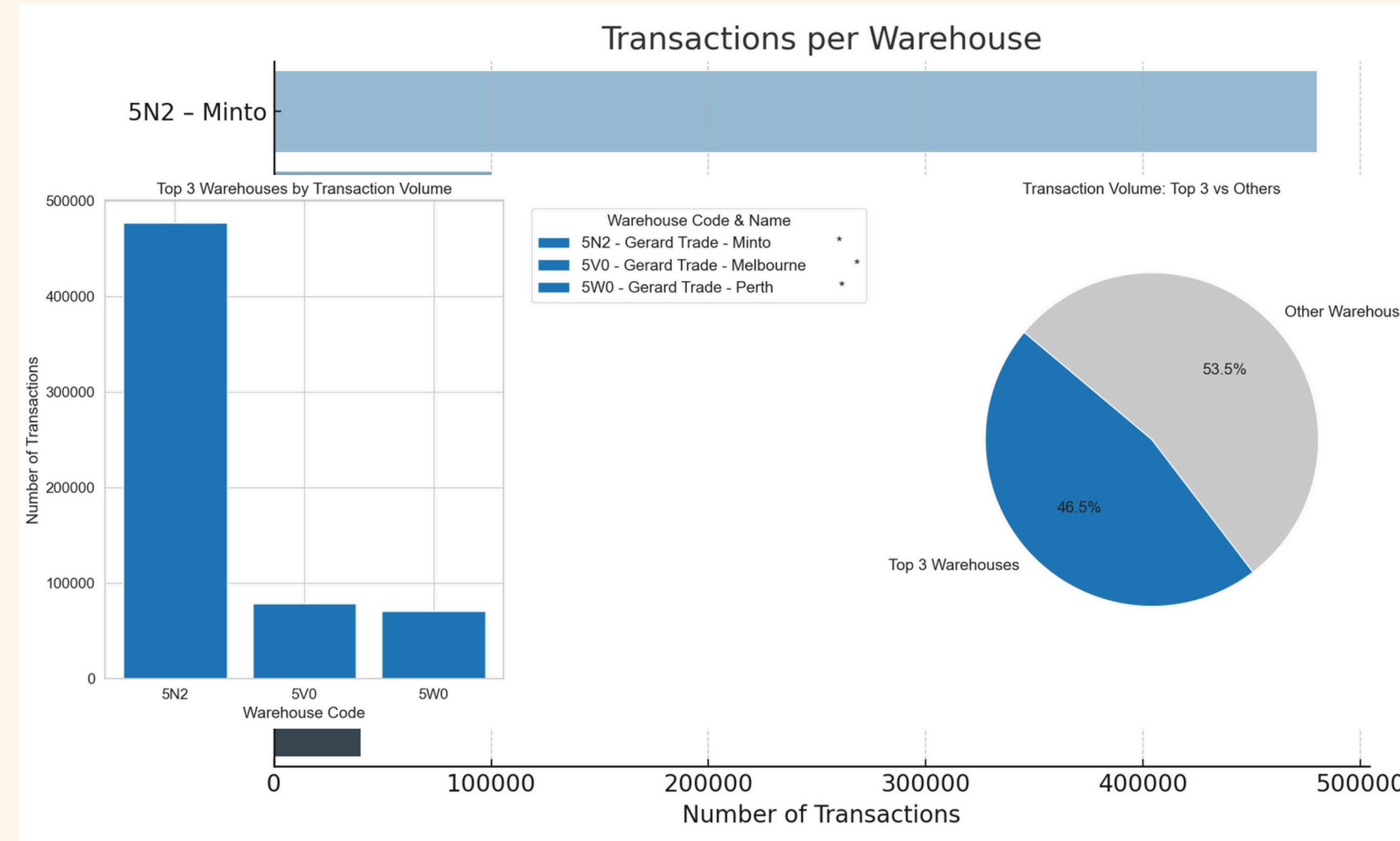
- **HIGHEST PORTION:** Traditional lighting (67% of total sales value)
- LED and Accessories: around 16%
→ opportunities beyond Traditional.

Optimizing product mix, including LED adoption and high contribution class could help improve situation in NZ and boost sales in AUS.

HYPOTHESIS TESTING & OPERATIONAL INSIGHTS:

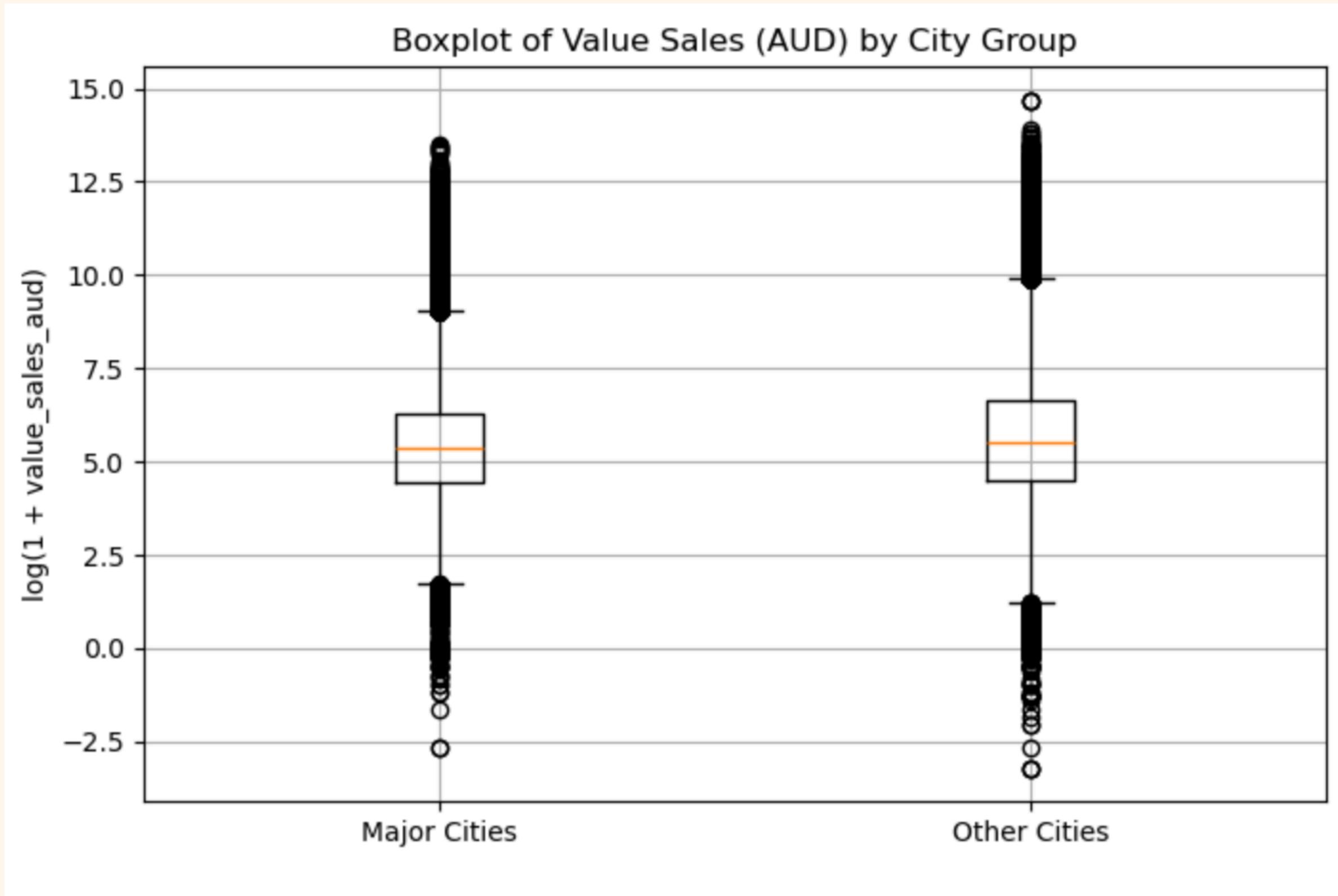
**Validating performance differences across
warehouses, cities, customer and bonus groups**

Warehouse Distribution & Operational Load



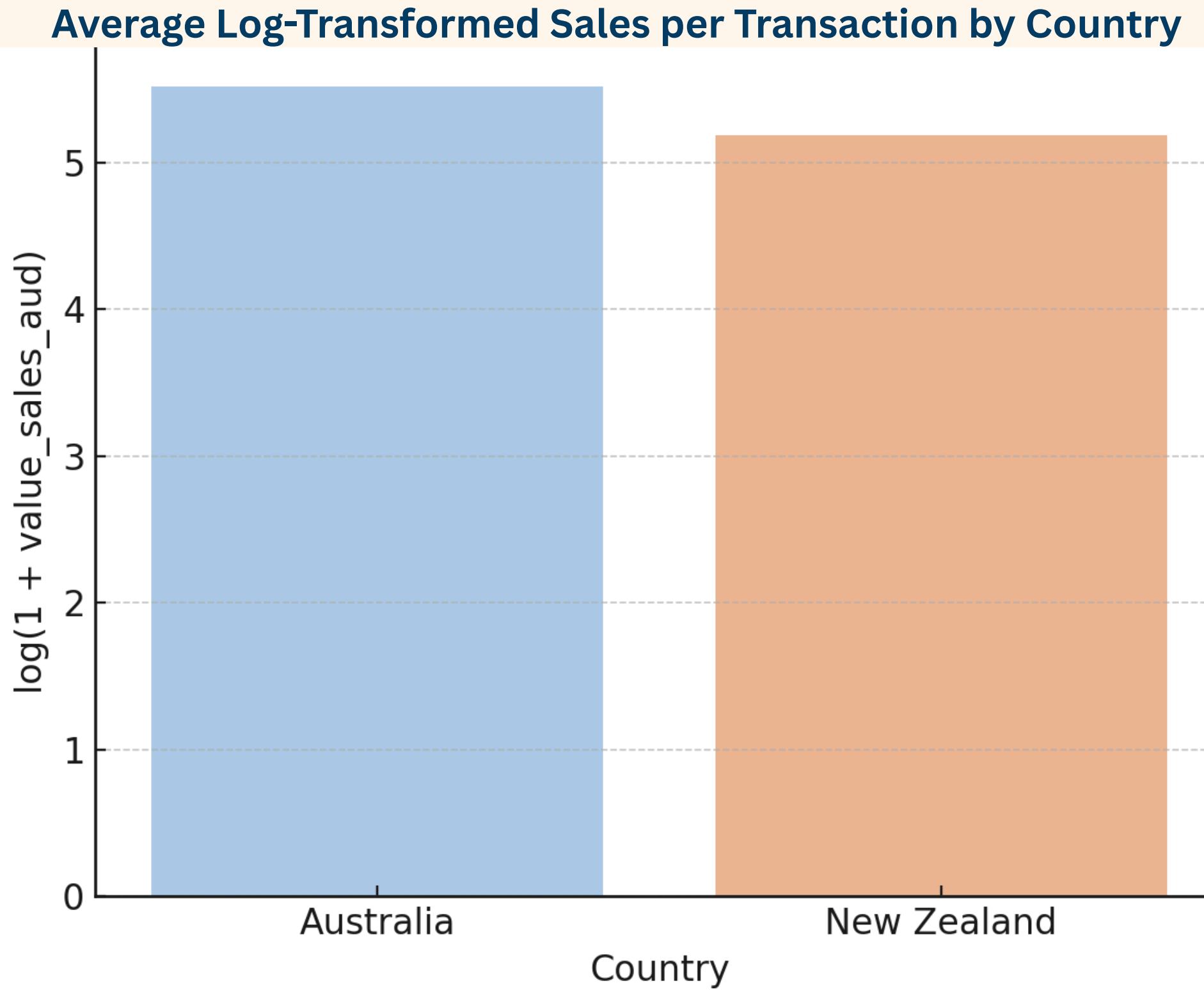
- Warehouse 5N2 – Minto handles nearly half a million transactions
- But the top 3 warehouses only account for 46.5% of total volume
- Remaining volume is fragmented across smaller locations

Urban Centers vs. Other Cities



- Two-sample t-test
→ p-value of 0.000
- There is a significant difference in average sales for urban centres versus other cities
- Other cities have higher average sales per transaction

Do Australian Orders Differ from New Zealand?



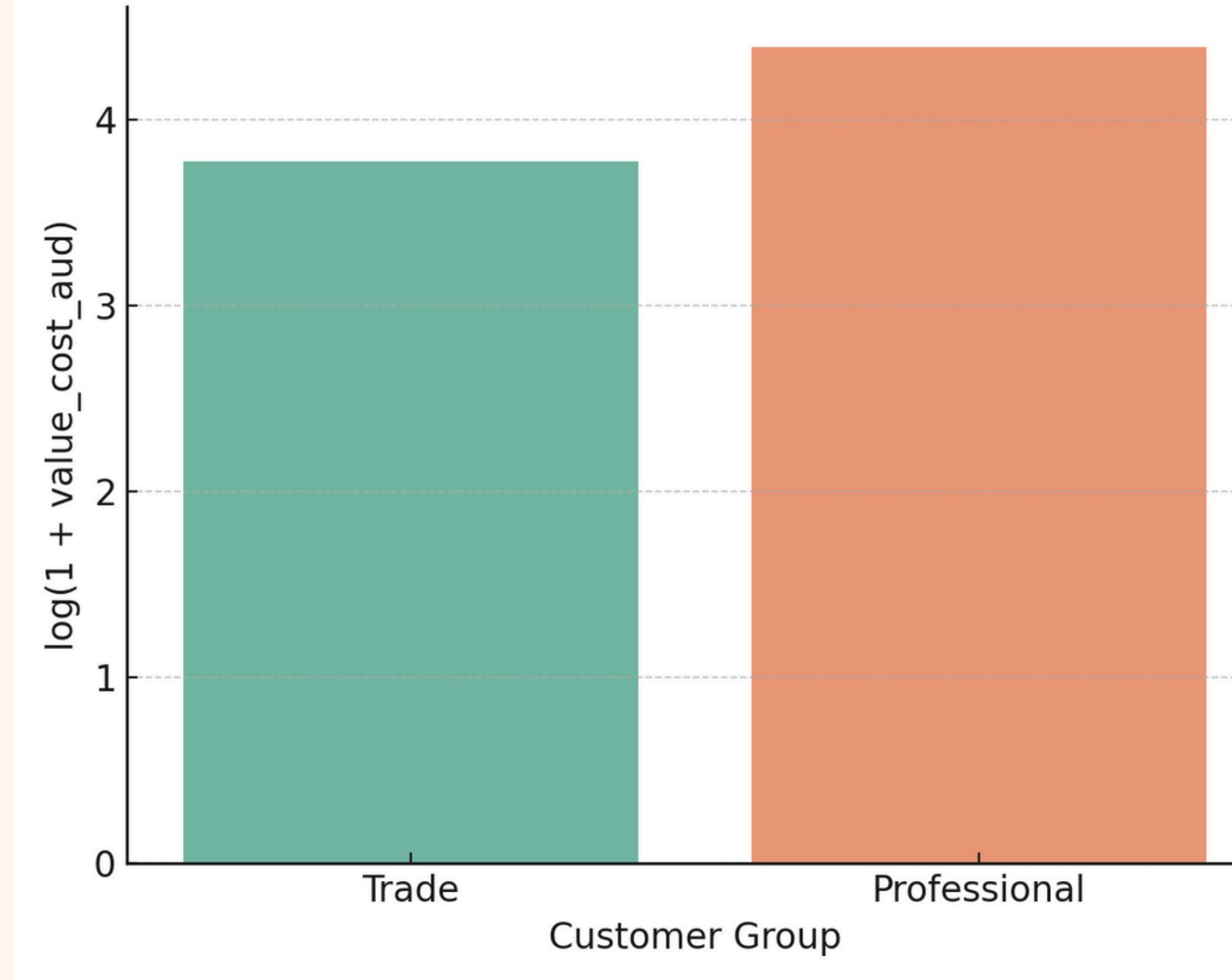
Average Log-Transformed Sales Per Transaction:
Australia: 5.5215
New Zealand: 5.1918

T-statistic: 64.5474489675805
P-value: 0.0

- Using the two-sample t-test we got a p-value of 0.000
- Australian orders or transactions are larger in value
- There is a significant difference between orders from Australia and New Zealand

Trade vs. Professional: Cost Comparison

Average Log-Transformed Transaction Cost by Customer Group



Average Log-Transformed Transaction Cost:

Trade: 3.7737

Professional: 4.3885

T-statistic: -141.84671011027706

P-value: 0.0

- Two-sample t-test
---> p-value = 0.000
- Professional bonus groups are more costly

Cost + Volume = Fulfillment Pressure

- Reinforces the idea: low-value, high-volume orders = operational bottleneck
- >> Warehouse design and customer segmentation strategies should be aligned.

MULTIPLE REGRESSION

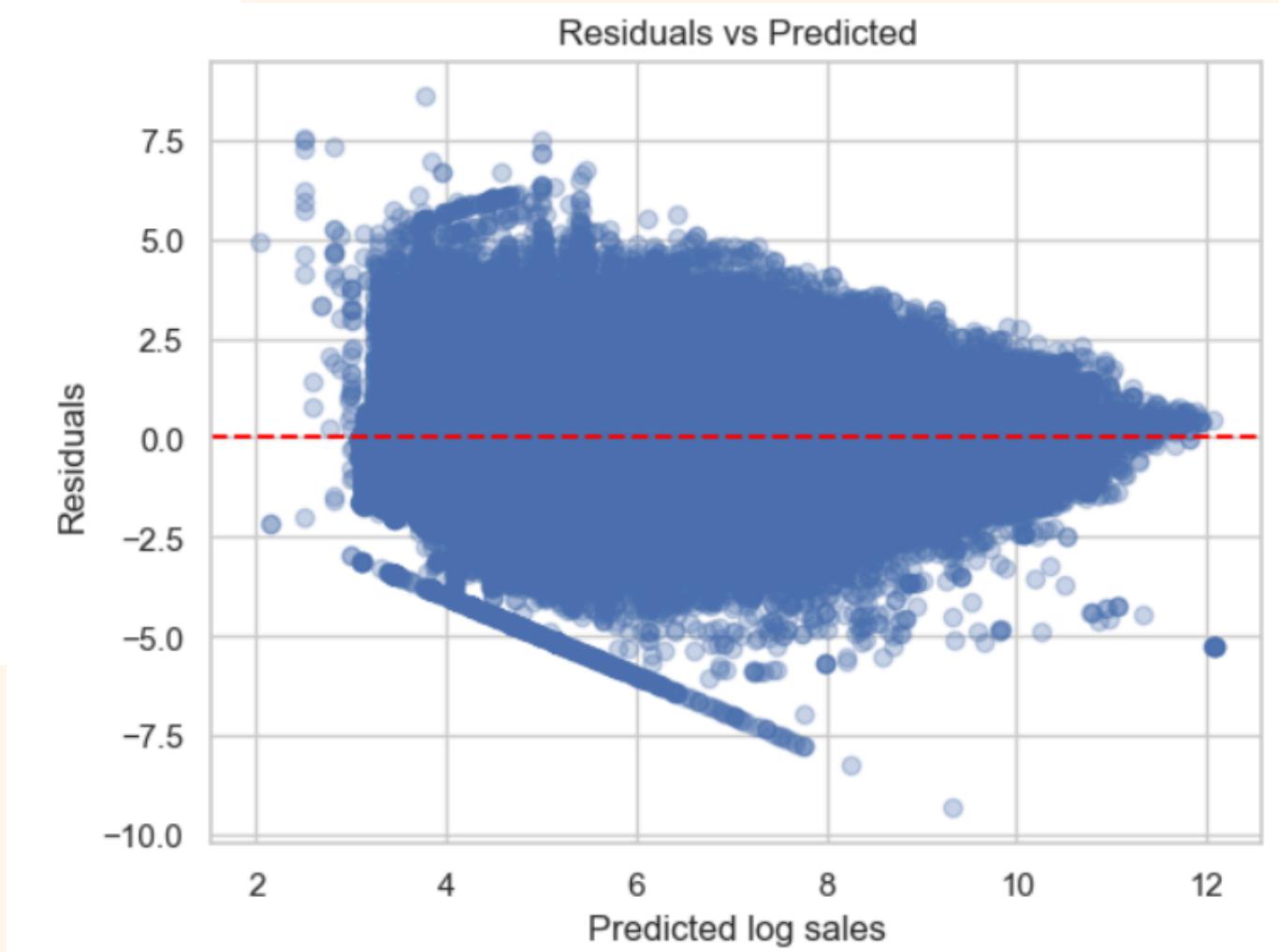
Uncover What Drives Performance

LET THE MODELS SPEAK WHAT DRIVES SALES?

OLS Regression Results			
Dep. Variable:	y	R-squared:	0.601
Model:	OLS	Adj. R-squared:	0.601
Method:	Least Squares	F-statistic:	6.670e+04
Date:	Thu, 29 May 2025	Prob (F-statistic):	0.00
Time:	21:57:40	Log-Likelihood:	-2.3845e+06
No. Observations:	1769701	AIC:	4.769e+06
Df Residuals:	1769660	BIC:	4.770e+06
Df Model:	40		
Covariance Type:	nonrobust		

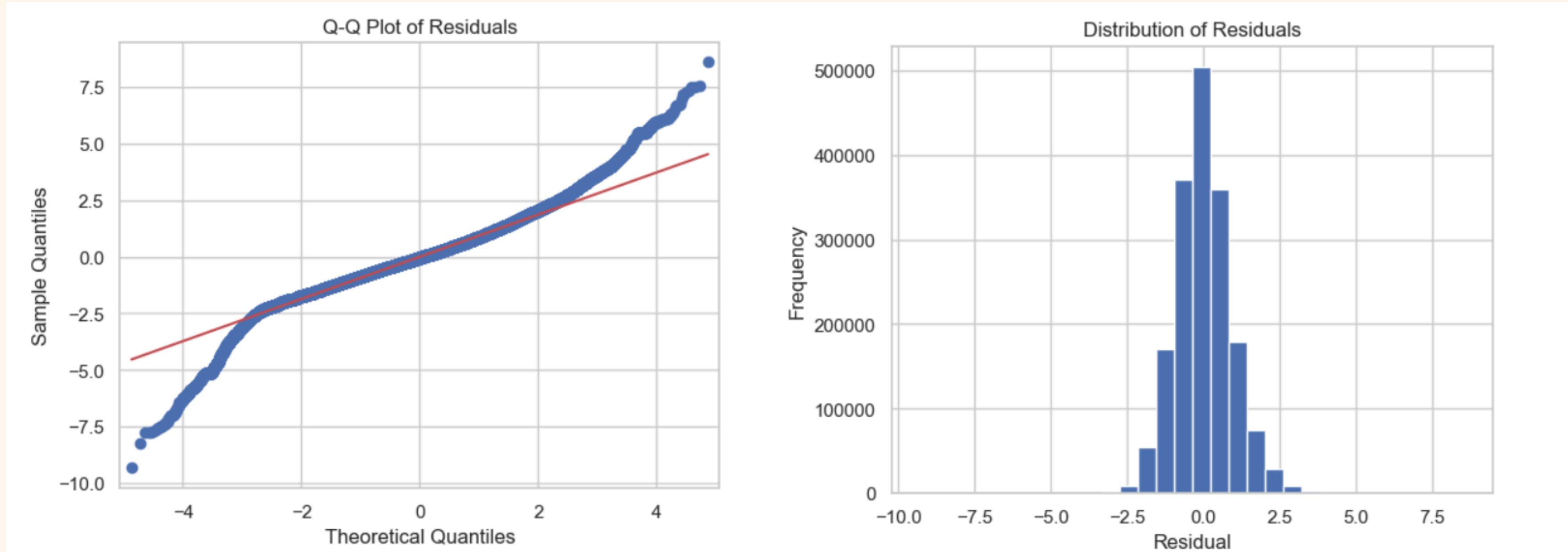
Sales Model

- **Adjusted R² = 0.601 → strong explanatory power**
- Top drivers: Item type, business area, month, bonus group
- Confirms: Customer type and item mix matter more than seasonality or region



- Residuals are mostly well spread
- Possible linear pattern at lower end → model less accurate for small sales
- Suggests heteroscedasticity or hidden structure → worth further checking

LET THE MODELS SPEAK WHAT DRIVES SALES?



We also checked the normality of residuals, which is a key assumption in linear regression.

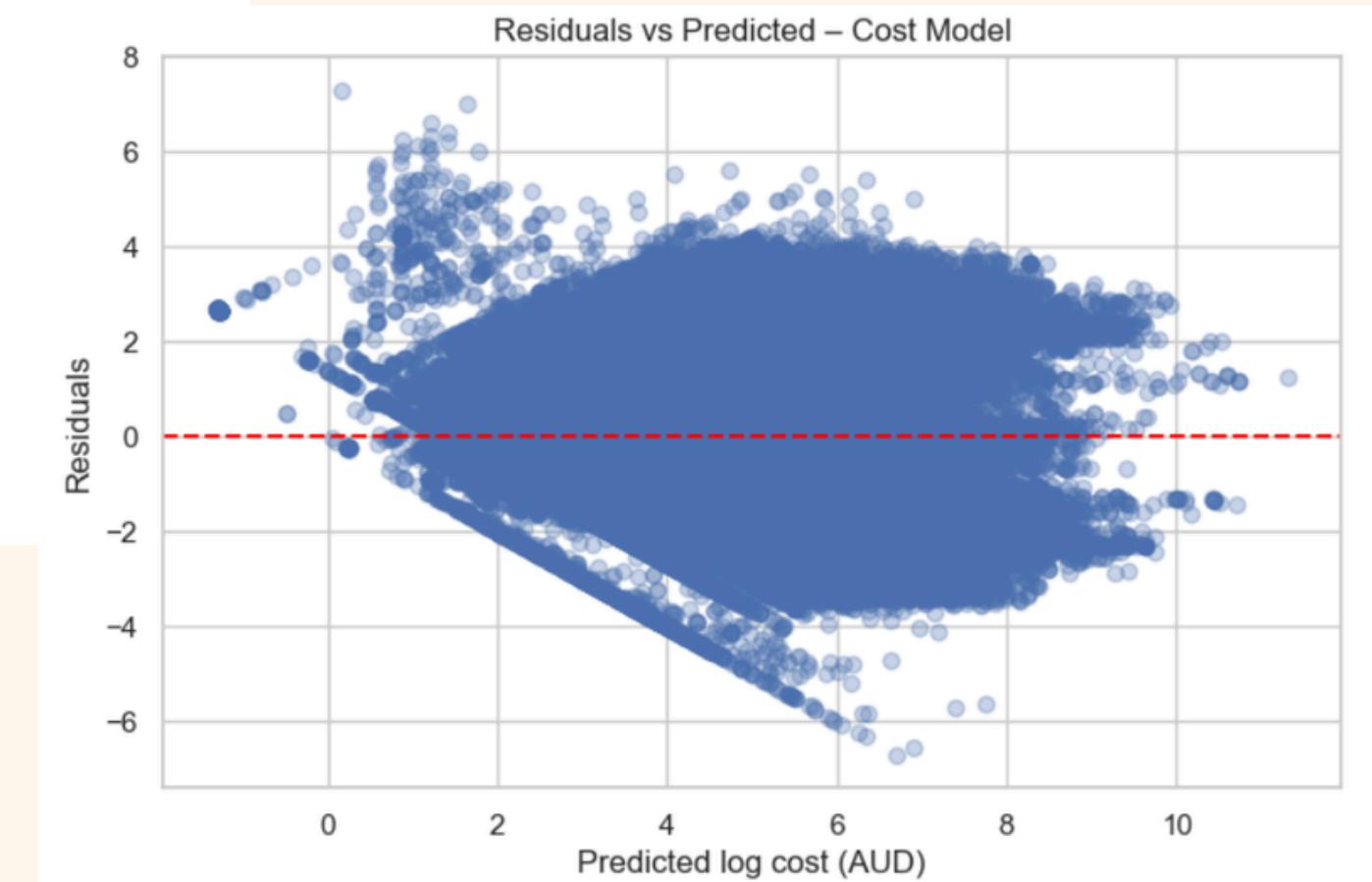
- Q-Q plot: most points follow the line → residuals are close to normal.
- Histogram: bell-shaped curve centered at zero.
- Confirms the model meets key assumptions.

LET THE MODELS SPEAK WHAT DRIVES SALES?

OLS Regression Results		
Dep. Variable:	y	R-squared:
Model:	OLS	Adj. R-squared:
Method:	Least Squares	F-statistic:
Date:	Thu, 29 May 2025	Prob (F-statistic):
Time:	22:16:00	Log-Likelihood:
No. Observations:	1702692	AIC:
Df Residuals:	1702651	BIC:
Df Model:	40	
Covariance Type:	nonrobust	

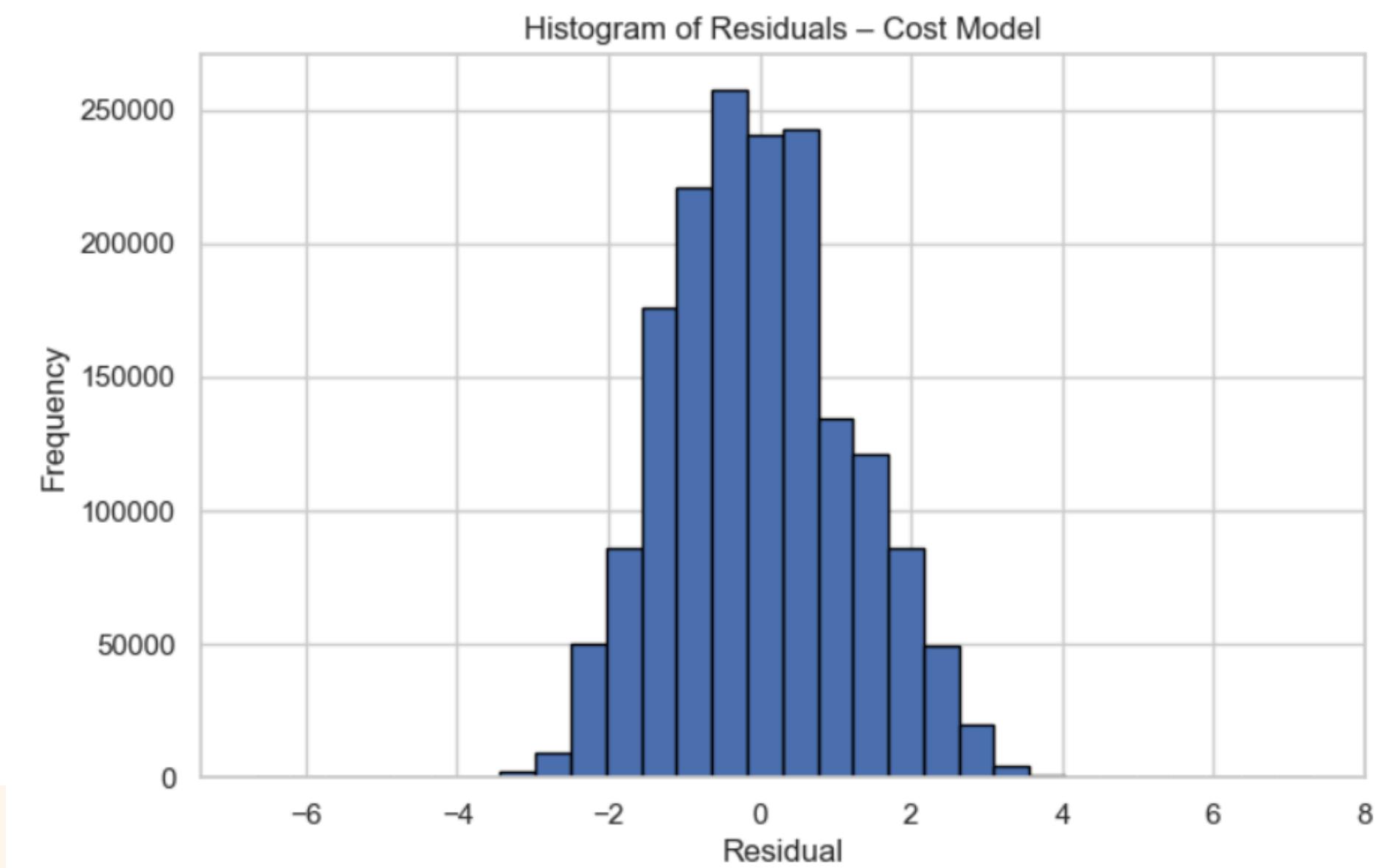
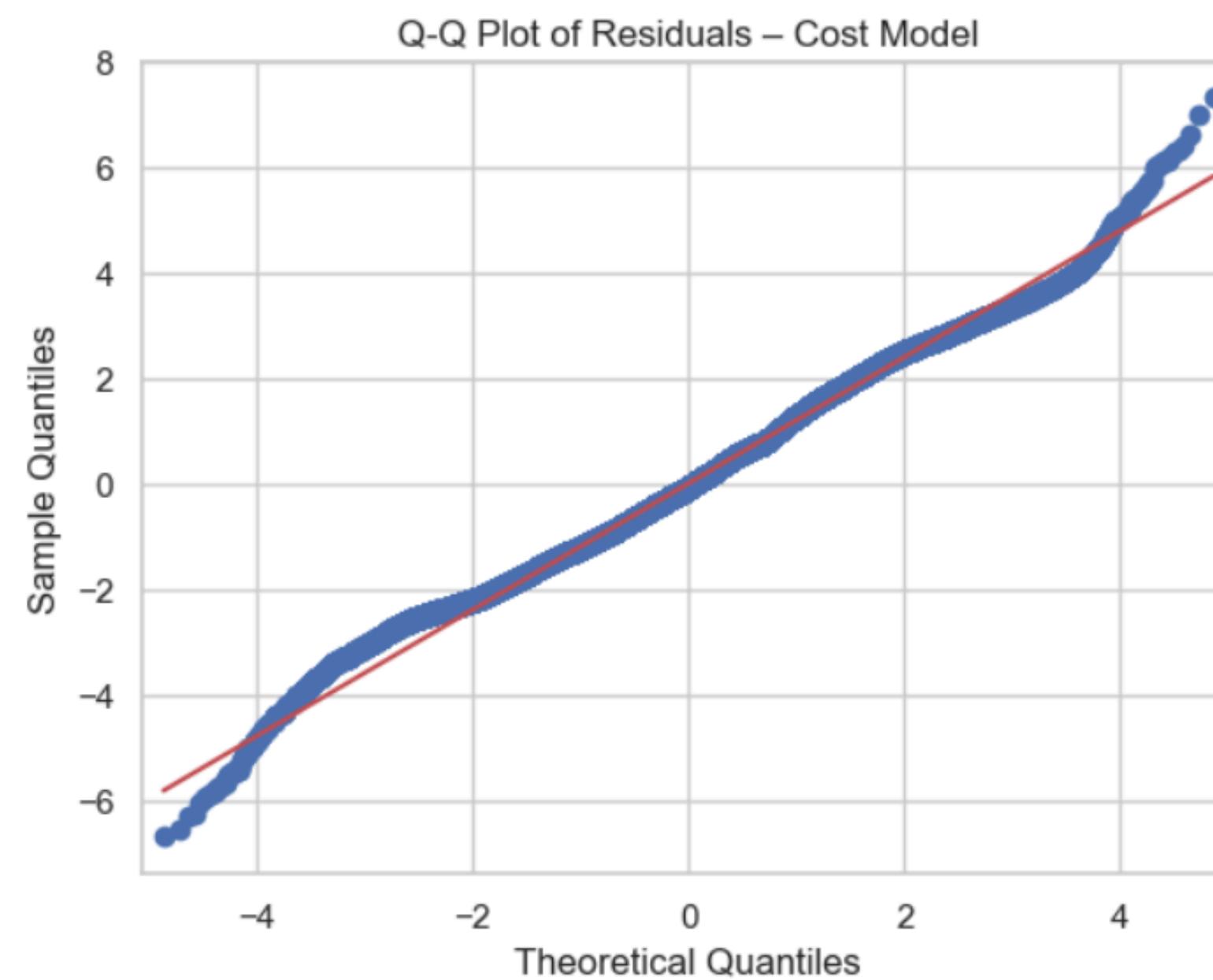
Cost Model

- **Adjusted R² = 0.433 → moderate fit**
- Top factors: Business area, item type, trade group
- Trade group → strongest influence on cost
- Model assumptions hold (normality, homoscedasticity) → results are reliable



- Residuals spread well, but show a downward linear trend at low predicted cost
- This means the model may underestimate small-cost cases
- Suggests mild non-linearity or outliers → worth deeper look

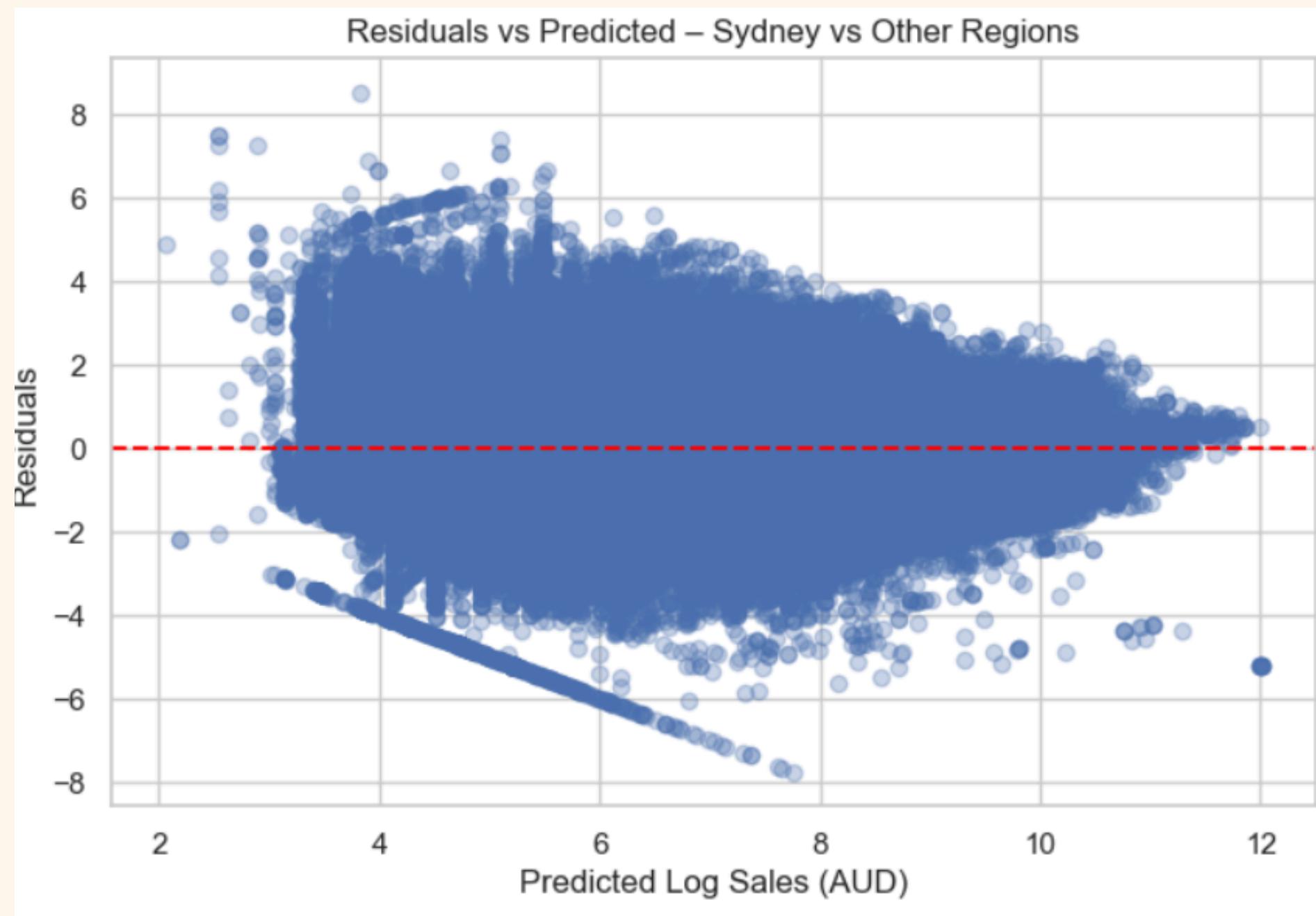
LET THE MODELS SPEAK WHAT DRIVES SALES?



- Q-Q plot: residuals mostly follow a straight line → normal
- Histogram: symmetric distribution around 0
- Confirms model meets linear regression assumptions

LET THE MODELS SPEAK WHAT DRIVES SALES?

WHY IS SYDNEY SO POWERFUL IN TOTAL REVENUE, BUT WEAK IN TRANSACTION VALUE?

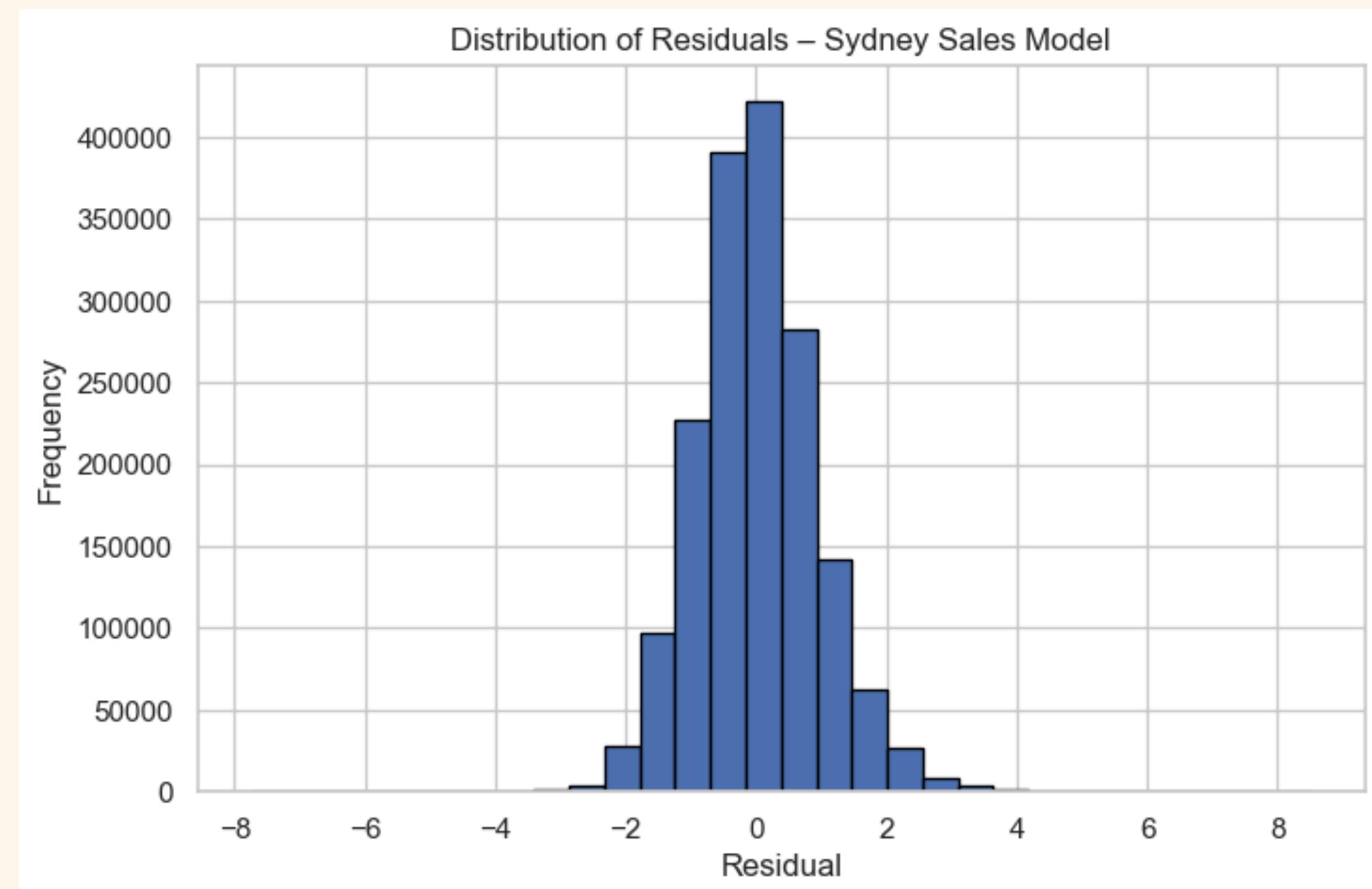


- Model struggles more with small sales values
- The “triangle shape” shows less accuracy at low sales
→ Likely from Sydney's small transactions
- Diagonal gap suggests the model may miss unique traits in Sydney: bundle size, customer type, or purchase style

LET THE MODELS SPEAK WHAT DRIVES SALES?

WHY IS SYDNEY SO POWERFUL IN TOTAL REVENUE, BUT WEAK IN TRANSACTION VALUE?

- The shape is mostly symmetric and centered around zero.
→ The model is not consistently biased Sydney's sales too often.
 - The assumption of normality is reasonably met → one of the requirements for trusting our regression results.
- > Most prediction errors are small and balanced, meaning the model is generally accurate and trustworthy.



SUMMARY

- **Sydney has high revenue sales but low average transaction size.**
- **Significant differences in sales between Australia and New Zealand**
- **Professional bonus group has high costs**

RECOMMENDATIONS

- **Launch bundle deals or upselling promotions in Sydney**
 - Leverage Sydney's high revenue sales to boost average transaction size
- **Tailor regional marketing and pricing strategies**
 - Aligning performance differences across countries, and cities to boost average value per sale.
- **Optimize cost management for the Professional bonus group**
 - Assess if operational refinement is needed